



First African Bicycle Information Organisation

FABIO

END OF PROJECT REPORT

2022 / 2023





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Acronyms/ Abbreviations

FABIO- First African Bicycle Information Organisation.

EURIST- European Institute for sustainable Transport

SHG- Self Help Group.

E-bike -Electric bicycle.

GHG- Green House Gass

Co2 -Carbondioxide



1.0 Introduction

As the globe suffers, the effects of climatic changes by increased human emissions of heat-trapping greenhouse gases are already having widespread effects on the environment: glaciers and ice sheets are shrinking, river and lake ice is breaking up earlier, plant and animal geographic ranges are shifting, and plants and trees are blooming sooner.

Effects that scientists had long predicted would result from global climate change are now occurring, such as sea ice loss, accelerated sea level rise, and longer, more intense heat waves. Some changes (such as droughts, wildfires, and extreme rainfall) are happening faster than scientists previously assessed.

Transport is also highlighted as one of the biggest contributors to environmental degradation; Highway vehicles release about 1.4 billion tons of greenhouse gases (GHGs) into the atmosphere each year—mostly in the form of carbon dioxide (CO₂)—contributing to global climate change. Each gallon of gasoline you burn creates 20 pounds of GHG. That's roughly 5 to 9 tons of GHG each year for a typical vehicle.[1]

This has risen concern from environmental activists, governments, civil society organizations across the globe to seek the best strategies' mitigation measures.

The E-bike comes in to play to be part of the mitigation against the effects of climate change in Africa. It offers an environmental friendly system which involves using solar panels for charging after utilization. In addition, it also offers E-mobility solutions for addressing mobility challenges in Africa.

2.0 The E-bike project

In a bid to respond to the climate change challenges and transport question, FABIO in partnership with EURIST with support from KfW initiated a three years project dubbed Africrooze that uses E-Mobility. The project was introduced in Uganda in 2020 with testing of the technology. The project was modeled into two components: The social component and the business component. 80 bicycles were imported to Uganda and these were distributed in Jinja and Iganga under different projects: Bicycle Ambulance, Bicycle for Water, Bicycle delivery, Tourism E-bikes and E-Tax's.

These were locally managed under the service centers (equipped with solar panels) that were situated in the targeted districts whose role was to offer E-bike rental, maintenance and recharging services.



2.1 Major Project Objective

The main goal of the project was to develop a low cost, zero emission, and fast means of transport - to provide a mobility solution in both rural and urban Africa

2.2 Other Project objectives

The project, however, has more objectives from the different aspect of implementation and these include the following:

Economic Objectives

- Improving the income of boda boda riders who can save more money/spend less money by using an E-bike instead of motorcycles
- The adjusted models create new earning opportunities for small businesses, e.g. delivery
- Creating employment for new E-bike taxi riders, those who have not been working as boda riders.
- Creating employment in assembly and sales

Social Objectives

- Improving the living conditions of many people through the improved access to fundamental necessities such as health care, access to clean water and education
- Improving access to markets as well as providing a mobility solution for farmers to carry their produces
- As there is still a huge gender imbalance in access to mobility, women and women groups with E-bikes will benefit a lot and hence the Gender Issue will be one main focus
- The E-bikes provide health and fitness – especially for urban residents.

Ecological Objectives

- E-bikes, driven by green energy, are emission-free and contribute to climate protection
- The production of E-bikes uses little resources and needs little urban space
- Batteries will be recycled after use



2.3 Project activities

- **Pretesting the technology/prototype:** This involved assembling and pre-testing the first E-technology by the technicians and users. The prototype basically tested: the strength, durability and battery capacity to hold power. These helped to inform the final product of the project.
- **Baseline Study:** This was done to establish the status quo of our beneficiaries before actual implementation commenced. The exercise targeted 150 participants (65 Males and 85 Females) in the categories of : Boda boda riders (people who ride a bicycle to transport passengers from one place to another), VHT's who use a manual bicycle to support patients to access health centers, Motor bike, Motorists, Hotels who distribute food from one place another, Women who use a manual Bicycle to sell water to support their families, Medical practioners in the intended project scopes, among others. The number of women is high because they use the bicycle in groups of a bout 25 to 35 as in figure 15 and 16 Two data collection methods were deployed during the exercise : Interviews that were guided by a defined a questionnaire and Observation methods were deployed to generate data from the interviewees. These were examined in the areas of : **Biodata, Mobility, Bicycle usage, security of a bicycle, income per day, distance travelled per day, income spent on transport per day, distance travelled or walked on a daily basis. The feedback /response was used to form a basis for the initial stages of the project.**
- **Beneficiary identification:** This involved selecting and scrutinizing of the rightful projects beneficiaries under the different project components (Bicycle for Water, Bicycle Ambulance, Delivery Bikes, E-Taxis and Tourism). The process involved working with the data generated from the baseline, community leaders and other existing structures to come up with the final and rightful list of project beneficiaries.
- **Training of Beneficiaries :** This involved equipping 120 people with skills and knowledge in : Maintenance, Storage and Usage since majority of them were interacting with the E-technology for the first time. Please note that much as the training originally targeted 100 people, the actual exceeded due to the excitement of learning about the new technology.

Infrastructure development (Service center): This involved constructing a structure that would harbor the service Centre and a photovoltaic system was be set up at the FABIO office and In Iganga to offer rental, maintenance, battery replacement and recharging services. In additional, each Centre was assigned a lead technician whose role was to support the unit to operate.



figure 1 E-Bike charging center

- **Identifying and Training of local mechanics:** This involved equipping the identified local mechanics (26) with skills on E-Technology on the areas of: Assembling, repairs, trouble shooting, maintenance, brake adjustment and wheel alignment . Upon completion of the training, these were awarded certificates of completion of training.



