



# FINAL REPORT: COVID-19 impacts on the peri-urban mobility of women and vulnerable households in Madagascar

COVID-19 Response & Recovery Transport Research Fund

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<b>Abstract</b>	
<p>The impact of COVID-19 transport and mobility restrictions on women and vulnerable people living in low-income countries like Madagascar is still largely unknown. This research project aimed to understand how the lives of vulnerable households, particularly women, living in Antananarivo's peri-urban areas were affected by COVID-19 transport and mobility restrictions in March-September 2020. The research was conducted in nine peri-urban municipalities of Antananarivo and networked with researchers in 10 other African and Asian low income countries (LICs) to explore similarities and differences.</p> <p>Short-term and long-term improvements to make transport systems in peri-urban Antananarivo safer, more gender-sensitive and more responsive to the needs of users will require inclusive participatory planning. There should be greater emphasis on complementing minibus operations with policies and infrastructure supporting pedestrian movements, bicycles, motorcycles and three-wheelers.</p>	
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## ACRONYMS

ATT	Agence des Transports Terrestres (Land Transport Authority)
CNAPS	Caisse Nationale de Prévoyance Sociale de Madagascar
COVID-19	Novel Coronavirus 2019
FCDO	Foreign, Commonwealth & Development Office
FGD	Focus group discussion
HVT	High Volume Transport Applied Research Programme
IMC	IMC Worldwide Ltd
INSTAT	National Institute of Statistics
MGA	Ariary (currency of Madagascar). USD 1 ≈ 4000 MGA
LIC	Low-income country
UCA	Urban Commune d'Antananarivo (Antananarivo Urban Municipality)
UCTS	L'Union de Coopératives des Transporteurs Standardisés
USD	United States Dollar
USDc	United States Dollar cents



## EXECUTIVE SUMMARY

The COVID-19 pandemic crisis exposed many social, economic and political vulnerabilities already prevalent. In many countries, urban transport services were required to cease operating or reduce services and passenger numbers to reduce virus transmission. Mandatory mask wearing and disinfection protocols were often required. In Madagascar, the capital city of Antananarivo was most affected by the pandemic. The government imposed transport restrictions from March to September 2020. Some passenger limits and measures to reduce viral transmission were still in place in January 2021. This research has highlighted some of the impacts of such transport restrictions on the lives of women and vulnerable households in Madagascar.

This project's research goal was to understand how the lives of vulnerable households, and particularly the women, living in peri-urban Antananarivo were affected by COVID-19 transport and mobility restrictions and how this compared to experiences in some other LICs. The aim was to identify solutions and policy recommendations for improvements that can be implemented in the short- and long-terms.

The research was conducted between October 2020 and January 2021 in nine peri-urban municipalities to the north, west, south and east of Antananarivo's urban centre. A mix of qualitative and quantitative gender-disaggregated research methods were used to survey over 1,100 people, including 900 vulnerable households and institutional stakeholders (transport operators, local government officials and the transport regulator). Transport experts in ten African and Asian LICs were contacted to obtain comparative information.

Before COVID-19, it was known that the majority of households in peri-urban Antananarivo were already vulnerable due to low levels of income. This research confirmed the negative economic impact of the pandemic. The percentage of households reporting daily revenues below the household poverty line (6.9 USD per day) went up from 64% to 79% during the COVID-19 restrictions period. Household daily revenues saw an overall 59% reduction and the percentage of households declaring the lowest daily revenue tier (up to 2.5 USD) increased by fifty percent (from 41.4% to 60.7%). The percentage of households declaring no main or regular source of revenue saw an eightfold increase, from 3.4% to 27.1%. Over half (59.5%) of survey respondents reported in December 2020 their income had not yet returned to pre-COVID-19 levels.

Half of surveyed households did not own a means of transport. Of those who did, 80% owned a bicycle. Minibus services are the only authorised public transport. 60% of passengers are women. Minibus fares increased by 10-15% due to restricted passenger numbers and sanitary requirements. Before COVID-19, minibus services were people's main transport mode, followed by walking and bicycles. When the minibus services were banned or greatly reduced, walking became the commonest way of travelling, followed by bicycles. Bicycles, mainly used by men, became increasingly important for transporting agricultural produce into urban markets. Women benefited from bicycle use through consignments and family delegation.

Female farmers and women trading in agricultural products for the urban markets were particularly affected by transport restrictions. Without minibus services, many walked into urban markets carrying their produce. Higher transport and intermediary costs and price fluctuations also reduced the incomes of farmer-traders.

By December 2020, minibus services were again the main transport mode used by the respondents, but people perceived them to be unsafe in terms of COVID-19 risk. Walking and cycling were perceived as the much safer from COVID-19, but more dangerous in terms of the risk of a crash, robbery or sexual harassment.

The COVID-19 transport and mobility restrictions have highlighted the fragilities of Antananarivo's peri-urban transport system. The pandemic now provides an important starting point for reform and improvement. Short- and long-term planning should be based on greater dialogue and inclusion, involving transport users (women and others), transport operators, the transport regulator and the local governments. To make the transport systems more adapted to the needs of its users, safer and more gender-inclusive, the vital minibus sector should be supported. However, greater emphasis should also be placed on the complementary roles of intermediate means of transport, including motorcycles, motorcycle taxis, three-wheelers, bicycles, handcarts and oxcarts. Depending on the context, infrastructure provision should be suited to these modes of transport as well as pedestrians. From discussions with collaborators in other LICs, it appears that Madagascar could benefit from experiences in other countries with comparable situations. In Nepal, Myanmar, Uganda and Malawi the urban and peri-urban transport situations closely resemble aspects of Madagascar. Their transport restrictions also contributed to increases in pedestrians and bicycles, but they were able to benefit more from the use of motorcycles, motorcycle-taxis and three-wheelers.



## 1. Introduction

### 1.1 Project background, aims and objectives

Globally, in high-income and low-income countries alike, the covid-19 pandemic crisis has worked as a magnifying lens that exposed countries' social, economic and even political vulnerabilities. The health crisis and government response measures have led to widespread increases in inequalities that appears to be ongoing. They have also exacerbated the deficiencies and existing challenges in many sectors of economic, social and political activity. Public transport is one of the sectors that faced early and sometimes long-lasting restrictions because of virus containment measures. These were aimed at reducing the number of people travelling between countries, between cities and within cities, as well as increasing the physical distancing of people within transport systems. These transport and mobility restrictions affected all travellers and transport operators, but the poorest and most vulnerable people were among the worst affected as these often depended on crowded public transport for their livelihoods and they had no savings to cushion them. Some of the most striking images of the early days of the pandemic were in India where millions of migrant workers and their families had to walk to return their home when the country suddenly entered a nationwide lockdown in which most trains and buses were suspended (1). Some journeys were over 100-miles long and some took five-days, or more. In bustling African cities, like Harare in Zimbabwe, reductions in bus services meant commuting for some essential workers started at 3 am, with travel times greatly increased (2). In Uganda, market traders were asked to sleep at the markets for over a month to help stop the spread of the virus (3).

In Antananarivo, Madagascar's capital and largest city, the COVID-19 crisis has similarly exposed and exacerbated the vulnerabilities of the public transport system that provides vital links between peri-urban areas and the city centre. Antananarivo has an urban population of 1.3 million as well as 3.6 million people (14% of Madagascar's population) living in its peri-urban areas. A recent World Bank paper (4) looking at the impacts of COVID-19 and the path for economic recovery in Madagascar noted that extreme poverty is likely to increase significantly in vulnerable urban households, which (in relation to rural households) are more exposed to the job losses in manufacturing and service sectors and to the loss of income for informal workers, who were unable to work due to lockdown measures.

The main goal of this research project has been to provide evidence to support the development of coherent, inclusive and gender-sensitive local transport policies and practices post-COVID-19, to ensure a public transport system that is resilient to the current and future pandemics and is adapted to the needs of transport users and operators.

As such, this project aimed to answer the following research questions:

- How have the lives and the mobility of women and vulnerable households been affected by the transport-related COVID-19 containment measures?
- How do these changes and the COVID-19 impacts compare to experiences in other LICs in Africa and South Asia?
- Are there solutions, identified by users and local stakeholders or inspired by experiences in other LICs, that can be implemented in Madagascar in the short-term and in the long-term?

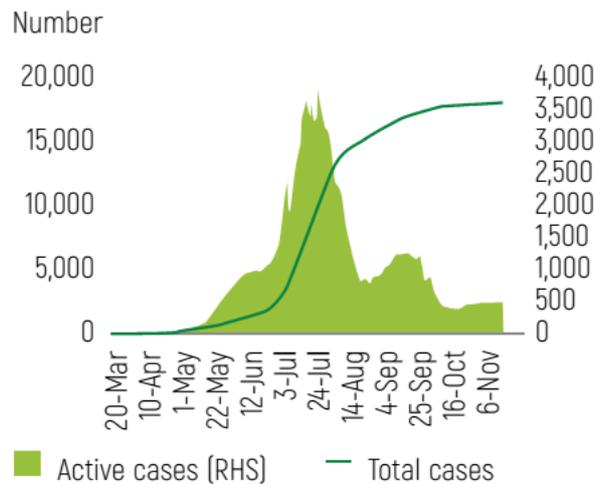
Households are considered vulnerable if they have insufficient resources and resilience to cope with livelihood stresses such as external risks and shocks and internal fragilities. Vulnerability links poverty, risk and the ability to manage risk. Livelihood disruption, infrastructure failures and economic shocks can induce a descending spiral of poverty in vulnerable households. The levels of poverty in peri-urban Antananarivo are high so that most households and communities in the surveyed areas can be considered vulnerable. Therefore, this research has not tried to identify specific vulnerable households but has considered that most members of the community comprise vulnerable households and so the findings of the surveys and related research can provide evidence of the problems faced by vulnerable households. By identifying specific problems, this research was intended to help identify transport-related solutions that can assist the vulnerable households cope with the transport challenges induced by the pandemic.



## 1.2 Transport challenges being addressed during the COVID-19 pandemic

Official data shows that in Madagascar there had been 18,001 confirmed cases of COVID-19 and 267 attributed deaths up to mid-January 2021<sup>1</sup>. As in many countries, the national statistics may under-represent the extent of the pandemic, due to unreported or untested infections. The country experienced a rapid growth in cases between May and July 2020 and a peak of infections between mid-June and mid-July 2020 (Figure 1). Many of the virus containment measures adopted by the Malagasy government at different stages between late March and September 2020 were transport and mobility related: border closure, transport bans, restrictions to movements between regions, curfews, total and partial lockdown periods.

Figure 1: Number of COVID-19 cases in Madagascar



Source: Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE)

Note: Last updated on November 18, 2020. Total cases recorded.

Antananarivo was the city most affected by the pandemic. It was the first city where cases were registered and it endured harsher and longer virus containment measures than other places in Madagascar, including transport restrictions. One of the key government responses to the COVID-19 pandemic in Madagascar was a strict lockdown and transport ban into and inside the region of Antananarivo starting in March 2020, to prevent the virus spreading to other regions. The measures were as follows:

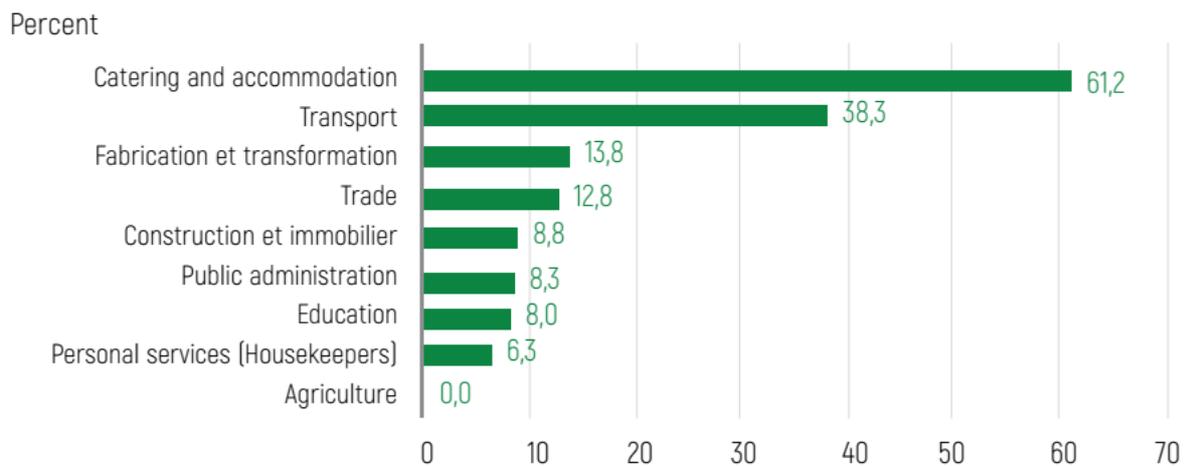
- March-mid-May 2020: strict lockdown period, during which people were not allowed to move for work reasons, public transport was banned, and local food markets were to close at noon;
- Mid-May-June 2020: partial lockdown period, during which movements for work reasons were allowed in the morning, public transport was allowed between 6 am and 3 pm (albeit with restrictions on the number of passengers, mandatory mask wearing and hand washing), markets closed at 2 pm and there was an evening curfew;
- July 2020: second strict lockdown period, with the same restrictions as the March-May period;
- August 2020: partial lockdown again for two months, with the same restrictions as the May-June period;
- Since late September, there have been no movement restrictions, but the number of passengers allowed in public transport vehicles is still limited and mask-wearing and hand washing remain mandatory.