- **Assembling and construction of the different E-Bike Models:** This activity involved constructing /putting together the bicycles for distribution.

Figure 2



FABIO Bicycle technician welding /fixing a part on the E-Bike during the assembling exercise

- **Launch/Project Rollout:** This involved officially unveiling the project to the public, stakeholders and beneficiaries and this was witnessed by about 300 people/ key stakeholders the National and international level: The second Deputy prime minister, the Germany Minister, the area Member of Parliament, the local government representatives, members of the media (Television, Print, Local Radios and U-tube) , Bicycle users, Business people, Cultural leaders, Civil Society Organizations , among others. The event gave publicity to the project and people embraced it in high gears.



Figure 3

The photograph above shows the Deputy Prime Minister of Uganda(with a mask), German Ambassador and other high level stakeholders flagging off the road testing during the Launch



Figure 4

The photograph below shos some of the E-Taxi beneficiaries during the launch



Figure 5

The photograph shows a E-Bike press conference

- **End of project evaluation** : This was the last part of the project and it involved interviewing 85 project beneficiaries (46 males) in the areas: level income (before and after), usage, social status, service center, quality of services received from the service center, number of times charged the battery, number of trips in a day, E-Bike Vs Motorcycle, Costs of repair and maintenance, Safety of the E-Bike.

3.0 The different Project Components and Usage

The project was clustered into two major segments: Business and Social components. Each of these had affiliated subprojects that contributed to the overall project objectives as seen below:

Social Component

The component basically aimed at enabling vulnerable communities to access different social services at ease/ a zero cost as seen below:

Bicycle Ambulances:

These were distributed to the Village Health Teams with the aim of increasing access to health services.



Figure 6

Business/Economic Component

This basically aimed at enabling beneficiaries increase their daily income and cut down the cost of transport expenses

Bicycle for Water:

These were distributed to vulnerable groups of women who fetch water on their heads for sell to support their families. The E-Bike was intended to off load the burden of carrying water on the head from these women to using E-Mobility with all the advantages it came with .

E-Taxi:

These were distributed to people who initially used ordinally bicycles transport people from one place to another. The E-Taxi replaced the manual bike hence increasing on the number of routes one makes a day considering its convenience

Delivery Bike:

These were distributed to different hotels who originally incurred a lot of money on distribution of food a round the city. The bike helped to cut down the distribution costs.

Tourism Bike:

This was basically used /hired by tourists to adventure different parts of Jinja.



Figure 7



Figure 8



Figure 9



4.0 The Impact of the project

The project is said to have greatly impacted on the lives of the beneficiaries both directly and indirectly through the different clusters highlighted above and rough estimates are as seen below:

Figure 10

Cluster	Estimated no of Direct beneficiaries/level of income	Year 1	Year 2	KEY
E-Taxi	134,4000/=	134,4000/=	2,688,000/=	At least 8 people a day @500
Water Bike	134,4000/=	134,4000/=	2,688,000/=	At least 5 times a day (5Jericans each time)
Bicycle Ambulance	5040 patients	5040patients	1080patients	At least 3patients a day & 2 outreaches a week
Tourism Bike	86	86trips	172 trips	At least two trips a week @ 50,000
Delivery Bike	3,360,000/=	3,360,000/=	6,720,000/=	At least 5times a day@ each trip worth 2000/=

Key: The assumption is the average income of a boda considering that some days may not make a lot of money due say to rain or the breakdown of the bike is 4000ugx .This will be cash at hand after all expenses like food. Most of the Boda work at least 6 days a week.

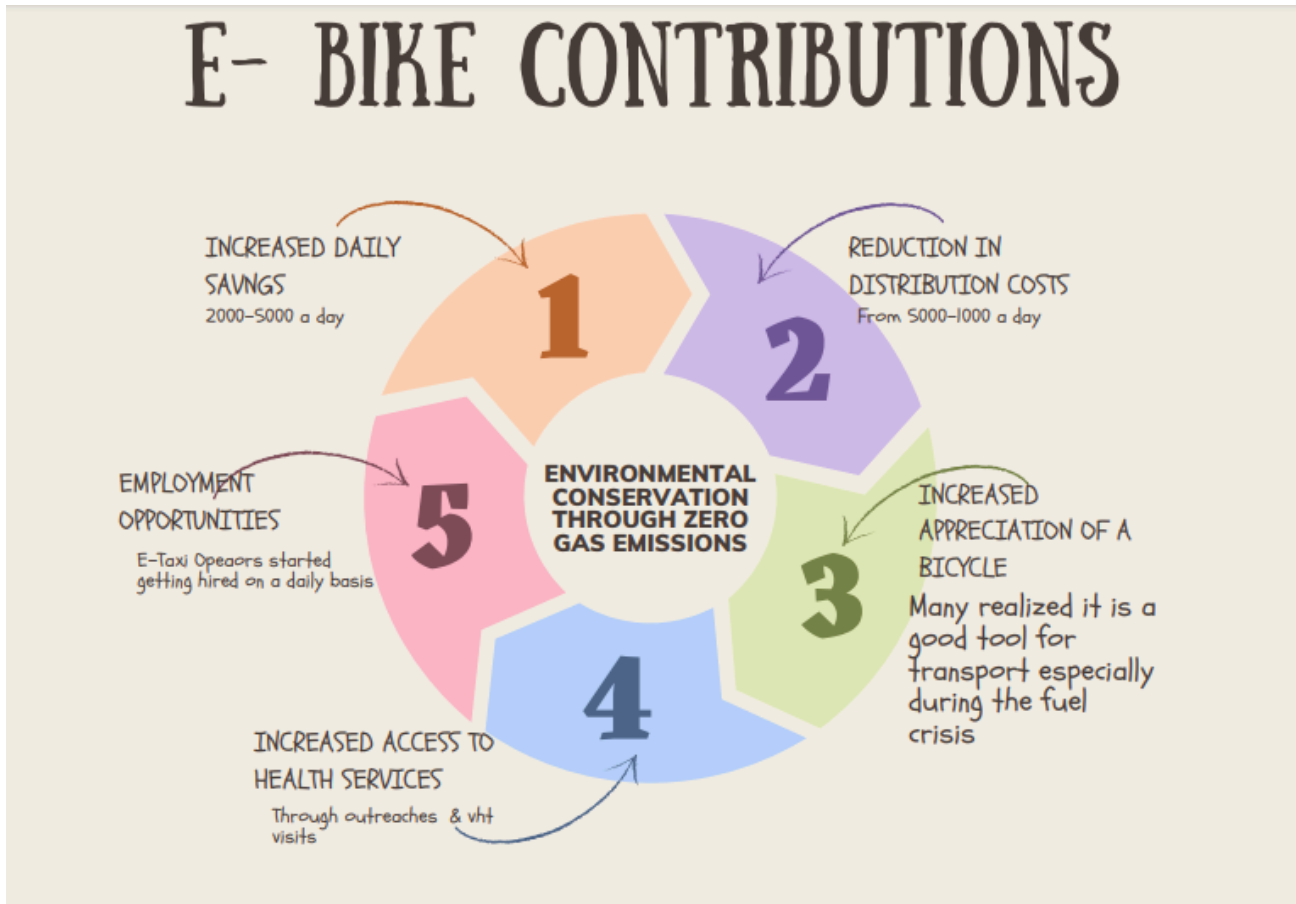
Year two the number of people using the Ambulance may not increase although the demand for it still raises because the battery loses its power so it can not carry more. Tourist bikes could not make a lot of income because during the project period, there was an outbreak of covid which restricted movements of the internal tourist.



4.0 The Impact of the project

The project is said to have greatly impacted on the lives of the beneficiaries both directly and indirectly through the different clusters highlighted above and rough estimates are as seen below:

Figure 11





5.0 Challenges faced during project implementation

These have been categorized into two: Technical and human errors as seen below:

- Not following instructions and guidance by the lead technician and project coordinator. This contributed to 70% of the breakdowns encountered i.e high breakdown of the spokes, overloading as many users proudly reported that the bike carries 200kg as opposed to the official 120kg. However, this was also attributed to the poor quality of the spokes hence leading to frequent expenditures.
- The high tear and wear which is associated to bad habit of waiting until the bicycle can not move before it is taken for repair. People do not maintain their bikes, but rather only do repairs.
- Lack of good will from some riders to contribute to the weekly remittances hence making procurement of spare parts very difficult for FABIO.

The technical challenges

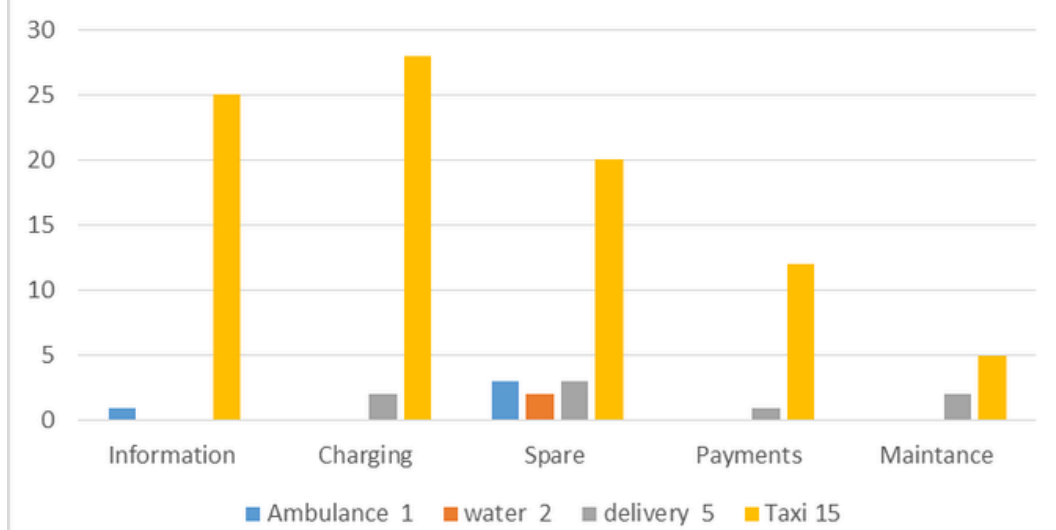
- Lack of experience and enough information the E-Bike focal person and technicians considering that it was their first time to interact with the E-Technology.
- Some e-bikes were shipped to FABIO with missing parts which made work so hard.
- Some parts of the E-bike were of poor quality like the bottom bracket, brakes, spoke hence leading to frequent breakdowns etc



The service centers.