According to a World Bank survey conducted in June 2020, the transport sector was the second hardest hit sector by employment losses due to the COVID-19 crisis in Madagascar: an estimated 38% of the jobs in the sector were affected (Figure 2). Less is known about the subsequent and continuing impact of the COVID-19 disruptions to transport and mobility on the lives of vulnerable households, especially women. Transport systems are rarely adapted to such people whose vulnerabilities can be exacerbated by changes to transport over which they have no control.

<sup>1</sup> Data from 14/01/2021 - <https://www.worldometers.info/coronavirus/country/madagascar/> (compiling official data from the Ministry of Public Health in Madagascar).



Figure 2: Share of employment affected by COVID-19



Source: World Bank Madagascar Economic Update, 2020 (survey carried out in June 2020)

Past research on transport services and mobility in Madagascar is scarce and outdated. Population pressures in the peri-urban areas are high and living costs are rising as a result of the post-COVID-19 economic crisis. In these peri-urban areas, many households rely on public transport to access employment and markets in Antananarivo city centre. The main public transport services are minibuses, provided by semi-formal operators who are associated within cooperatives and who tend to use old and over-crowded vehicles. Intermediate means of transport like bicycles, motorcycles, handcarts and oxcarts are also important, although the road infrastructure is not adapted to facilitate their use. After the ban on public transport (minibuses), the Malagasy press reported a large increase in the numbers of bicycle-taxis and motorcycle-taxis in the urban centre of Antananarivo, although such transport services are currently illegal in Madagascar (5).

There is a need to work in close collaboration with local stakeholders (including policy makers) to identify sustainable solutions to the mobility problems of those who rely on public transport (and related facilities). The authorities and other stakeholders need to learn from the crisis response and adapt to the post-COVID-19 reality, so that transport can become safer, resilient, inclusive and adapted to the needs of women and vulnerable households living in Antananarivo's peri-urban areas.

### 1.3 Alignment with the HVT research themes, priorities and programme objectives

This project has been consistent with HVT's goals of building transport knowledge and providing an evidence base to support the transformation of inclusive, gender-appropriate transport systems in low-income countries. The evidence has come from Madagascar and a network of relevant professionals in other LICs, promoting knowledge exchanges and the development of policy recommendations that can be useful within and outside Madagascar.

### 1.4 Alignment with FCDO priorities

This project will contribute to two of FCDO's key priorities:

- strengthening resilience and response to crisis;
- tackling extreme poverty and helping the world's most vulnerable.

Madagascar is a tropical island that has already been strongly affected by the climate crisis and is expected to become even more vulnerable to extreme climate events in the coming years. Madagascar has a very high rate of poverty, with three-quarters of the population surviving on less than 1.90 USD per day (6). Antananarivo's urban poor population is particularly vulnerable to external risks, shocks and stress, like those caused by the pandemic health crisis and its subsequent economic crisis. A 2014 World Bank paper looked at the spatial distribution of poverty in Madagascar. It identified the Antananarivo region as the part of the country where the percentage of people in extreme poverty increased the most between 2001 to 2010, which highlighted the vulnerability of this region's population to crisis and external shocks (7). The most recent World Bank Economic Update for Madagascar, published in December 2020, noted that 'the COVID-19 crisis



was an external shock of unprecedented magnitude', which triggered an economic recession that threatens to erase the economic gains of the past decade. So far, the negative impact has been higher in urban and peri-urban rather than the rural populations. The poorest people in Greater Antananarivo live in its urban valleys (formerly rice fields) and the peri-urban areas where the nine municipalities of the present research are located. The project thus aimed to provide evidence relating the performance and resilience of the peri-urban transport services around the capital city of Antananarivo. This document reports on how these transport services have responded to the COVID-19 crisis and how they serve the vulnerable households in peri-urban areas. This research has focused on women and vulnerable households and in particular women farmers and traders who form an important proportion of those travelling regularly within the peri-urban areas and into the city centre.



## 2. Methodology

### 2.1 Summary of approach

In Madagascar, there is little or no public consultation on transport services, with few opportunities for public transport users to express their opinions, grievances and suggestions to the authorities and operators responsible for transport services. This research aimed to involve and engage the transport users, especially women and vulnerable households, and identify their mobility needs in the context of the COVID-19 crisis.

The research was carried out by ONG Lalana, a non-governmental organisation based in Antananarivo, Madagascar. Lalana has more than 20 years of experience in transport and mobility work, through initiatives aimed at improving infrastructure, transport systems and people's participation in transport-related policy development. The senior team in charge of this research project comprised:

- Jessé Randrianarisoa, MSc, Principal Investigator, Data Analyst and Project Manager
- Holy Ralimamy, BA, Socio-economist, Survey Manager and Project Support
- Nathalie Rasamison, BA, Socio-economist, Survey Support
- Paul Starkey, MA, MSc, Senior Adviser and Quality Assurance
- Ana Luísa Silva, MSc, PhD Candidate, Adviser and Dissemination Lead

Both research advisers (Paul Starkey and Ana Luísa Silva) were based outside Madagascar, while Jessé Randrianarisoa, Holy Ralimamy and Nathalie Rasamison were based in Antananarivo, Madagascar. They were supported by a team of local enumerators contracted specifically for this project.

This research investigated mobility issues while also searching for possible solutions to the disruption caused by the COVID-19 pandemic. The researchers listened to users and transport operators and their suggestions for improving the transport, including possible options should there be a second wave of COVID-19. The participatory research also involved the local authorities and the national Land Transport Authority, helping them to see transport-related issues from the points of view of the women and disadvantaged groups. It is intended that this will have a positive influence on the planning and development of the land transport sector, informing an advocacy strategy to develop a more participatory vision of transport development in the peri-urban areas of Madagascar's capital.

To complement the findings from the research in Madagascar and to benefit from experiences in other LICs where contexts are similar, the project has been closely networked with other LICs through international collaborators (researchers and practitioners). Researchers and transport professionals from other LICs have shared their experiences concerning COVID-19 related transport measures in their countries and transport options that appear successful.

The goal is to use this research as an opportunity for advocacy, both within and outside Madagascar, engaging transport users, operators and the relevant authorities with the aim of stimulating and contributing towards of inclusive and gender-sensitive local transport policies appropriate to the COVID-19 reality. This research aimed to provide realistic suggestions, endorsed by users, operators and authorities for ways of improving the existing transport services and transport policy in the context of the challenges brought by COVID-19, where physical distancing and hygiene are important.

### 2.2 Methodology

The research was carried out over a period of three months, between October 2020 and January 2021. Nine peri-urban, semi-rural municipalities (known as 'communes') to the north, west, south and east of greater Antananarivo had been selected as research sites: Ampangabe, Anosiala, Ambatolampy and Merimandroso (Ambohidratrimo District); Soalandy and Ampanefy (Atsimondrano District); and Manandriana, Masindray and Ambohimalaza (Avaradrano District).

These municipalities were considered representative of the municipalities that surround Madagascar's capital in terms of geography, population and economic activities. They are each located about 10 km from the main urban area and have a total of about 180,000 inhabitants. Their locations are shown in blue in the Figure 3.



This research used inclusive and participatory approaches in the identification of the transport-related needs of the target groups in the context of the COVID-19 crisis. Initially, the research was qualitative, using ethnographic research methods including focus groups, interviews and researcher observations to understand the views and realities of the target groups and stakeholders. This strategy allowed the researchers to identify the mobility patterns of women and vulnerable households before the pandemic, during the period of COVID-19 related restrictions, and at the time of the research. The research was designed to ascertain how things had changed in terms of travel times, costs and livelihood impacts. The different stakeholders were asked to identify key constraints and suggest possible solutions. As key issues were identified, quantitative survey methods were used to gather research evidence to support the presentation of the problems identified by the various stakeholders, and evidence to support the suggested solutions.

During the data collection phases, the team engaged in discussions with a network of international collaborators in ten different countries. In the preparation phase, our research was described, and information was collected about the prevailing COVID-19 and transport-related similarities and differences in and around the other cities. The interviews provided information about the COVID-19 related measures and transport options that appeared successful in the other countries. These findings were shared with the team responsible for data collection in Madagascar.

After the survey phases, a second round of international discussions took place to discuss the findings and recommendations emerging from Madagascar, as well as to allow for any further observations relating to the other countries. Our collaborators were encouraged to quickly share any relevant finding and ideas with appropriate stakeholders in their countries and networks and to consider how to upscale good practices through their local contacts (including government and aid agencies).





Figure 4 shows a visual representation of the project's research methodology, from the initial preparation stage to the post-project dissemination and advocacy activities.

**Figure 4: Visual representation of the project's research methodology**



The Land Transport Authority of Madagascar, known as l'Agence des Transports Terrestres (ATT), and representatives of the local authorities were invited to participate in some research activities, such as attending focus group discussions with transport operators, validation of the questionnaires and the identification of solutions.

### 2.3 Innovation

Participatory approaches to transport planning that involve stakeholder consultations to build a consensus have been used successfully in many countries, but such approaches have seldom been used in the transport sector in Madagascar. The research team is unaware of any other study conducted on the mobility of women and vulnerable households in Madagascar's peri-urban areas.

An innovative networking approach was adopted, to ensure that the team could learn from experiences in other countries while data was being collected in Madagascar. An international liaison component was built into the research, and meetings were held over Zoom with a network of researchers/transport experts in ten other LICs in Africa and Asia. These international consultations were initiated at the beginning of the research to learn of the COVID-19 transport situations in other countries. Towards the end of the research, the same experts were contacted again to share ideas emerging from the research findings.

### 2.4 Research activities undertaken

During the first data collection phase, the researchers used ethnographic research methods including focus groups, interviews and researcher observations to identify trends and to understand the views and realities of the target groups and stakeholders. Approximately 230 local stakeholders were involved in obtaining the qualitative information.

During the second data collection phase, quantitative questionnaires were developed based on the key issues arising during first data collection phase. Some quantitative data related to costs, tariffs, frequencies and prices was then collected through discussions with stakeholders (transport operators and market traders). A household survey was designed, and the sample size was set at 100 households in each municipality. A total of 901 households were surveyed.

Additionally, ten initial meetings were held over Zoom with transport researchers and practitioners in ten LICs in Africa (Cameroun, Kenya, Liberia, Malawi, Senegal, Tanzania, Uganda and Zambia) and two in Asia (Myanmar and Nepal). The same people were contacted again during the data analysis phase and further detailed discussions were held, with two-way exchanges of information.



Further details of the activities undertaken are provided in Section 3.

## 2.5 Assumptions

The main assumption of this research project was that transport restrictions to minimise and control the spread of COVID-19 in Madagascar had a negative impact on the lives of women and vulnerable households in Madagascar, particularly in its urban and peri-urban population. Our team had anecdotal evidence of this (from discussions with people living in peri-urban communities and local news), but this was believed to be the first research being conducted on this topic in Madagascar at the time of the research design. Evidence of the overall negative impact of the COVID-19 containment measures and subsequent economic crisis on the poor and most vulnerable populations in Madagascar was published by the World Bank prior to the start of the research (8,9).

It was assumed by the research team, and by many of the transport stakeholders, that there was a real possibility of a second surge in COVID-19 cases which might lead to new restrictions. Finally, it was assumed that many of the transport and mobility problems experienced by people would be longstanding and associated with the various types of private and public transport in use in Antananarivo. Thus, the research was looking not only at the COVID-19 problems, but at many of the current transport issues facing women and others in peri-urban Antananarivo. Potential short-term and long-term solutions to improve people's mobility and the transport systems were discussed with the various stakeholder groups.

The strategy to have international liaison meetings was developed with the assumption that cities in other LICs in Africa and Asia share similarities with the transport-related COVID-19 issues in Antananarivo. The containment measures and the impacts of COVID-19 related transport restrictions in other LICs could be similar to those observed in Madagascar. If this were the case, it would allow researchers from other countries share their experiences, providing possible ideas and lessons to the research team. They might also be able to learn from the findings of the research in Madagascar and discuss possible solutions and future strategies in Madagascar and/or their own countries.

## 2.6 Languages used in the research

The official languages in Madagascar are Malagasy (the indigenous language) and French (the colonial language). The Madagascar research team are fluent in both languages and the research was conducted in a mix of these languages. The questionnaires were prepared in French, but these were only used by the researchers, and the actual questioning was performed in the language with which the respondents were most comfortable. The international liaison discussions were conducted in English or French, depending on the language preference of the respondents.

## 2.7 Currencies and exchange rates

The currency used in Madagascar is the Ariary (MGA). All data was collected in MGA. At the time of the research, the exchange rate with the United States Dollar (USD) was around 1 USD = 4000 MGA. While the exchange rate fluctuated daily, this single approximate exchange rate was used for the purposes of this research and this value has been considered valid for international comparisons of the various issues discussed in this research.

### 3. Implementation

#### 3.1 Activities conducted

The research activities undertaken are summarised in the following paragraphs.

##### 3.1.1 Preparation activities: 26 October to 9 November 2020

The first two weeks of this project were dedicated to designing data collection tools such as the guidelines for conducting the semi-structured interviews and focus group discussions. Research permissions were also sought from, and granted, by local authorities in all of the nine research municipalities. The Ministry of Transport and the Land Transport Authority (ATT) were contacted, and the research was explained to the relevant officials. They agreed to cooperate in various ways, including participating in some of the focus group discussions, subject to the availability of the relevant staff. In Madagascar, the ATT is the government agency in charge of suburban and rural transport in Madagascar, while local government in urban municipalities (such as Antananarivo's Urban Commune) are in charge of urban transport. The National Police Force is responsible for overseeing road users' compliance to rules and regulations in urban areas and the National Military Police Force (*Gendarmerie*) does the same for rural areas.

##### 3.1.2 Initial International Liaison Meetings: 26 October to 9 November 2020

Ten meetings were held over Zoom with transport researchers and practitioners in ten LICs in Africa and Asia: Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania, Uganda and Zambia. The findings of these meetings are summarised in Section 10.