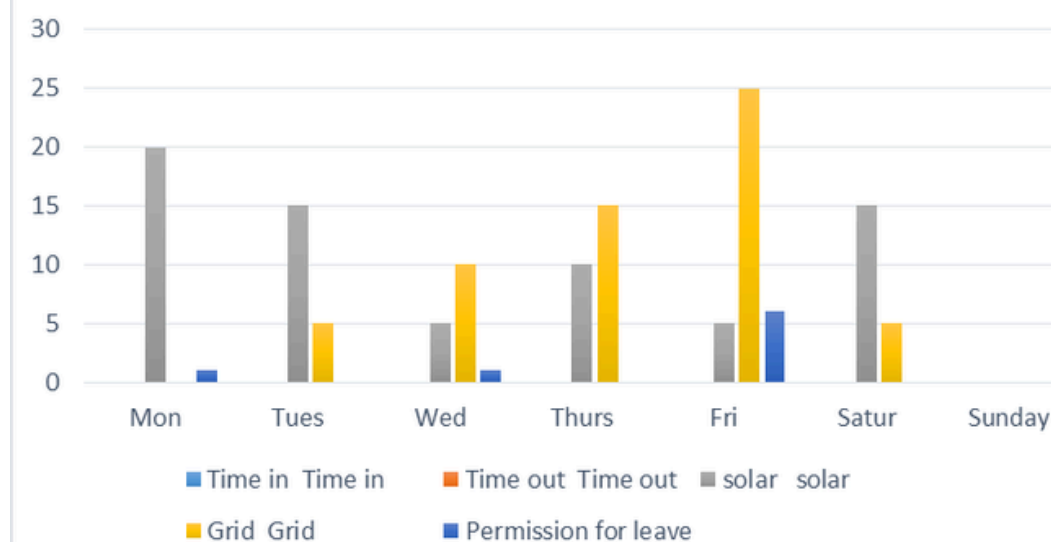
- To facilitate effective functioning, servicing and management of the E-Bike project, two service centers were established in the two targeted districts of Jinja and Iganga. The centers are equipped each with a solar panel, Power tools, Hand tools and Charging E-Bikes batteries.
- 2.0 Service Center Operation
- The service centers are managed by the recruited mechanic under direct supervision of the E-Bike project manager. The center operates from Monday to Friday 8:00am - 5:00 pm although sometimes due to the high demand , it is forced to open during weekends.
- The center has a data management system where every battery brought in for charging and released after charging is recorded both in hard copies and soft copies in terms of date brought in for charging; details of a person who delivered the battery; time delivered; power level of the battery during the time it was brought for recharging (full, empty and one bar); date the battery was taken after charging; time the battery was taken after charging; and the receiver signs upon receiving the battery". It should be noted that this process is carried out on a daily basis and every beneficiary or everyone in need of the charging service from any of the FABIO service centers is obliged to go through the same process. The data collected is then used for reporting purposes.
- Furthermore, the service centers are also in charge of assembling, modification, servicing the bicycles and batteries. Common cases of what is commonly serviced include: Tear, wear and breakdown. The bicycle center is also in charge of cross-checking the status of the bicycle whenever beneficiaries come for charging.

Figure 12 why people visit service centre.



Because the E-taxis are the many of all the E-bikes, still they remain as the largest visitors at the service centre and also charging takes the biggest part of the graph. However there are still other reasons why people visit the center.

Figure 13 Charging



KEY: Time in means the time when the battery comes for charging
Time out when it is taken after charging.

- The trend of charging changes according to the day of the week both in terms number of people charging but also a shift either from grid to solar likewise because of the following:
- On Monday all the batteries are often charged on solar because the solar batteries are fully charged. As the days of the week goes by, the solar charge batteries lose power hence the need to use the grid.
- Even with the constant sun, the batteries of the solar system are not able to get fully charged which cause them to fail to charge all the 25 batteries that are received daily.



Challenges faced at the service centers.

- The system in Jinja is less effective as it causes overheating and burning of the MPPT charger controllers, leading to system malfunction. In addition, the charging system in Jinja is quite unreliable because the battery power holding capacity has greatly declined as opposed to that of Iganga that uses batteries whose capacity can store power more and helps it to charge even in the night. The system in Jinja can only work after charging the batteries up to 75% and less than that damages the batteries. This affects the recharging process for the batteries, and all this is attributed to the quality of the solar system.
- The service center in Jinja was designed to charge up to 38 batteries at ago and use power tools like grander , however, it currently charges up to 25 batteries per day. Due to the depreciation of power holding ability of the solar system, it is a struggle to use the power machines.
- Batteries for the bicycles have mostly lost the ability to hold power for a long time. This means that people have to charge more than once in a day, which puts pressure on the service center. At the beginning of the project most users could use their batteries for either a full day working or one and half day.
- There is a challenge of lack of adequate spare parts and therefore FABIO can not meet the needs of the users. This is partly attributed to limited financial resources.
- Due to the frequent breakdowns of the E-bikes, sometimes we lack adequate storage space for the broken bikes. Additionally, the high numbers of repairs are overwhelming for the available human resource. (parts like the motor, tyres, brakes often wear and tear)
- The Service center in Iganga is rarely used by the E-bike users to charge the bikes as expected. In addition, E-bike users in Iganga do not make the weekly contributions and in most cases are unable to meet their repair costs.
- Some parts of the bike are not repairable. This is due to the way they are designed by the manufacturer, these parts include: The motor, battery controller and data communication cable. These parts are not only cheap quality but also not repairable.



Contribution to the Uganda National Development Plan (NDPIII).

Uganda's national development plan III has about 18 programs with well detailed targets and below are the areas where the E-bike project contributes to and what it contributes.

Programs	Areas of contribution.	Contributions
Tourism development	Employment in the tourism sector and increasing the number of tourist	FABIO organises E-bike tours across the Eastern Region and uses the opportunity to promote the tourism industry in Uganda.
Integrated transport infrastructure and service	Sustainable modal transport system , Reducing the average travel time	The project provides for E-taxis which offer a more sustainable model of transport with carriage capacity of 120KGs. The Government of Uganda is striving to reduce heavy reliance on motorcycles, which are less sustainable, and putting focus on Non-Motorized Transport as an integral part of the transport system. The E-taxis have provided a suitable alternative.
Innovation technology development and transfer	Application of appropriate technology in production and service	The E-bike is a great innovation of its kind, which is contributing to knowledge and technological transfer from north to south. Additionally, the E-Bike has been renovated to meet the need of the African people such access to healthcare (E-bike Ambulance), Access to water (E-bike for water), Access to jobs and income (Delivery E-bike) and other innovations.

Figure 14



First African Bicycle
Information Organisation

FABIO

About the Water E-bike

The water E-bike were 10 in number and meant for 10 women groups, 5 in Jinja and 5 Iganga with each consisting between 25–30 people. However, due to the great importance, one water E-bike was given to a single mother in Jinja. Below is the table showing the distribution of Water E-bikes in Jinja and Iganga.

Figure 15

District	Group Name	Sub-county	village
Jinja	Tugezeku Women group Kyebajatobona Lumuli Restored Self Help group Nabirye Rose Tibata Yosamu	Bundo Butagaya Bundod Butagaya	Kivububuka Namizi Lumul Buyala Bubugo
Iganga	Peace women development Group Kidakobona Group Gemakumwino Group Twezimbe group Kiwanuka Florence	Nakigo Nawanyingi Nawanyingi iganga municipal iganga Municipal	Bugabwe A Nawanyingi Lwerera Nawadyo Nabidongo prisons



About the Water E-bike

Below is a table and graph reflecting number of people reached with using the E-bike for water in the respective villages in Jinja .

District	Village	Group	No.Reached	Target
Jinja	Kivubuka	Tugezeku	13	30
Jinja	Bubugo	Bubugo	1	1
Jinja	Namizi	Kyebajatobona namizi	13	30
Jinja	Buyala	Nabirye Rose	1	1
Jinja	Lumuli	Lumuli	5	30
Iganga	Bugabwe A	Peace women development	32	30
Iganga	Nawanyingi	Kidakabona	28	30
Iganga	Gemakuwino	Luwerera	30	30
Iganga	Twezimbe	Nawadyo	25	30
Iganga	Kiwanuka Florence	Nabidondo Prisons	10	30

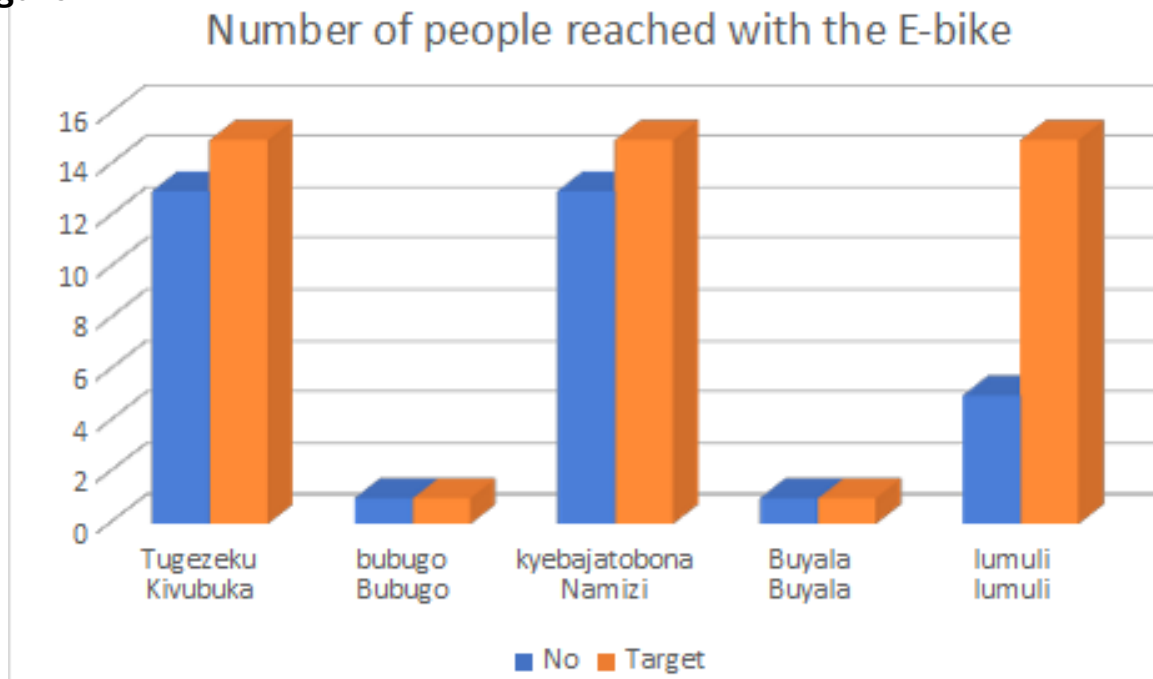
Figure 16

Note: The water bicycles were signed to women groups of 25 to 30 people and it was share with the purpose of helping women fatch water. The water is got from an average of 6kms from the house holds and normally use 20liter jellycans carried on their heads. with the E-bike they could carry about 6 jellycan at once and with easie. Two bicycles of 10 water bikes were assigned to single moters who uses the bicycle to sell water and pay family bills. (The single moter of Buyala has 7 dependants and the one for Bubugo has 4 dependant).

Target refers to the total number of people in the group, number reached mean the total number of people who actually used the bicycle.

About the Water E-bike

Figure 17



About the bicycle Ambulance

- These are into the social component of the project, the bicycle ambulances are used by the Village Health Teams (VHTs) to transport people to health centers especially those in critical conditions like pregnant mothers, children among others. These also use the Bicycles for community out reaches to create health related awareness depending on the running government programs at their respective health centers.
- They were 10 in number and distributed to the VHTs attached to particular health centers in the districts of Jinja and Iganga as here below

Figure 17

District	Health Centre	Subcounty	VHT
Jinja	Butagaya Health centre III Budima Health Centre III Lumuli Health centre II Bubugo Health II Kibibi Health centre II	Butagaya Butagaya Butagaya Butagaya Budondo	Musaabi Charles Kalera Moses Ndase Moses Mukusike Richard Hamba John
Iganga	BunyiroHealth centre III Bulamagi Health centre III Nakalama Health centre III Nawanzu Health centre III Busowobi Health Centre III	Nawanyingi Bulamagi Nakalama Nakigo Nakigo	Bitagala Yusufu Naigaga Margerett Namulidwa Ronnah Namuddu Hadija Mutumba Hatimu

About the Bicycle Ambulance

The Ambulance is designed with a trailer which can be adjusted between angles of 30 and 60 to give comfort to the patient.