##### 3.1.3 Data Collection Phase 1: 10 to 27 November 2020

The first data collection phase was mainly qualitative, and the researchers used ethnographic research methods including focus groups, interviews and researcher observations to identify trends and understand the views and realities of the target groups and stakeholders. Nine semi-structured interviews with local government officials were carried out in the beginning of the first data collection phase, one in each municipality. In addition, during this period the team conducted a total of 35 focus group discussions (FGD) and interviews across the nine municipalities, ensuring a good geographical distribution and stakeholders' coverage across the three Districts that the communes belong to (as detailed in Table 1). More meetings were held with female stakeholders, since this research focused on the impacts of COVID-19 transport-related restrictions on women's mobility. Approximately 230 local stakeholders participated in data collection activities during phase 1. During the data collection phase the team also made observations relating to transport types and their uses and took photographs and dashcam videos.

Figure 5: Focus group discussions



The senior research team met weekly over Zoom to discuss progress and observations from the ground and to identify new data collection needs and important issues for quantitative research or further stakeholder discussions.



### 3.1.4 Data Collection Phase 2: 30 November to 23 December 2020

Using the lessons from the first data collection phase, the team identified quantitative data to collect through discussions with stakeholders (transport operators and market traders) and households. A household survey was designed with the intention of surveying 100 households (one person per household) in each of the municipalities. A total 901 households took part in the survey (Table 2). The surveyors used a stratified sampling method within each municipality based on gender, location and livelihoods. Using convenience sampling methods, the surveyors were assisted by the municipality authorities to identify people in each of the identified strata. In the short, two-week timeframe for data collection, it was easier to find women in their homes than men. The final sample comprised 37% men and 63% women (Table 3). As one of the goals of this research was to understand issues relating to women's transport and mobility, this sample composition was considered adequate. Age groups were well distributed, as shown in Table 3. Surveyed households comprised an average of 4.8 people. Nine out of ten respondents were married.

**Table 1: Focus groups conducted in the municipalities**

Stakeholder Category	Municipalities in Ambihidratrimo District	Municipalities in Atsimondrano District	Municipalities in Avaradrano District	Number of FGDs
<b>Women</b> (farmers, housewives, traders, small business owners, artisans, salaried employees)	Ampangabe Anosiala Merimandroso	Soalandy Ampanefy	Manandriana Masindray Ambohimalaza	<b>12</b>
<b>Men</b> (farmers, traders, small business owners, artisans, salaried employees)	Ambatolampy Anosiala	Ampanefy	Manandriana Masindray	<b>7</b>
<b>Transport Operators: mini-bus cooperatives</b>	Ambatolampy Merimandroso Ampangabe Anosiala	Ampanefy Soalandy	Ambohimalaza	<b>7</b>
<b>Transport operators: other</b> (small truck/pickup owners, bicycle taxis, motorcycle taxis, three-wheelers, oxcart, handcart and other non-motorised transport)	Anosiala	Ampanefy	Ambohimalaza	<b>5</b>
<b>Students</b>	-	-	Ambohimalaza	<b>1</b>
<b>Other</b> (Salaried employees in tax-free zones and motorcycle-taxi riders)	Neighbouring peri-urban municipalities (Tanjombato and Ambohimangakely)			<b>2</b>
<b>Directorate of minibus operators</b> ( <i>Conseil d'Administration de l'Union de Coopératives des Transporteurs Standardisés, UCTS</i> )	Urban Antananarivo Municipality			<b>1</b>
<b>Total</b>				<b>35</b>

**Table 2: Number of household survey respondents per municipality**

Municipality	Respondents
Ambatolampy	96
Ambohimalaza	99
Ampanefy	102
Ampangabe	114
Anosiala	99
Manandriana	95
Masindray	101
Merimandroso	98
Soalandy	97
<b>Total respondents</b>	<b>901</b>

**Table 3: Respondents by age and gender**

Age group (years)	Women		Men		Total	
16 to 25	59	10.4%	18	5.4%	77	8.5%
26 to 35	172	30.4%	79	23.5%	251	27.9%
36 to 45	170	30.1%	103	30.7%	273	30.3%
46 to 60	120	21.2%	102	30.4%	222	24.6%
Over 60	44	7.8%	34	10.1%	78	8.7%
<b>Total</b>	<b>565</b>	<b>62.7%</b>	<b>336</b>	<b>37.3%</b>	<b>901</b>	<b>100.0%</b>

Traffic counts over periods of 24 hours were also conducted in two municipalities, Ampangabe and Masindray, between 21 and 23 December. They ran from 10 am to 10 am the following day in each municipality. These municipalities had good observation sites and clear exit points into Antananarivo. They represented two different realities: Ampangabe is located further away from the capital, with stronger rural characteristics; Masindray is located closer to the capital and more of its population are able to find salaried jobs in the city.

### 3.1.5 Stakeholder workshop: 17 December 2020

A stakeholder workshop was held on 17 December 2020 to present and discuss the initial research findings. Twelve participants attended the session: local government officials from the nine subdistricts, a representative of the Land Transport Authority and a representative of the directorate of minibuses operators (UCTS). This is reported in Section 9.1.

### 3.1.6 Follow-up International Liaison Meetings: 5 to 15 January 2021

Follow-up discussions were held with transport researchers and practitioners in the same ten LICs in Africa and Asia that had been contacted before (Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania, Uganda and Zambia). The findings of these meetings are summarised in Section 10.

## 3.2 Data treatment and analysis

During the first phase of data collection that included focus group discussions and interviews with municipality officials and other key stakeholders, the research team in Madagascar produced summaries of all the meetings and discussions. These were shared with the team's advisers working outside Madagascar. The various initial findings were jointly discussed by all the senior team members through email exchanges and Zoom meetings. Similarly, the findings of the international liaison meetings involving the team's advisers and experts in other countries were regularly shared with the team members in Madagascar. This allowed the team to systematically identify issues for further exploration in the second phase of data collection. This continuous data collection and analysis methodology was also the basis for developing the quantitative questionnaires used in the second phase of data collection.

The quantitative data was collected using paper questionnaires, which were then cleaned, inputted and analysed using Excel to produce descriptive statistics. The sample was considered representative with a margin of error close to 3%, as shown in the sample size calculation in Appendix C. This process was led by the research team in Madagascar.

### 3.3 Low-income country (LIC) beneficiaries

It had been assumed that the research findings could be relevant to other cities in Madagascar and to cities in other LICs with similar contexts. This research was carried out in Madagascar only, although researchers from ten other LICs were involved to share experiences and results and to discuss possible solutions. Those countries were: Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania, Uganda and Zambia.

### 3.4 Limitations of the approach

This was a short duration and low-budget research project that was inevitably constrained by both time and available human resources. The ONG Lalana team (researchers on the ground and international advisers) tried to maximise data collection, analysis and reporting but there were inevitably limits to what they could achieve in the available time.



The research was carried out over a period of three-months between mid-October 2020 and mid-January 2021. It started about six months after the first COVID-19 containment restrictions had been imposed by the Malagasy government, and shortly after most of the COVID-19 transport and mobility restrictions had been lifted in Antananarivo (and in the whole of Madagascar). This timing meant that while the issues of COVID-19 transport restrictions were very much in people's minds, the exact details of events and costs during the first lockdown were not always easy for people to recall.

As mentioned in the introduction to this report (Section 1.2), one of the consequences of the public transport ban in Antananarivo was a notable increase in motorcycle-taxis and bicycle-taxis operating in the city centre, transporting both passengers and goods. Our researchers in the peri-urban areas found little evidence of these modes of transport being used by those living there, although some discussions suggested that these might have been used for journeys into the peri-urban municipalities, starting in the city centre. Since these modes of transport are currently illegal in and around Antananarivo (and elsewhere in Madagascar), speaking to these operators was difficult and time-consuming. Thus, it was not feasible to hold focus group discussion with the operators of these forms of transport during the short time available. There is opportunity and need for further research into these forms of transport services in the future.

Influencing policy change takes time and thus this research is only a starting point that has produced evidence that can be used in Madagascar and other similar contexts to improve transport systems for peri-urban transport users, particularly women and those most vulnerable.

### 3.5 Clarification concerning terminology

Many of the household survey questions asked people about their travel patterns and economic activities during three different periods of time.

- *'Pre-COVID-19'*: Before the COVID-19 pandemic, so what was normal for them in 2019;
- *'During COVID-19'*: During the period of transport restrictions in place between March and September 2020;
- *'After COVID-19'*: People's patterns and activities in December 2020 when the survey was undertaken. This was after the various COVID-19-related transport restrictions that had been removed at the end of September 2020.

In this report, *'after COVID-19'* is a concise way of referring to the period **after the ending of the main 2020 transport restrictions** that had been imposed in response to COVID-19. This allows short captions to be used in tables and figures. Clearly, in the research survey and in this report, there have been no suggestions that the COVID-19 pandemic has ended in Madagascar. *'After-COVID-19'* is merely shorthand for the *'after the period of 2020 transport restrictions'*, and it does not imply COVID-19 is no longer a problem for the people of Madagascar.



## 4. Research findings: Characteristics of the nine municipalities

### 4.1 Municipality location and population

This study took place in nine peri-urban municipalities from three Districts adjacent to Antananarivo, these are: Ampanefy and Soalandy (municipalities in the District of Antananarivo Atsimondrano) Masindray, Ambohimalaza and Manandriana (municipalities in the District of Antananarivo) and Anosiala, Ampangabe, Merimandroso and Ambatolampy (municipalities in the District of Ambohidratrimo). The area covers more than 230 km<sup>2</sup> and has 181,487 inhabitants. The location of the municipalities is shown in Figure 3.

In these municipalities, there are a total of 104 Fokontany (neighbourhoods/villages), 11 of which are quite far (5-7 km) from the municipality administrative centres (*'chef-lieu de commune'*). These outlying villages are difficult to access and some may even be inaccessible during the rainy season due to flooding.

The largest municipalities are Anosiala and Merimandroso (in Ambohidratrimo district). The smallest are Ampanefy and Soalandy (in Atsimondrano district). Population density is lowest in the municipalities of Masindray and Ampangabe which are quite rural municipalities with 158 and 320 inhabitants per km<sup>2</sup> respectively. The most densely populated municipalities are Soalandy and Ampanefy, located closer to the urban centre, with 2,340 and 2,893 inhabitants per km<sup>2</sup> respectively (see Table 4).

**Table 4: Population characteristics of the municipalities surveyed**

Municipality	Fokontany	Area (km <sup>2</sup> )	Population	Population (INSTAT)	Population density (people/km <sup>2</sup> )	Households	% Women heads of household	% Adult Population
Ambatolampy	8	19.5	15,925	19,859	817	3 181	10	37.5
Ampangabe	14	47	15,000	17,747	320	<i>n/a</i>	20	<i>n/a</i>
Anosiala	18	54	45,000	40,408	834	<i>n/a</i>	30	30
Merimandroso	20	56.5	19,745	15,472	350	4,000	20	<i>n/a</i>
Ampanefy	8	9.69	22,670	21,666	2,340	<i>n/a</i>	1	29.5
Soalandy	8	5.6	16,201	13,093	2,893	<i>n/a</i>	<i>n/a</i>	43.5
Ambohimalaza	11	33	14,479	17,747	439	3 141	13	51.2
Manandriana	6	15	10,467	7,128	698	1 665	<i>n/a</i>	60
Masindray	11	76	12,000	14,400	158	2 800	20	40
<b>Total</b>	<b>104</b>	<b>230.65</b>	<b>181,487</b>	<b>163 839</b>	<b>787</b>	-	-	-

**Notes:** These figures were provided by the local government officials in each municipality. The official population number estimates from the National Institute of Statistics (INSTAT) are also presented. *n/a* = not available data

### 4.2 Economic activities

The main economic activities of the population include agriculture, artisanal crafts, trade and a variety of formal and informal salaried jobs. This section describes the economic activities in the municipalities and uses data from the present research as well as some estimates provided by the municipalities.

#### 4.2.1 Agriculture

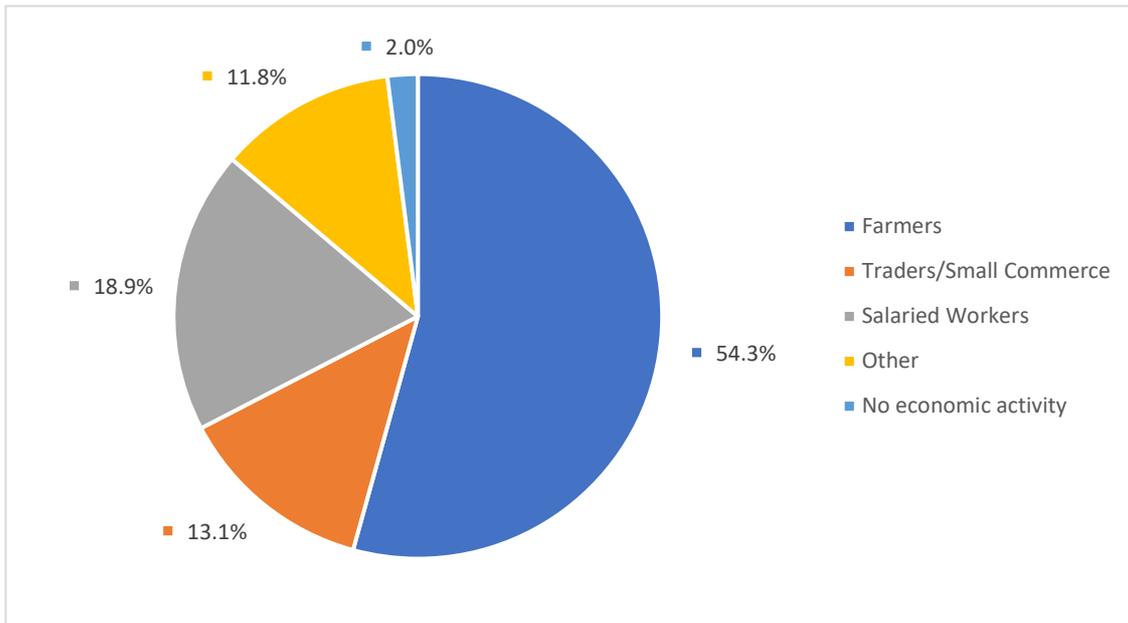
Even though they are located in the periphery of Antananarivo, the nine research municipalities are still predominantly rural in their characteristics. In seven municipalities, the local government officials estimated that between 70 to 90% of the population was engaged in some form of agricultural activity. In Ampanefy and Soalandy municipalities, due to poor irrigation facilities, most of the rice fields are now used for brick production.

While much of the agricultural production comprises food crops for household consumption, the sale of farm produce is an important source of income for most households. Figures from the household survey indicated that around 54% of respondents regarded themselves as farmers, and over half of them did not engage in other economic activities. This figure is lower than the municipality estimates, which may indicate that the



municipality estimates are outdated. It appears that the populations of the peri-urban municipalities are gradually diversifying as they become increasingly influenced by the nearby urban economy. Eighteen percent of survey respondents identified themselves as salaried workers, 13% as traders/business owners and 12% had informal jobs. From discussions with respondents and municipality officials, it is likely that many of the households that gained their income from non-agricultural activities would also be engaging in some agricultural production for home consumption. The breakdown of economic activities of respondents is shown in Figure 6.

**Figure 6: Reported economic activities (household survey)**



*Note: N = 901*

Agricultural production continues throughout the year, with a variety of crops, subject to the availability of land and water. After the rice harvest, farmers grow peas, beans, various vegetables and salad crops in the rice fields. As water resources become scarce at the end of the dry season in November-December, the little water that remains is used to prepare the rice fields for the next agricultural season.

The Merimandroso Municipality is famous for onion and garlic crops, with annual production of 6,200 tonnes of onions from 950 ha of farmland and 500 tonnes of garlic from 309 ha. Manandriana specialises in chives, while Ampangabe municipality produces beef and veal and supplies them to the capital. Ambatolampy municipality is important for supplying the capital with fish, as it has a large lake, which is suitable for fish farming.

The vegetables produced are largely intended for sale. Farmers in these areas not only supply to the large markets of the capital, they also supply to the markets in other Malagasy provinces via wholesalers and traders. Farmers are increasingly using purchased inputs (commercially produced seeds, fertilisers and pesticides) to meet the market demand. Farmers do encounter marketing problems and transport is a key issue. Two municipalities (Anosiala and Ampangabe) have local traders/intermediaries with trucks or vans who purchase produce locally for sale in the larger markets, and in some cases, they transport it and sell it on behalf of farmers, only paying them after the sale. Prior to COVID-19, most farmers used urban minibuses (*taxis be*) or rural minibuses (*taxi brousse*) to take produce to market in the early hours of the morning (before the rush hour for transporting passengers to the city). The effects of COVID-19 on transport patterns are discussed in more detail in Section 5 of this report.

#### 4.2.2 Artisanal crafts

The people working in artisanal crafts are mainly blacksmiths and metal workers, notably in Ampanefy, basket-weavers in Manandriana and carpet makers in Ampangabe. Brick producers are also included in this category. Brick-making is predominantly a male activity while making baskets and carpets occupies both men and women. Unusually, some women, as well as men, work within the blacksmithing and metal working enterprises. The municipalities estimate that 10-15% of their populations are engaged artisanal crafts.



### 4.2.3 Traders and small commerce

Thirteen percent of the survey respondents were traders and people working in small commerce (mainly small storekeepers selling groceries and basic necessities). From local government records, there were 245 registered traders (6.1% of households) in Merimandroso, one of the more remote municipalities. According to the estimates of local government officials, this category includes 2-4% of the population in Ambohimalaza and Ambatolampy in contrast to 30-50% of the population in Manandriana and in Ampanefy (a municipality close to the city).

### 4.2.4 Employees in companies and factories

Employees (salaried workers) comprised 19% of survey respondents. Municipality officials reported that 10-20% of their population were employees worked in free trade zones, but not necessarily within their municipalities. There are few factories or large enterprises within the municipalities in the study area. Anosiala has two factories in a free trade zone area, employing 2,000 people from that municipality as well as 2,000 people from elsewhere. Ambatolampy has four companies, including a printing house. There are five companies in Ampanefy, one free trade zone in Ambohimalaza (produces cardboard boxes) and an essential oils distillery employing ten people in Masindray.

### 4.2.5 Daily labourers

As noted, rice production in the municipalities of Ampanefy and Soalandy suffers from water scarcity (due to a dam) and so rice fields have been transformed into brick fields. The majority of people in these municipalities work as daily wage labourers. Many work in the brick fields and a granite quarry selling gravel chippings and other stone products. The families of wage labourers may also grow small plots of vegetables for home consumption and some sales.

## 4.3 Markets and the main destination of agricultural products

### 4.3.1 Markets

There are three main agricultural marketing strategies operating in the surveyed municipalities:

- Agricultural producers who sell directly to the nearest markets (urban or peri-urban);
- Local traders/intermediaries who collect the produce from the farmers and transport it to the wholesale markets in Antananarivo (Anosibe, Namontana, Andravoahangy, Ankadindratombo and Talamaty-Ivato);
- Traders/intermediaries serving other Malagasy provinces and cities, notably Toamasina (a large port city 350 km eastwards) and Mahajanga (a coastal city 565 km northwest).

The traders/intermediaries buying from the farmers to sell at the wholesale markets in Antananarivo or other cities have agreed points for loading produce and are personally acquainted with the farmers. Payment agreements are generally informal and sometimes on trust. The prevailing prices generally determine whether farmers sell to these traders, take their products themselves into the urban markets or sell at smaller market stalls closer to their homes. Examples of local marketing of agricultural products and the collection point for traders carrying produce to Toamasina are shown in Figure 7.



Figure 7: Vegetable stall and buying point in Masindray for farmers/traders selling to Toamasina



#### 4.3.2 Product destination for agricultural production in each municipality

The production of Ambohimalaza and Masindray municipalities is sold mainly to the markets of Ankadindratombo and Anjeva where the collection point for vegetables destined for Toamasina is located. Large quantities can be delivered to Anosibe (one of the largest wholesale markets in the city centre), while small quantities reach the urban markets of Mahazo, Ambanidia, or other smaller neighbourhood markets.

The produce from Manandriana is taken to the wholesale market of Andravoahangy, or to Sabotsy Namehana and Ankadikely Ilafy for smaller quantities.

The four municipalities of the Ambohidratrimo District sell their production mainly to the markets of Ivato, Talatamaty, Mahitsy and Ambohidratrimo. Larger quantities are also brought to the market of Anosibe, but in general, the farmers choose to go to the markets closer to their homes as this can be more profitable.

Vegetables produced in Soalandy and Ampanefy are sold to the markets of Andoharanofotsy and Tanjombato, and larger quantities are delivered to the markets of Anosibe and Namontana.

#### 4.4 Mobile network coverage and mobile phone access

Mobile phone access is important for all transport stakeholders, including people needing to find out about agricultural prices and contacts with commercial transporters. Mobile network coverage is high in all the surveyed municipalities, at 95% (Table 5).

Table 5: Reported mobile network coverage

Network coverage	Respondents	%
Households with network coverage	857	95%
Households with no network coverage	10	1%
Don't know	34	4%
<b>Total</b>	<b>901</b>	<b>100%</b>

Eighty percent of households own a mobile phone. Personal mobile phone ownership is slightly higher among men (65.4%) than women (51.6%). Only 7.4% of respondents own a smartphone. For those without mobile phones there are privately-run, informal sector booths that allow people to make calls from the stall-keeper's mobile phone for an agreed tariff. These are known as 'taxi phones'. However, 6.2% of respondents reported having no access to a mobile phone, either at home or in their village/nearby village (Table 6).

Table 6: Reported mobile phone access

Mobile phone access	Women		Men		Total	
Personal basic phone	255	45.1%	191	56.8%	446	49.5%
Personal smartphone	37	6.5%	29	8.6%	66	7.3%
<i>Total personal phone ownership</i>	<i>292</i>	<i>51.6%</i>	<i>220</i>	<i>65.4%</i>	<i>512</i>	<i>56.8%</i>
Household basic phone	152	26.9%	46	13.7%	198	22.0%
Household smartphone	6	1.1%	7	2.1%	13	1.4%



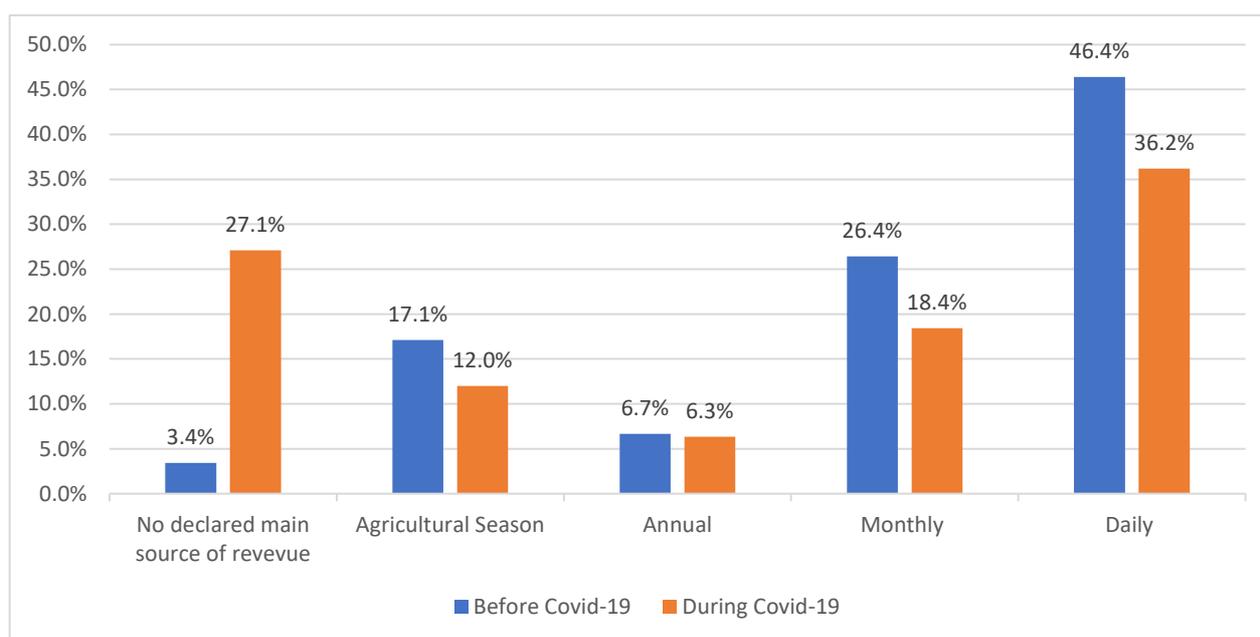
Mobile phone access	Women		Men		Total	
Village phone stall (taxi-phone)	46	8.1%	33	9.8%	79	8.8%
Phone stall (taxi-phone) in nearby village	11	1.9%	3	0.9%	14	1.6%
No mobile phone access	38	6.7%	18	5.4%	56	6.2%
No answer	20	3.5%	9	2.7%	29	3.2%
<b>Total of phone access for women and men</b>	<b>507</b>	<b>89.7%</b>	<b>309</b>	<b>92.0%</b>	<b>816</b>	<b>91.0%</b>
<b>Total of households owning a mobile phone</b>	-	-	-	-	723	80.2%
<b>Total respondents (N)</b>	<b>565</b>	<b>100.0%</b>	<b>336</b>	<b>100.0%</b>	<b>901</b>	<b>100.0%</b>

#### 4.5 Revenue patterns before and during COVID-19 restrictions

Before COVID-19 nearly half (46.4%) of the households in our survey sample reported mainly daily revenues and about a quarter (26.4%) reported having monthly revenue (see Figure 8). Seasonal agricultural revenue is also still important in these areas and 17% reported their main source of revenue to be seasonal. Only 5.9% of the 901 survey respondents reported more than one frequency of gaining revenues. This fell to 4.4% during the COVID-19 transport restrictions.

During the COVID-19 restrictions period, the percentage of households declaring no main/regular source of revenue saw an eightfold increase, from 3.4% to 27.1%, as illustrated in Figure 8. We observed a 60% reduction in declared daily revenues and the number of households declaring the lowest daily revenue (up to 10,000 MGA or 2.5 USD) per day increased by fifty percent (from 41.4% to 60.7%) as shown in Figure 9.