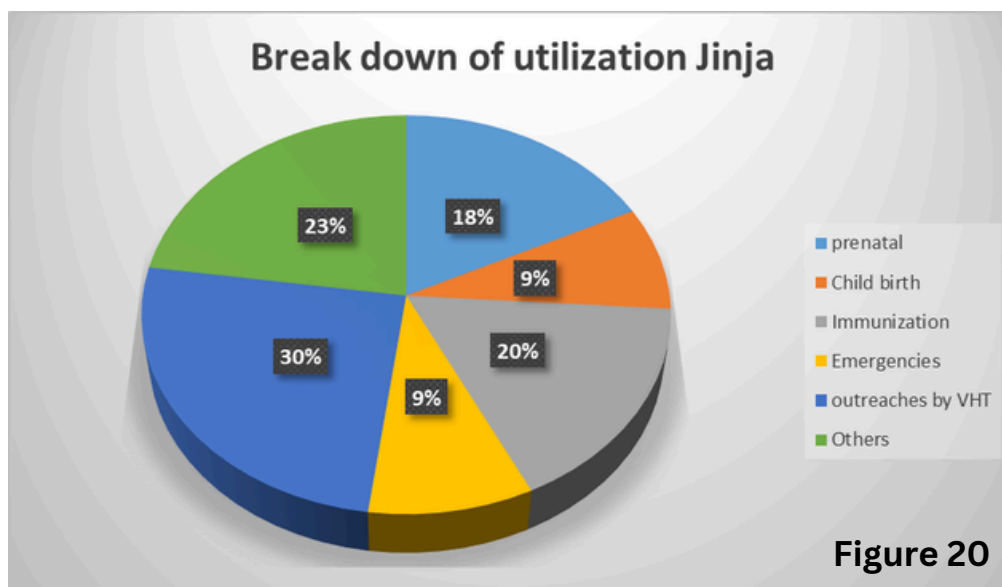
During the implementation, the bike has been utilized for various health purposes like access to health units by patients, out reaches by VHTs depending on the government program among others.

Below is a graph showing the utilization

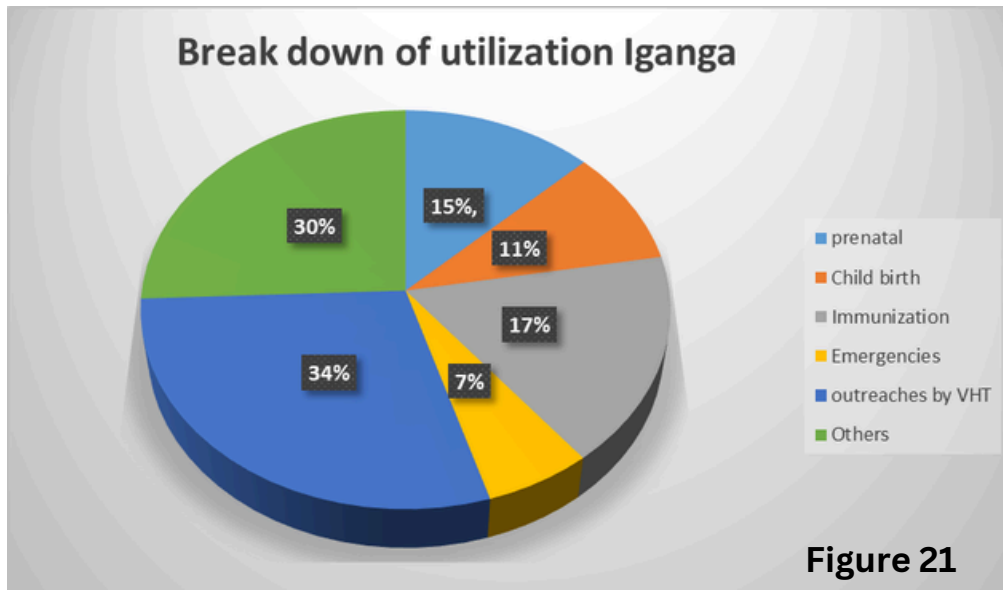
Figure 19

District	Female	Male	Total
Jinja	198	100	298
Iganga	180	107	287
Total	378	207	585

The charts below show the breakdown of E-bike utilization by VHTs across the beneficiary districts.



Ambulance



Key

Prenatal: pregnant mothers receiving antenatal care

Emergencies: patients in critical condition for example children with convulsing disease, asthma attacks, accidents among others

Out reaches by VHTs: Health programs that health canter extend to the community such as Mass Vaccination of children, deworming, family planning services, among others.

Others: Among these are patients on palliative care, Malaria, check-up, missed hospital appointment, fever among others.

Specific challenges affecting the Ambulance E-bike

- At the offset, we had designed the project that community should contribute to the repairs and maintenance however with bounce of time this is not the case and for this reason they often request for spare parts from FABIO.
- Some communities wish to use the carrier of the bicycle rather than using the trailer most especially if they are conscious.
- The strength of the bicycle in terms of motor to carry people. Some areas are very hilly and require a stronger motor and extra battery to be able to work well.

About the Delivery E-bike

- This type of bicycle is equipped with a box which helps to keep cold things cold and warm things warm. Following the outbreak of covid in Uganda, the need for deliveries of foodstuff and other related services increased in the country, however with the increase of fuel prices, the costs for delivery shot high.
- These bicycles are attached to the hotels and restaurants to make deliveries for them instead of paying a random boda motorcycle.
- The hotels do not associate much in making money using the delivery bikes, however they acknowledge the following:
 - They are very sure that the orders shall be safely and timely delivered by their staff to customers.
 - The delivery staff use the same bicycle as their means of transport to commute to work. As a result, they're happier and have increased commitment to their work.
 - There is a slight increase in the scoop of operation as they go up 5 kilometers more than before using the E-bike.
 - The bicycle is also used to go shopping of the food staff from the local market.