Figure 8: Reported main frequency of revenue (%)

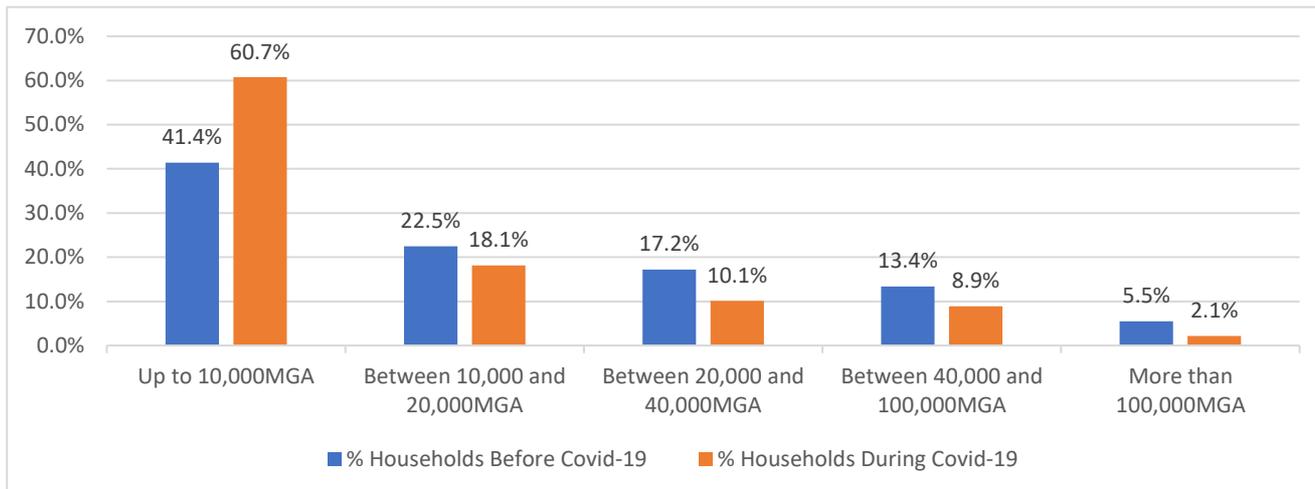


Note: N = 901

The World Bank considers the international poverty line to be 1.9 USD per person per day, which is the same figure used by the Madagascar government for the purpose of international comparisons (10). Respondents in the household survey comprised 2.5 adults and 2.3 children. Living as a household allows the sharing of some costs and so, in some measures of household poverty, children are considered to be 0.5 of an adult (11). In Madagascar, this would make the poverty line for the families of the survey respondents to be 6.9 USD or 27,740 MGA. Before COVID-19, the households reporting revenues under 20,000 MGA (below the 27,740 MGA poverty line) were 63.9%. This figure increased to 78.7% during the COVID-19 restrictions period (Figure 9).



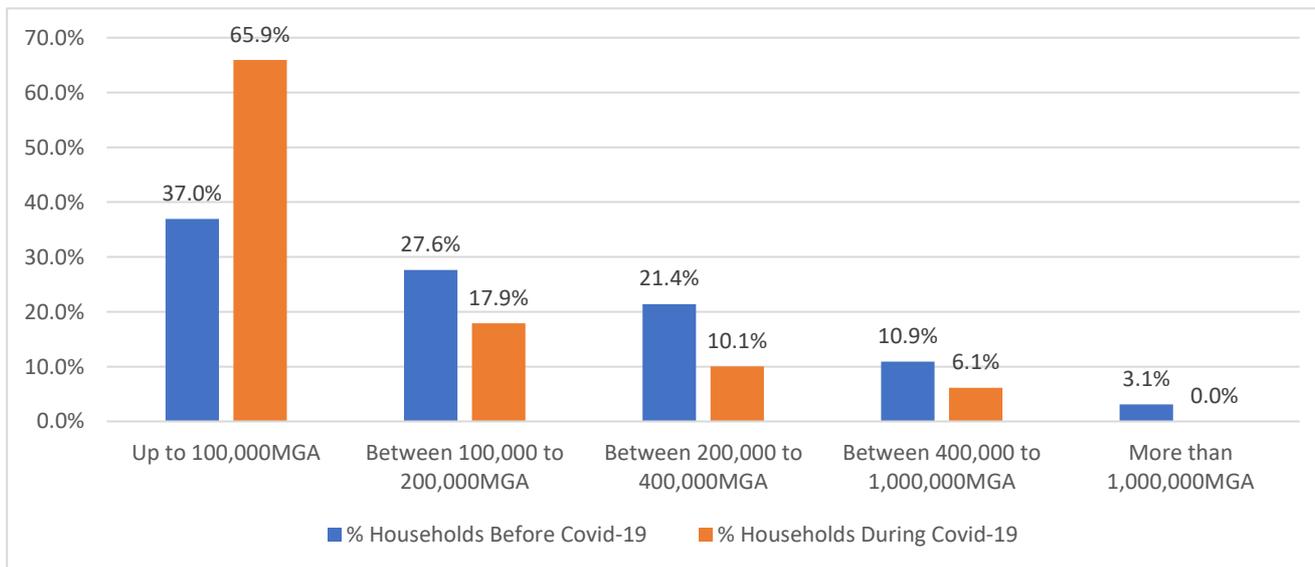
Figure 9: Daily income figures before and during COVID-19 (%)



Note: N = 418 (before COVID-19) and 326 (during COVID-19)

Households reliant on monthly revenue also reported a sharp fall in monthly revenue after the start of the COVID-19 restrictions. Prior to COVID-19, 37% of households reported they were in the lowest monthly revenue category (up to 100,000 MGA or 25 USD, which is well below the estimated household poverty line of 6.9 USD per household per day). During the COVID-19 restrictions period, 65.9% of households declared their monthly income was below 100,000 MGA (25 USD) which is about double the percentage figure in the pre-COVID-19 period (see Figure 10). This suggests loss of salaried jobs among the households in our research municipalities.

Figure 10: Percentage distribution of monthly incomes before and during COVID-19

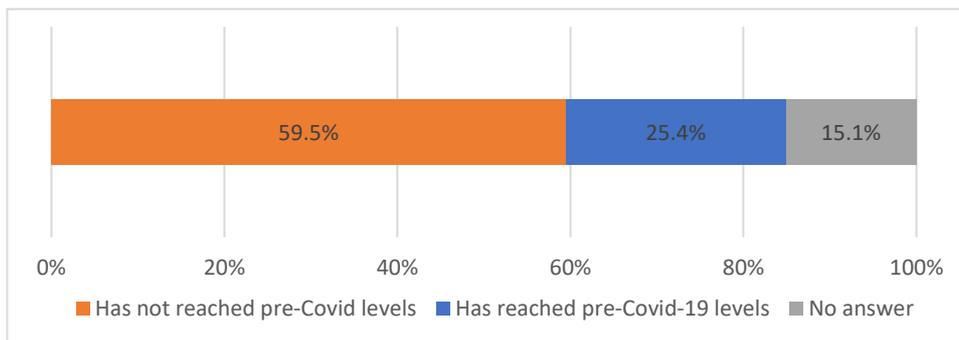


Note: N = 257 (before COVID-19) and 179 (during COVID-19)

Only one quarter of the surveyed households reported that their income levels had returned to the pre-COVID average. Almost 60% of respondents stated that this has yet to happen (see Figure 11). The remaining 15% declined to answer that question.



Figure 11: Percentage distribution of current household income levels after COVID-19



Note: N = 901

## 4.6 Regulated public transport provided by minibuses

### 4.6.1 Taxi-be and taxi-brousse

Minibuses are the main and the only legal, regulated form of public transport in urban Antananarivo and its surrounding municipalities. In other cities in Madagascar, the urban municipalities generally also allow and regulate some intermediate means of public transport including (depending on the city) motorcycle three-wheelers (motor rickshaws or tuk-tuks), tricycle rickshaws and hand rickshaws. Until quite recently hand rickshaws were a common form of short distance passenger transport in Madagascar. Many have now been replaced by motor rickshaws or tricycle rickshaw and remaining ones are mainly used to carry freight.

Many minibuses in Madagascar are modified vans, with access doors at the back. Some also have side doors. The main vehicle types are the Renault *Trafic* and the Peugeot *J5* (that both have 14 passenger seats), Mazda *E series* (with 18 seats) (see Figure 12) and the slightly larger Mercedes *Sprinter* and *308* (both have 27 passenger seats or 32 in the long-wheel-base models). These are shown in Figure 13 and Figure 14. The larger *Sprinters* and *308s* could be classified as midi-buses (with a capacity of some Toyota *Coaster* models), but they operate in the same way (and are in the same rotas) as the minibuses, and so operationally they can be considered to be large minibuses. Most minibuses operating in the peri-urban area have roof racks for agricultural produce and other passenger loads.

Figure 12: Minibuses: Renault *Trafic* (14-seats), Peugeot *J5* (14-seats) and Mazda (18-seats)



Figure 13: Minibuses: Mercedes 308 (27-seats) and Mercedes 308 long wheelbase (32-seats)





Figure 14: Minibuses: Mercedes Sprinter (27-seats) and Mercedes Sprinter long wheelbase (32-seats)



Urban minibuses in Madagascar are known as *taxi-be* while rural minibuses are known as *taxi-brousse* ('bush taxis'). The vehicles used are the same (see Figure 15 and Figure 16) and the main differences relate to their routes. *Taxi-be* operate in and around Antananarivo and, depending on their routes, they can travel into the city centre and its central markets and use the central terminals. Their routes are relatively short and restricted to the urban and peri-urban areas. *Taxi-brousse* serve rural, regional and provincial areas and generally have longer routes. Those coming into Antananarivo often start far away from the city and terminate at the markets and terminals located around the periphery of the central zone. They are widely used for carrying produce, so they generally have large roof racks and their stops along the way are often frequent and longer to allow time for loading and unloading. In the peri-urban area, there are *taxi-be* terminals in the municipalities, and some municipalities have *taxi-brousse* routes passing through them. To add some confusion to the distinction, people in the more remote municipalities generally refer to all minibuses as *taxi-brousse*, even those that are technically *taxi-be*. In this research, the two forms of minibus can be considered functionally the same for the residents of the peri-urban municipalities. While some tables and charts show both transport types (due to respondent word usage), these can be combined when interpreting people's travel patterns. It was *taxi-be* minibus owners who participated in the focus group discussions and the workshop, as these are most closely linked to the peri-urban municipalities where this research took place.

Figure 15: *Taxi-be* minibuses



Figure 16: *Taxi-brousse* minibuses





#### 4.6.2 Minibus operations and organisation

All minibuses are privately owned. The owners are organised into cooperatives that are licensed to run specific routes from a designated terminus. All minibuses have route permits provided to the owners within their cooperative. The owners must also obtain public transport insurance. However, the owners do not form transport companies or employ the vehicle operating staff (as would private-sector bus companies). Rather they lease their vehicles on a daily basis to the drivers for an agreed fee. The drivers, together with their conductors, operate the day-to-day services and collaborate with the other drivers to organise their rotas and service timing, as planned by the cooperatives. Other countries, including Tanzania and Kenya, have in recent years also endeavoured to regulate minibus services by requiring them to associate into cooperatives.

In this research study, all the minibus routes start at the central administrative hub of a municipality. The *taxi-be* cooperatives are based in the municipalities where they start their routes they are linked within a larger directorate, the Union des Coopératives de Transports Standardisés (UCTS). This organisation brings together a fleet of 2,750 vehicles with roughly 6,000 drivers and conductors (assistants responsible for loading and ticketing). While all drivers are men, a small number of conductors are women (see Figure 17).

Figure 17: *Taxi-be* minibus with a female conductor/loader



The vehicles are often old, with the interiors in poor condition (see Figure 18) and the operators interviewed reported that their vehicles needed constant maintenance and repairs, a situation that was aggravated by the bad condition of many roads. Prior to the COVID-19 pandemic, *taxi-be* usually ran overcrowded during the peak travel times (between 5 am to 8 am and between 3 pm and 8 pm). These are still the busiest times, but COVID-19 has affected the loading levels.

Figure 18: Interiors of *taxi-be* minibuses



Survey data indicates that minibus fares are on average 61 MGA or 1.5 USDc per passenger-km. By international standards this is quite low. Comparisons of transport tariffs between countries can be difficult, but one way to overcome the differences in fuel costs, exchange rates and national standards is to consider the 'Rural transport premium'. This is the ratio between the cost of per passenger-km of the available public transport services on low-volume, rural roads and the cost per passenger-km of long-distance bus services.



Being a ratio, there are no units or exchange rate issues, and many idiosyncrasies due to local prices are cancelled out. In most circumstances, there will be a Rural Transport Premium, because rural transport services typically use smaller vehicles for shorter distances on poor roads, while long-distance transport (typically in large buses) benefit from two economies of scale (large loads and long distances) and are likely to run on better infrastructure. The Rural Transport Premium is affected by vehicle size and road conditions, and some examples are provided Table 7. It can be seen that Madagascar appears to have a Rural Transport Premium of about '1', an extremely low value. This low figure can be explained by the fact that in Madagascar the same vehicles are used for rural transport (*taxi-brousse*), short-distance peri-urban transport (*taxi-be*) and inter-city services and that national roads are in poor condition, so that vehicle operating costs are high. The long-distance ticket price is about 1.5 USDc per passenger-km, which is similar to the cost of the peri-urban minibuses.

**Table 7: International examples of Rural Transport Premium**

Country	Public transport type	Rural Transport Premium
Tanzania	Motorcycle taxi	10
Myanmar	Motorcycle three-wheeler	5
Pakistan	Motorcycle three-wheeler	1.2
Kenya	Minibus	5
Nepal	35-seat bus	3
Madagascar	Minibus	1

### 4.6.3 Minibus routes

Each of the municipalities has at least one clearly defined *taxi-be* line (a fixed route into the city) that is served by between 12 and 22 vehicles, depending on the line. There was a total of eight *taxi-be* routes in the research municipalities. These are shown in Figure 20, that has an ariel view of the whole area (from Google Earth) and traces of the actual routes. The location of the municipality terminals and the main market destinations for farmers are also indicated on the trace maps.

Table 8 provides details of the minibus routes, their length, the number of vehicles operating the route and the costs of fares from the route origin to the destination. In each municipality, the minibus lines pass through about 3-4 small villages (*fokontany*). In total they serve 34 villages, but 70 other villages in the municipalities are not on the minibus routes, so many people must walk, or use other forms of transport, to reach the minibus routes. Figure 19 shows some of the rural sections of the minibus routes.

**Figure 19: Examples of the rural sections of some of the minibus routes studied**



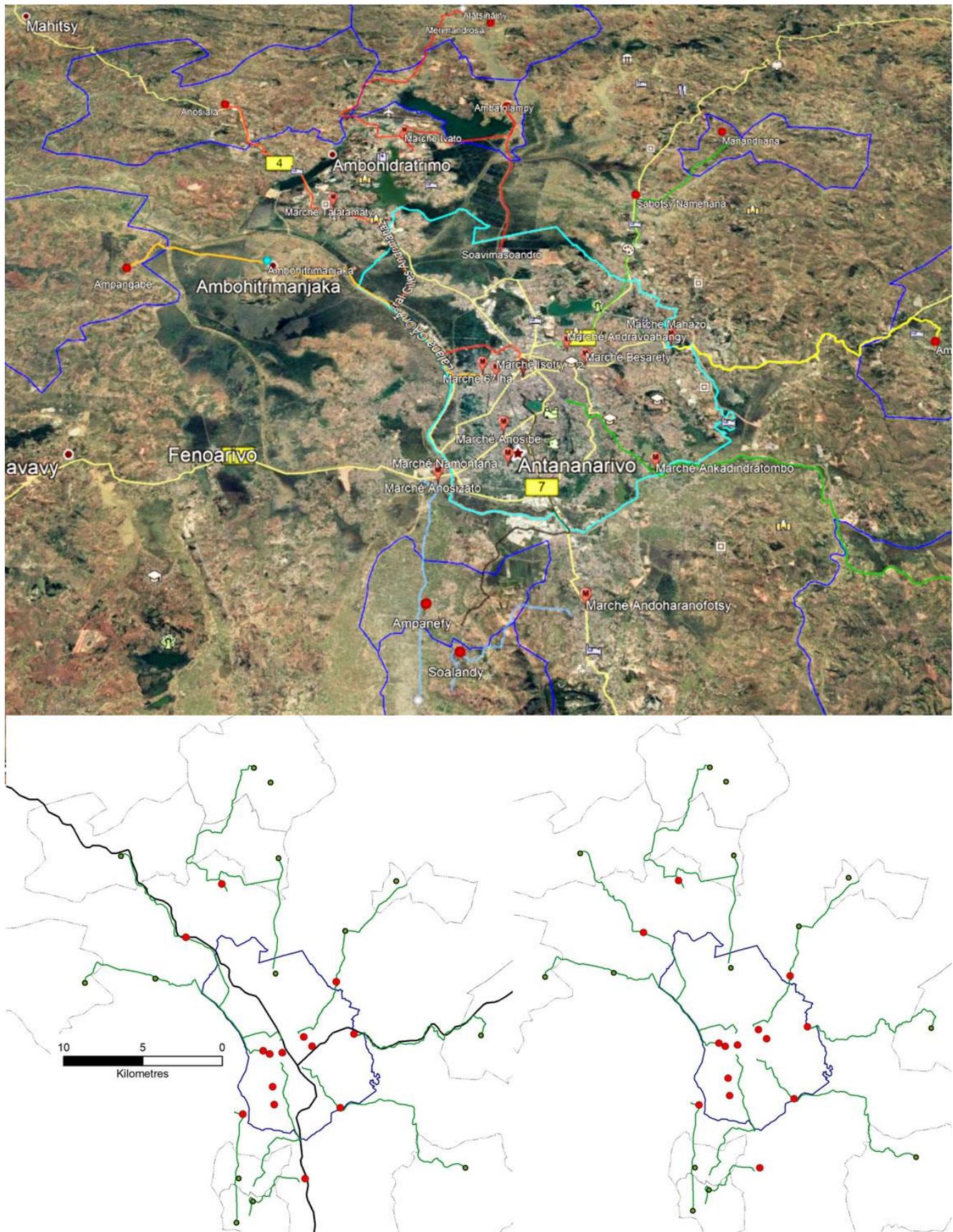
The municipalities of Ampanefy and Soalandy have noted an increase in minibus routes and vehicles over the past five years. They now have three *taxi-be* lines working in the area and covering routes where people previously had to walk. On the other hand, people in the municipality of Merimandroso complained that the *taxi brousse* station was moved to a village located about 1 km from the municipality hub (*chef lieu de commune*) despite this being where most of the transport operators live and where the local market is located.

Table 8: Minibus (*taxi-be*) routes serving the researched municipalities

Municipality	Minibus lines	Vehicle fleet	Route length (km)	Passenger fare (MGA)
Ambatolampy Tsimahafotsy	D: Ambatolampy – Horizon Ivato	15		500
	D: Ambatolampy - Soavimasoandro	20	7.3	500
Merimandroso	Alatsinainy – Horizon Ivato	<i>No data</i>	13	1500 <i>(2000 in rainy season)</i>
Ambohimalaza	E: Andranonahoatra - Mahazo	20 <i>(16 in service)</i>	12.5	600
Soalandy	G: Beravina - Anosizato		7.7	600 <i>(2000 in rainy season)</i>
	Soalandy - Andoharanofotsy			600
Ampanefy	F: Talata – Ampefiloha (CNAPS)	30 <i>(13 in service)</i>	11.1	600
Anosiala	D: Anosiala - Vassacos		19.6	1000
Ampangabe	B: Ampangabe – 67 ha	25	15.3	1000
Manandriana	H: Manandriana – Sabotsy Namehana		13.5	500
Masindray	I: Masindray - Ambohijatovo		16.4	1000



Figure 20: Minibus routes and destinations for the surveyed municipalities (aerial view and route lines)



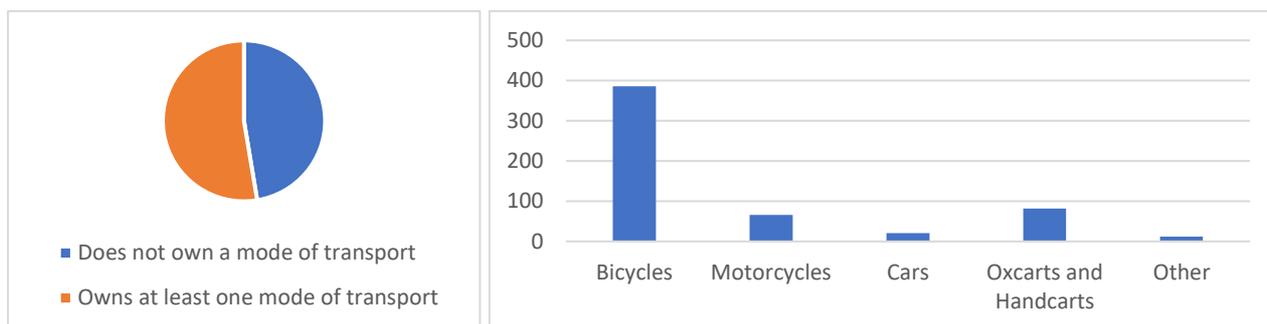
**Key:** *On ariel map.* Red dots: Municipality terminals. Red pins: Main markets  
 Light blue line: Antananarivo urban area. Dark blue lines: Municipality boundaries  
*On the trace maps.* Red dots: Main markets. Green lines: Minibus routes studied.  
 Black lines: Main arterial roads (national roads).



#### 4.7 Privately owned transport

According to the survey, half of the households in the research municipalities (47%) do not own any mode of transport, as seen in the pie chart in Figure 21. Of the 474 households that own at least one mode of transport, 81% own bicycles, 17% own oxcarts or handcarts, 14% own motorcycles and 4% own a car. Ownership patterns are also shown in Figure 21. A small percentage of households (3%) owns other types of vehicle, such as vans, pickups and trucks. All the motorcycles are powered by petrol and most motorcycles are of standard design, with large wheels. A few motorcycles could be classified as ‘scooters’ as they have smaller wheels and a platform for the driver’s feet. Such models have not been disaggregated and in this research are designated as motorcycles. Recent Lalana research in urban Antananarivo showed that scooters are more common than motorcycles in the city itself. Although female riders of motorcycles and scooters are a minority, the majority of female riders choose to use scooters (12).

**Figure 21: Transport ownership in surveyed households**



**Note:** Pie chart shows percentage ownership (N=901) while bar graph shows numbers owned (N=474)

Overall, the bicycle is the most commonly owned mode of transport: 42% of all 901 surveyed households owned one. After bicycles, carts were owned by 9% of all surveyed households. It is likely that many of these ‘carts’ would have been oxcarts, and some would have been large, human-pulled handcarts. Both of these carts are called ‘*charettes*’ (literally ‘carts’) in French, and in the survey, there was no disaggregation of oxcarts (*charrettes à bœufs*) and handcarts (*charrettes à bras*). These two cart types are illustrated and discussed further in Sections 5.2.6 and 5.2.7. Apart from the minibuses, oxcarts and handcarts are the most used modes of transport to carry agricultural produce. They are operated almost exclusively by men, although women benefit from their services.



## 5. Research findings: Transport patterns

### 5.1 Transport patterns

#### 5.1.1 Reasons for travelling

In the research municipalities, people travelled for a variety reasons, and the main purposes were as follow.

- Professional reasons and/or economic activities;
  - Smallholder farmers travelling to sell their own produce;
  - Smallholder farmers who are also intermediary traders for other farmers;
  - Intermediaries/traders (trading in agricultural products and other goods in the municipality markets);
  - Salaried workers, formal or informal (teachers, employees in factories and other private companies, artisans, civil servants);
  - Intermediaries doing agricultural trade with other regions in Madagascar;
- To attend high schools and universities outside the municipality (including in urban Antananarivo);
- To take care of administrative issues;
- To buy household goods and articles (usually women);
- For medical reasons;
- To visit family members.

#### 5.1.2 Traffic counts

Twenty-four-hour traffic counts, disaggregated for gender, were undertaken in two municipalities, Ampangabe and Masindray. These municipalities were selected to provide contrasting situations. Ampangabe in the northwest is relatively remote from the capital and has many rural characteristics. Masindray to the southeast is more influenced by the nearby urban environment and more of its population commute into the city. The main results are summarised in Figure 22 and Figure 23.

**Figure 22: Traffic count numbers by traffic type in Masindray and Ampangabe**

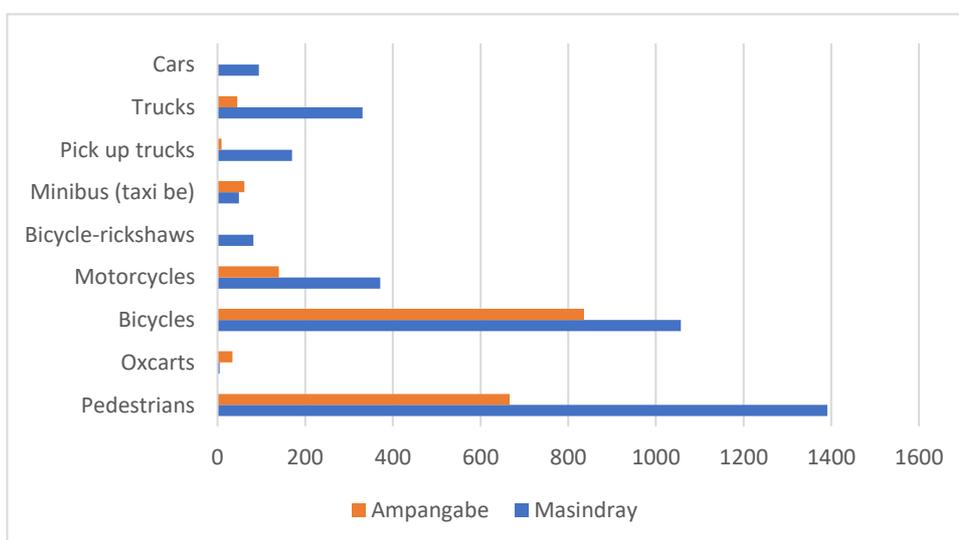
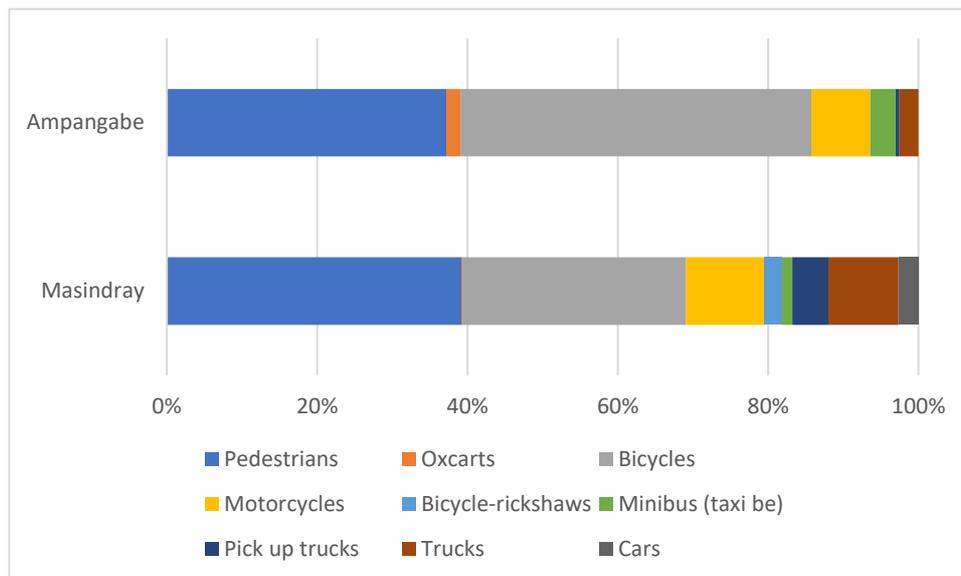


Figure 23 shows that the households surveyed in the Commune of Masindray, further away from the city centre, use a lot more ox carts, bicycles and taxis-be than Masindray.