The delivery E-bicycles.

Figure 22

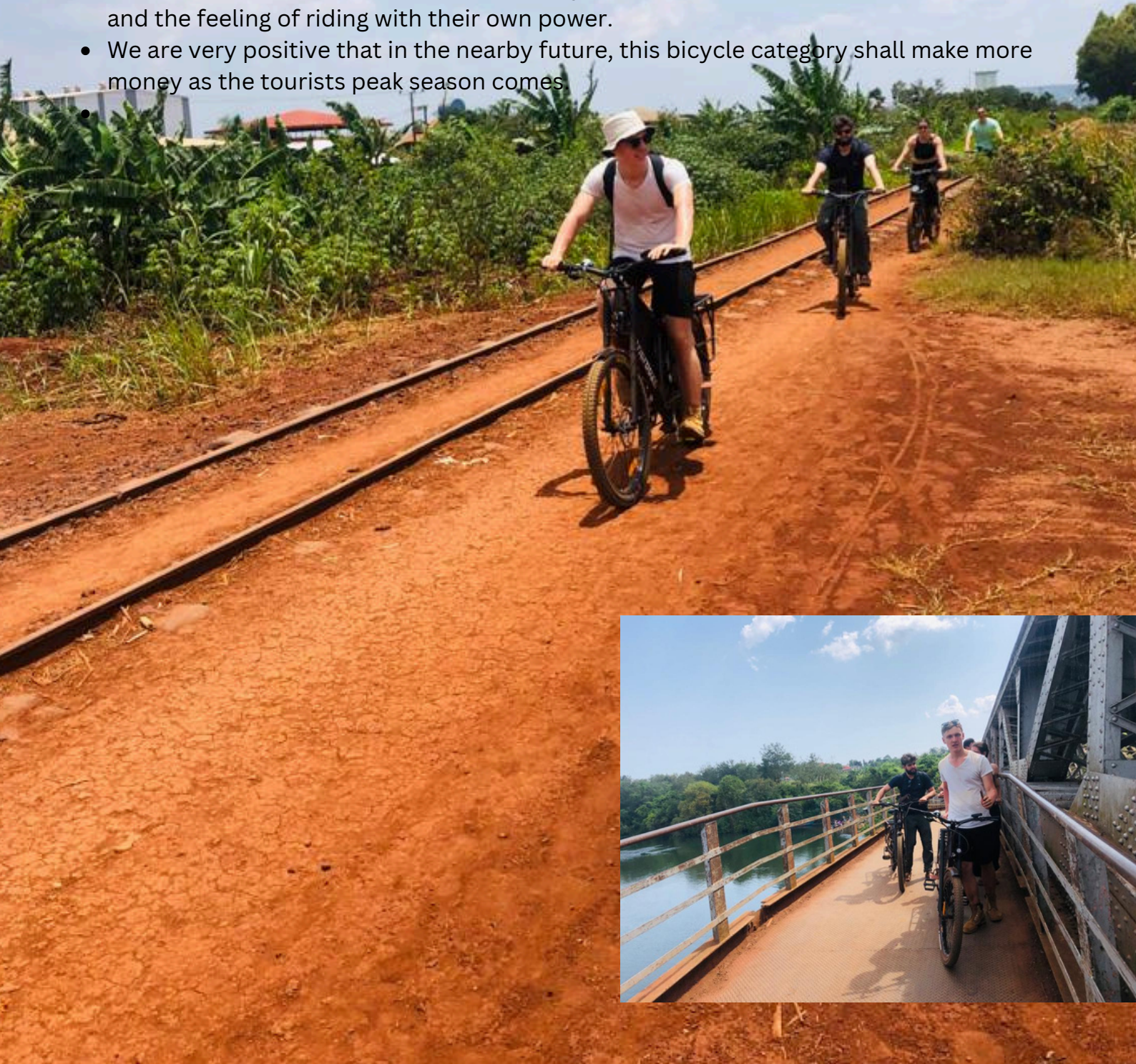


- Like the other E-bike categories, the delivery e-bike also faced some challenges that were specific to its operation, and these include the following:
 - Failure by some of the beneficiaries to contribute even when the bicycle was making income for them.
 - The batteries have lost their abilities to hold power, which is affecting the hotel to handle more demand and orders.



About the E-bike for tourists

- It is true that Jinja is one of the hotspots for tourism in Uganda. However, the landscape hinders some people from being able to enjoy tourism using the bicycles.
- In this project 10 bicycles were used as tourist E-bikes. However, the outbreak of Covid-19 greatly affected this E-bike category due to travel restrictions limiting the number of tourists in Uganda. Additionally, people lost their jobs especially within Uganda which also affected the potential of bike tours.
- We would like to give this section of the E-bike category another chance as the economy is recovering. April is the highest peak for the tourists' visit in Uganda.
- Since the project started, we were able to rent out E-bikes twice (8e-bikes in total).
- Most of the tourists preferred the ordinary bikes to the E-bikes because of the price and the feeling of riding with their own power.
- We are very positive that in the nearby future, this bicycle category shall make more money as the tourists peak season comes.





General contribution of the project

Employment

- The project created employment both short term and long term basis. In the short term, the project employed people to assemble bicycles and install solar systems at the service centers. On the other hand, the trained technicians continue to use knowledge to earn a living as well as E-taxi and delivery bikes
- On another positive note, out of the 80 bicycles distributed, 5 people have been able to use the bicycle to create new business for the wives. This is mostly related to the E-taxis, these people were able to save money after using the bike and through the saving they started new business.