Figure 23: Traffic count by road user (%) over 24h in Masindray and Ampangabe



Note: N = 4,033 in Ampangabe and N = 5,111 in Masindray

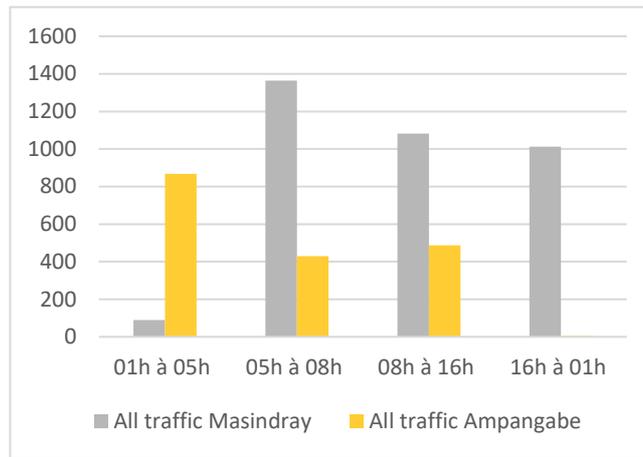
### 5.1.3 Travel patterns throughout the day

The main patterns of traffic movements are summarised as follows:

- *From 1 am to 5 am:* this is the period during which farmers travel into the city (and neighbouring municipalities) to sell their produce to the market traders. Farmers playing the role of intermediaries and trading in other goods also travel during this period. Figure 24 and Figure 25 show that both traffic and travel numbers are much higher in this period in the more rural Ampangabe municipality, with few movements at this early time in the more urban Masindray.
- *From 5 am to 8 am:* this period shows high traffic and travel movement in both municipalities.
  - Agricultural intermediaries and those trading in other goods are still leaving for the markets.
  - Informal and formal workers travel to the city and other municipalities for jobs. The higher numbers of vehicles and travellers recorded in Masindray at this time (as seen in Figure 24 and Figure 25) show the larger numbers of commuters travelling for work.
  - Students travelling to high schools or universities in the city or other municipalities.
- *From 8 am to 3 pm:* this is a quiet period for the minibuses, although it is the return time for many farmers, traders and those travelling outside the municipalities for administrative reasons, seeking medical care (albeit very few) and those visiting family members.
- *From 3 pm to 8 pm:* this is another busy period for the minibuses as commuters, including students, return to their homes in the peri-urban municipalities.
- *From 8 pm to 1 am:* a very quiet period with few travellers and very few (if any) minibus movements. However, during this time, several pickups and small trucks carry large quantities of produce from the municipalities, with most destined for other regions of the country.

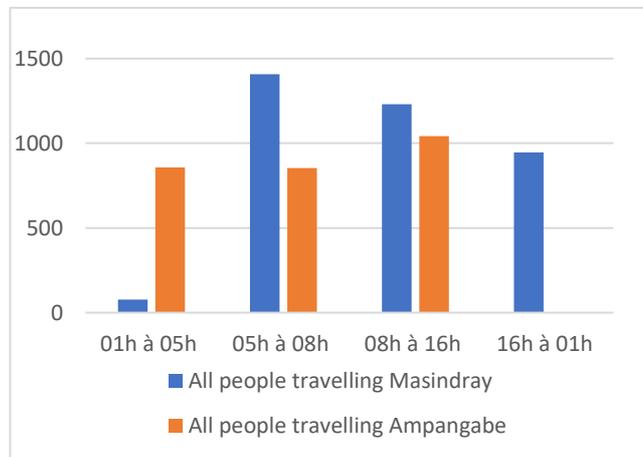


**Figure 24: Traffic count totals for four time periods in Masindray and Ampangabe**



*Note: Based on 24-hour traffic counts, including all vehicles and all pedestrians*

**Figure 25: Peoples' movements during for four time periods in Masindray and Ampangabe**



*Note: Based on 24-hour traffic counts, including all vehicle passengers and all pedestrians*

## 5.2 Main modes of transport used

### 5.2.1 Overall situation and main modes of transport

According to the traffic count data (Figure 22 and Figure 23), the large majority (80%) of the population in the peri-urban municipalities travels on foot, by bicycle and by minibus. People living in predominantly agricultural municipalities located further away from the city centre, like Ampangabe, have fewer transport options available than those living in municipalities located closer to the city centre, like Masindray.

**Figure 26: Passenger numbers by mode of transport over 24h in Masindray and Ampangabe**

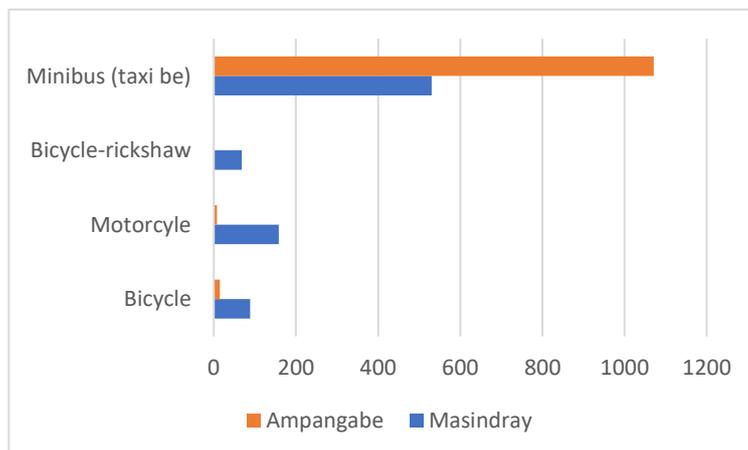
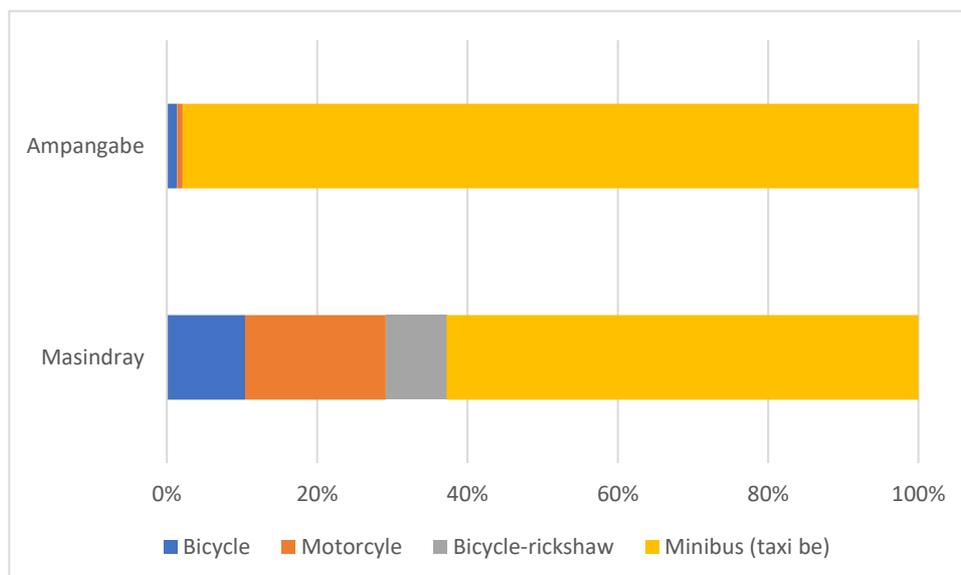




Figure 27: Passenger count by mode of transport (%) over 24h in Masindray and Ampangabe



Note: N = 4,033 in Ampangabe and N = 5,111 in Masindray

### 5.2.2 Gender differences in traffic counts

About 45% of the pedestrians observed during our traffic count were women. Women represent about 60% of minibus passengers (65% in Ampangabe and 58% in Masindray). Overall women represented over 60% of passengers in all modes of transport, except for passengers on bicycle-taxis in Ampangabe (women represent only one third of passengers but this was a small sample of 15 passengers). Only 5% of bicycle riders and only 8% of motorcycle riders were women (although this level of female ridership of motorcycles would be regarded as high in some LICs). In previous research on two-wheeler traffic in the urban centre of Antananarivo, only 1.5% of riders of two-wheelers (bicycles, motorcycles and scooters) were female (12).

### 5.2.3 Minibuses

Minibuses are the main means of transport of the population living in the nine peri-urban municipalities, because they have short journey times, can carry goods and are regarded as affordable. Most minibuses have roof-racks for carrying passenger's loads. More than 62% of those travelling as passengers on a mode of transport travel by minibus. On average, each vehicle carried 19 passengers per trip. Under the current restrictions, each vehicle is permitted to carry 21 passengers, which is about 2/3 of the normal maximum of 27 passenger per vehicles.

Most minibus trips occur in three time-slots:

- Early morning: 1-5 am. Farmers/traders travel with their produce to urban Antananarivo;
- Morning 'rush hour': 5-8 am. Commuters, employees, informal workers and students travel to schools and workplaces;
- Evening 'rush hour': 3-8 pm. Commuters, employees, informal workers and students return home.

There is a low frequency of daytime trips between 8 am and 3 pm.

### 5.2.4 Walking

Many farmers and farmer/traders, especially women, walk to carry their products to markets in nearby municipalities that are part of greater Antananarivo (Talatamaty, Ivato, Ankadindratombo, Anjeva, Sabotsy Namehana, Ambohitrimanjaka) or into the capital's urban centre markets (Anosibe, Namontana, Petite Vitesse, Mahazo, Andravoahangy and Besarety). They leave early in the morning (around 1 am), for an average journey of 2 hours. Having sold their products, they return by *taxi-be* in the morning or afternoon, depending on when they manage to sell their products. Some pedestrians are shown in Figure 28.



Figure 28: Pedestrians along the minibus routes



### 5.2.5 Bicycles

Bicycles are used by male farmers/intermediaries and traders who leave early in the morning to carry their goods to nearby municipalities and to the urban centre of Antananarivo. These farmers/intermediaries and traders leave around 2 am in groups of 10-20, travelling for an average of two hours.

Figure 29: Travellers by mode of transport over 24h in Masindrany and Ampangabe

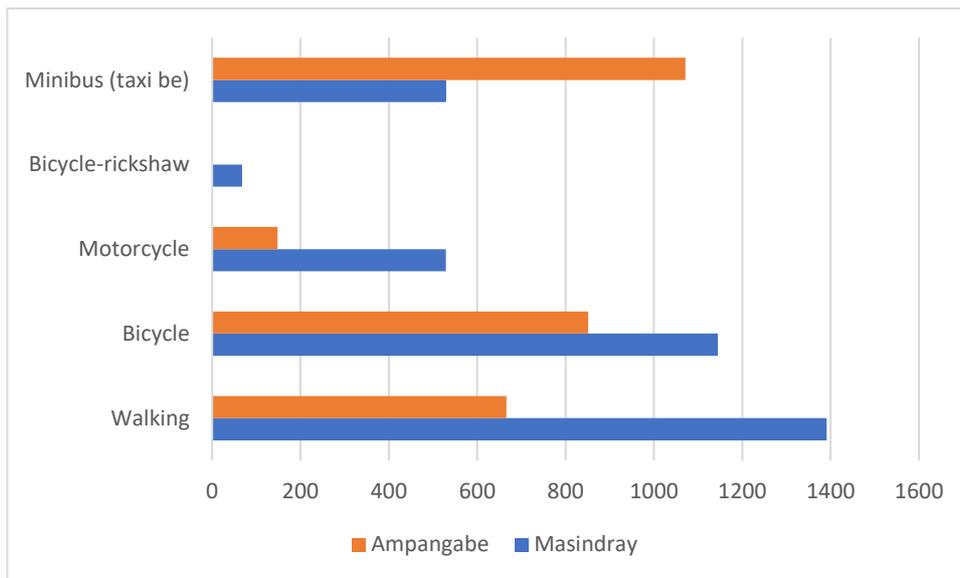


Figure 30: Traveller percentage by mode of transport over 24h in Masindrany and Ampangabe

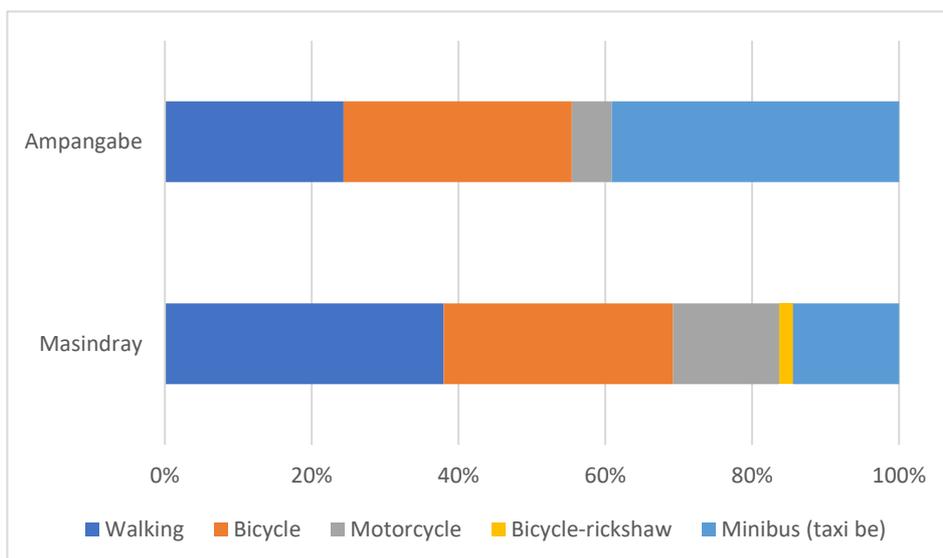


Figure 31: Bicycle use on the routes studied, including freight boxes for tomatoes



### 5.2.6 Ox carts

Oxcarts are used in rural areas for transporting agricultural produce, including from the fields to the villages, and from the villages to the collection points of large trucks. Trading intermediaries use ox carts when they need to carry large quantities of goods to the market, including the communal marketplaces within Ampangabe, Merimandroso and Masindray. Farmers who play the role of intermediaries also use ox carts when they have large quantities to carry to markets or collection points in their municipality or nearby municipalities. In Ambohimalaza, renting an ox cart costs 10,000 MGA (2.50 USD) per trip.