Skill and knowledge impact

- In addition to employment opportunity, the project has enabled a number of people to build their skills and knowledge a round the E-bike industry as seen below:
- E-bike assembling, repairing and maintenance Here about 26 people were trained and at least 12 were awarded with certificates.
- Solar charging system management. At least 4 people have been trained in managing solar charging system.
- Riding skills for women. All the women groups that benefited from the project were trained in riding the E-bikes and how the system works.
- Maintenance and basic repairs All the beneficiaries have been trained on how to repair and maintain their bicycles, in additional some have been giving instruction manual.
- Use of software like for tracking bicycles. Under this project we have an online software used to track bicycles using the GPS system and this was taught to the team which enriched them with a lot of knowledge.
- Creativity and innovation skill. FABIO worked with at least more than 20 people to design the different bicycle user cases like Ambulance trailer
- Data collection. The teams working under this project have been exposed to different new methodologies and tool of data collection.



Overall achievements

- For the first time a better and strong bicycle fitting to Africa and African conditions was developed. The AfricroozE can carry up to 120kgs. This is not common for most of the bikes available on the market at the current cost of the AfricroozE.
- The project has greatly improved the image of the bicycle in Uganda. A tool that has been greatly known as a poor man's tool has now gained value. This can be attributed to speed, carriage capacity and the outstanding outlook of the E-bike. Most of the riders during interviews reported to have now gained more respect from the community because they now use an E-bike.
- There is a shift of people from using motorcycles to E-bikes (taxi). Out of 10 E-taxi beneficiaries interviewed, 7 reported to receiving new customers who were initially using motorcycles.
- The E-bike has greatly improved the working conditions for all kinds of E-bike users. The water bike helped women to ease the burden of carrying water and food from the garden on their heads, and the Boda riders also reported to no longer use less power in paddling.
- With this project, the e-mobility sector in Uganda and particularly E-bikes have gained momentum on the national agenda. It has now enabled the start of discussions of reducing the prices of not only E-bikes but all bicycles in general in Uganda.
- Strengthened partnership between Government and civil society sector. Through this cooperation, we were able to receive tax exemption for the importation of the E-bicycle.



Challenges faced by the project.

- The project had a lot of challenges because it was the first time of its kind in Uganda these include but not limiting to the following:
- Taxes. Fact told there was not a clear idea about the cost of the taxes for importing electric bicycle, this was worsened by lack of a label name on the bicycle at the time of import which attracted fines.
- Missing parts during assembly. During the packaging of the bicycles, some parts were not included. This increased the costs and affected the quality of output because the parts on the local market were not exact as the one on the bicycle.
- 3. Inflation. During the budgeting time, the exchange rate was far different compared to the time of implementation, which made work so hard. Prices of some of the products had greatly increased.
- 4. Lack of experience working with the new technology. It was the first experience for many people, including the mechanics, to assemble the E-bicycle. However, FABIO trained 24 people, but only 8 could efficiently use the knowledge gained. The rest needed more time, which was not available.
- 5. Delays in payment of project funds. This affected our implementation timeline and plans.
- 6. Poor quality of some parts of the E-bike. Some of the parts like brakes had a high level of tear and wear as compared to the standard quality of the parts on the market.
- 7. Batteries are said to cover 40-50 km, however practically they go for 30 km, and they run empty, it should be noted that 30kms is also only possible if you are using low gears and also in level 1 and 2 of the assist.
- 8. High cost of the E-bike. Many users raised the concern of the high cost of the E-bike which is comparable to the purchase of a new motorcycle. However, FABIO continues to sensitize the communities on the advantages of using the E-bikes in the long run, and these efforts need to continue if the bike is to gain more momentum on the African Market.
- 9. Most of the electric parts of the bike are not repairable, most especially because of how they are designed. This means once it breaks down, you have to buy a new one.



Lessons Learnt

- During the implementation and management of the project, we realized that the E-bicycle to work more efficiently, effectively and more sustainably, it is better to work with small groups of not more than seven people per group. Below are our findings in this regard:
- Big groups of 20 to 25 lead to high levels of tear and wear.
- The degree of responsibility taking is extremely low when the group is big. This has a bearing on the maintenance and repairs of the bike.
- Two days trainings are not enough to equip users and mechanics with adequate knowledge and skill to handle the bike.
- One of the critical lessons is that having own spare parts as an implementing partner save the project money and creates more efficiency in the project implementation
- The fact that the technical team at FABIO and EURIST did not inspect the product before shipping created anomalies in the product we received from the supplier, which made the project more costly than what was planned. As a lesson, it is therefore important to invest in quality Control and inspection.
- More effort is needed in documentation and data collection and management. We recognized a capacity gap which requires capacity building in data collection, management and use.
- The Motor is not as strong as the conditions of Uganda, this we mean some areas are too hilly and using the current motor and battery is nearly a myth.



Recommendations

- The training time for both mechanics and the bicycle users should be increase from 2 to 4 days to create more effectiveness and reduce on brake downs.
- We should also have spares in stock always before starting mega projects
- Before massive production, samples should be checked and more tests made to ensure quality of the product. If possible, inspection before shipping should be done.
- More efforts and emphasis should be invested in the monitoring and evaluation tool and materials to use.
- There is need to improve the strength and capacity of the motor to enable the ambulances to work in all areas.
- More people should be trained in handling and maintaining the E-bikes and repairing and installation of solar energy systems.
- Improve the battery strengthen to enable moving farther distance up to 80 distance
- strengthen the relationship between partner organizations and government of Uganda.
- Change in design of the electric parts of the E-bike to enable the repairing process at local level.
- Lower the crossbar of the frame to enable the female to conveniently use the E-bike



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