Figure 32: Ox carts used on the routes studied



### 5.2.7 Handcarts

Handcarts are also a common mode of transport for shorter distances and (unlike ox carts) they are allowed in the urban city centre where they are increasingly being regulated in terms of routes and timings. Handcarts are used by farmers, intermediaries, artisans and small business owners to carry/bring goods into/from the city centre by those living in peri-urban villages that are closer to the city centre, especially in Soalandy and Ampanefy municipalities. In Ampanefy, renting the services of a man pulling a handcart costs between 500 MGA and 1,000 MGA (12.5 USDc and 25 USDc). Handcarts are primarily a freight service, but in one focus group discussion it was reported that some handcarts carried people and their goods during the lockdown. Examples of handcarts on a road in Soalandy are shown in Figure 33.

Figure 33: Handcarts used on the routes studied



### 5.2.8 Bicycle-rickshaws

In the municipality of Masindray, about 10 bicycle-rickshaws (tricycles) work along the 2 km of earth road that leads to the paved road in the municipality hub (*'chef-lieu de commune'*). These are illustrated in Figure 34. The rickshaw operators work between 6 am to 4 pm, carrying passengers and goods. Tariffs are about 1,000 MGA (25 USDc) per passenger or sack of goods. An operator can earn between 5,000 and 15,000 MGA (1.25-3.75 USD) per day, depending on the number of passengers and the amount of goods they carry.

Bicycle-rickshaws did not stop operating during the COVID-19 restrictions period, although they carried only goods. Their revenue increased slightly during that period, making them an exception – other transport operators (particularly *taxi-be*) reported less revenue during that period.

Figure 34: Bicycle rickshaws in Masindray



### 5.2.9 Motorcycles

Motorcycles are not yet common in the research municipalities. The traffic count suggested that they might be more common in municipalities like Masindray, closer to Antananarivo's urban centre and whose population has more chances to seek job opportunities in the city, rather in more agricultural municipalities. Examples of motorcycle use are shown in Figure 35.



Figure 35: Motorcycles used on the routes studied





## 6. Research findings: COVID-19 restrictions on transport and mobility

### 6.1 COVID-19 restrictions to transport and mobility

As observed in the introduction to this report, Antananarivo was the city in Madagascar most affected by the pandemic, the first where cases were registered and which endured harsher and longer virus containment measures, including transport restrictions. Starting in March 2020, one of the key government responses to the COVID-19 pandemic in Madagascar was a severe lockdown and a transport ban that prohibited most passenger movements within Antananarivo Region and also between this region and other regions. Between March 2020 and December 2020, the restrictions imposed were as follows.

- March-mid-May 2020: lockdown period, during which people were not allowed to move for work reasons, public transport was banned, and local food markets were to close at noon;
- Mid-May-June 2020: partial lockdown period, during which movements for work reasons were allowed in the morning, public transport was allowed between 6am and 3pm (albeit with restrictions on the number of passengers, mandatory mask wearing and hand washing), a curfew, and markets open until 2pm;
- July 2020: lockdown period (with the same restrictions as the March-May period);
- August-September 2020: partial lockdown again for two months (with the same restrictions as the May-June period);

Since late September, there are no movement restrictions, but the number of passengers allowed on public transport is still limited, mask wearing, and hand washing remain mandatory.

### 6.2 Impact of COVID-19 measures on transport operators

#### 6.2.1 Minibuses

Minibus operators were the most affected in the transport sector. During the periods of lockdown (March-May and July 2020), *taxi-be* minibuses were not allowed to carry passengers, although a few of them continued carrying goods from farmers/traders to markets in the morning. The directorate of minibus operators (UCTS) is a self-regulatory structure that brings together a fleet of 2,750 vehicles operated by 6,000 drivers and conductors. UCTS, as well as various drivers and conductors interviewed, explained the problems faced by the minibus owners and operators due to the COVID-19 pandemic. This confirmed the findings of a World Bank survey, according to which transport was the second most affected sector in Madagascar in terms of job losses due to the pandemic. The problems can be summarised as:

- For the six months that restrictions lasted, the activities of the *taxi-be* minibus operators either completely halted or reduced significantly. In December 2020, between 50 to 60% of fleet was operating and there were still restrictions to the numbers of passengers allowed inside minibuses (e.g., 21 instead of the usual 27 for the Mercedes 308 and Sprinter), so revenues were still lower than normal.
- All costs related to COVID-19 prevention have to be met by the transport owners or operators. These costs include vehicle disinfection, masks and/or face shields for drivers and conductors, gloves and hydro-alcoholic hand sanitiser gels. These rules are still mandatory, although enforcement had become minimal by December 2020 (unlike at the strictness at the beginning of the pandemic). The extra costs led to a permitted increase of 100 MGA in minibus fares, which represented a 10-15% increase over the previous fares.
- The minibus owners and the minibus operators reported they had not received any support from the government, in any form. Some minibus owners reported they were assisting their leasing drivers themselves. Many drivers and conductors reported that they went back to working in agriculture during lockdown and when transport demand was very low. The UCTS managed to get some support through partnerships. Fuel distributor Galana provides free vehicle disinfection and a bonus of 160 MGA (4 USDc) for every litre of fuel purchased; the National Insurance Scheme (CNAPS – Caisse Nationale de Prévoyance Sociale de Madagascar) has put in place a scheme to help drivers and conductors become members, so that they can benefit from family subsidies and pension when they retire.



The UCTS does not have a favourable opinion of the transport services provided by intermediate means of transport (motorcycle taxis, three-wheelers, oxcarts and handcarts) that have flourished during the lockdown and partial lockdown periods. They noted that the informal transport operators using such vehicles do not follow any rules. They questioned whether such modes of transport were appropriate.

### 6.2.2 Oxcarts and handcarts

Overall, oxcarts and handcarts increased their activities during the partial lockdown, and this continued after transport restrictions were lifted.

#### Box 1 Minibus (*taxi-be*) operators in Ampanefy Municipality

Before the COVID-19 crisis, 20 vehicles were in use every day in Ampanefy's *taxi-be* line F. In January 2021, only 13 were working. They managed to complete four roundtrips a day. The number of passengers permitted was reduced to 21 (from the usual 27). This reduction in passenger numbers led to a price increase, from 500 MGA to 600 MGA (15 USDc) per ticket.

On average, the revenue for one *taxi-be* in this line was 70,000 MGA (17.5 USD) prior to COVID-19, about 50,000 MGA (12.5 USD) during the partial lockdown, and 40,000 MGA (10 USD) in January 2021. Drivers and conductors observed that people had less purchasing power and that they prioritised school expenses when the schools restarted.

In pre-COVID-19 times, the minibuses departed every ten minutes from the line's starting point (the municipality hub). The research team watched minibus departures on a day in December 2020. They recorded that between 6 am and 8 am, minibuses departed every 30 min. Seventy percent of the passengers travelling that day were women; however, these represented only 25% of the women travelling into the city that day: the other 75% walked. A roundtrip into the city and back takes a minibus about 90 minutes. It takes one hour if traffic is light and 3 hours if there is traffic congestion.

In the early hours of the morning, minibus passengers arrive with their agricultural goods. One bag of vegetables (in an old 50 kg rice sack) is charged the same as a passenger (600 MGA or 15 USDc). For heavier loads such as cassava or rice, the same 50 kg sack is charged 1,000 MGA (25 USDc). The number of passengers increases slightly on Tuesdays, market day at Ankadivoribe.

During the lockdown period, bicycle-taxis carried passengers 5 km to Tanjombato (a municipality closer to the capital, 5 km distance), for 1,000 MGA (25 USDc); and to Anosy (near one of the largest markets in Antananarivo, at 8 km distance), for 2,000 MGA (50 USDc). Some people used handcarts to carry their goods to other markets in the city, like Isotry or Namontana.

Drivers and conductors noted that they didn't feel safe when they restarted working during the partial lockdown periods. However, they needed to work, so they carried on but always wearing masks.



### 6.2.3 Bicycle-taxis and motorcycle-taxis

In the absence of *taxi-be*, bicycles and bicycle-taxis became a fundamental mode of transport for those living in the nine municipalities. Although this activity is not regulated (making it illegal), bicycle-taxis do not usually report any problems with local government officials or police in journeys within the peri-urban municipalities (and this situation did not change during the restriction period). The same situation might not be true for bicycle-taxis which started operating in the urban city centre,

where the police were reported to have implemented strict enforcement. In the research municipalities, although some bicycle-taxi operators reported a decrease in activity during lockdown and partial lockdown (Text Box 2), the overall demand for their services increased. Motorcycle-taxis were working primarily in urban Antananarivo (rather than in the peri-urban municipalities). Figure 36 shows bicycles carrying passengers and some of these would have been bicycle taxis.

#### Box 2 Bicycle-taxis in Anosiala Municipality

The research team interviewed bicycle-taxi operators in Anosiala Municipality. These only transported goods, not passengers. One of them had been in that business for 35 years. They never faced any challenges by the local government that lets them operate, without paying any fees. The bicycle taxis serve all the villages (*fokontany*) in the municipality.

During the severe lockdown periods, they did not work. They worked half-days during the partial lockdown and their revenues were halved.

Bicycle-taxis can carry up to 100 kg (two bags of cement or sacks of rice). The freight cost charged varies between 1,000 and 5,000 MGA (0.25 USD to 1.25 USD) for a bag of 50 kg, depending on the distance. A freight trip that takes 1 h 50 min costs 5,000 MGA per bag (1.25 USD).

Figure 36: Bicycles and bicycle taxis carrying passengers



### 6.2.4 Bicycle-rickshaws and tuk-tuks

The few bicycle-rickshaws interviewed did not stop operating during the COVID-19 restriction periods, although they carried only goods. Their revenue increased slightly during that period, making them an exception.

In Anosiala Municipality, the three tuk-tuks (motorised three-wheelers) operating reported that during the lockdown they were not allowed to carry passengers, although they continued to carry goods. The average number of roundtrips per day decreased from seven to four and they estimated their revenue decreased by about 40%. In December 2020, their revenue reached 70% of their daily revenue prior to the COVID-19 crisis. One of the operators interviewed noted that the low fuel consumption and the low maintenance costs of three-wheelers are the main advantages of this mode of transport. This helped them cope during the prevailing difficult conditions.



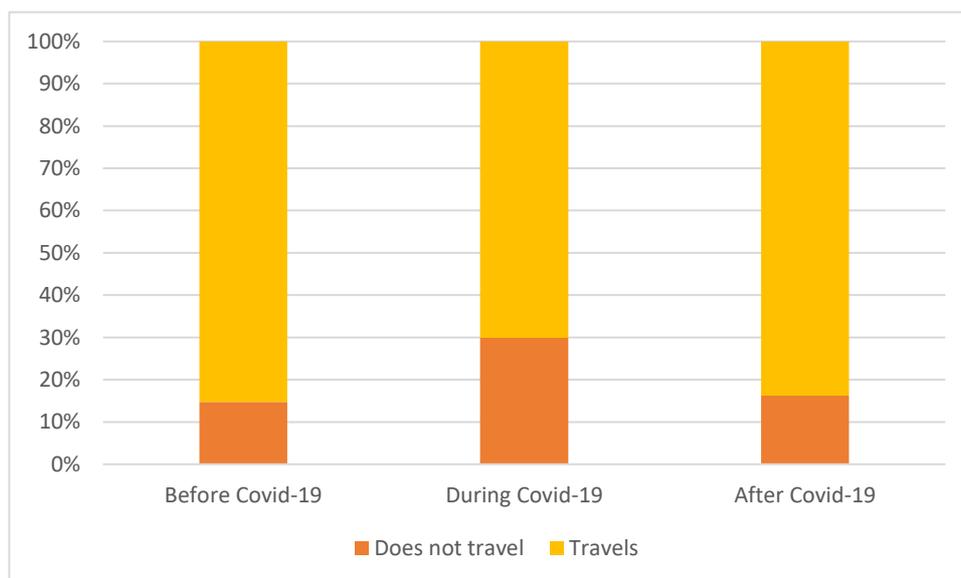
## 6.3 Impact of COVID-19 measures on transport users

### 6.3.1 Impact on people in general

According to the World Bank survey carried out in June 2020, 12% of the Malagasy population stated that they worked at home during the restrictions period but only 0.1% of the Malagasy population was undertaking employed telework during the restrictions period (4). Half of the World Bank survey respondents declared working on a farm or at a fishing location during that period, and 12% carried out economic activities on the street and public places. As in many other LICs in sub-Saharan Africa, most households in Madagascar, particularly in urban areas, rely on informal economic activities for day-to-day survival (13) and telework is not an option for most people.

Our household survey showed that, before the COVID-19 pandemic, 85% of the population living in the nine research municipalities regularly travelled into the city and to neighbouring municipalities to carry out different formal and informal economic activities. This is shown in Figure 37. During the COVID-19 transport restrictions period, people travelling for economic activities fell to 70%, but returned to pre-COVID levels in December 2020 when the survey was carried out, which was after the restrictions had been lifted (Figure 37). As focus group participants had observed, most people living in the peri-urban municipalities had no option but to ignore the lockdown measures imposed by the government in order to obtain some form of income.

**Figure 37: Number of people (%) travelling to carry out economic activities**

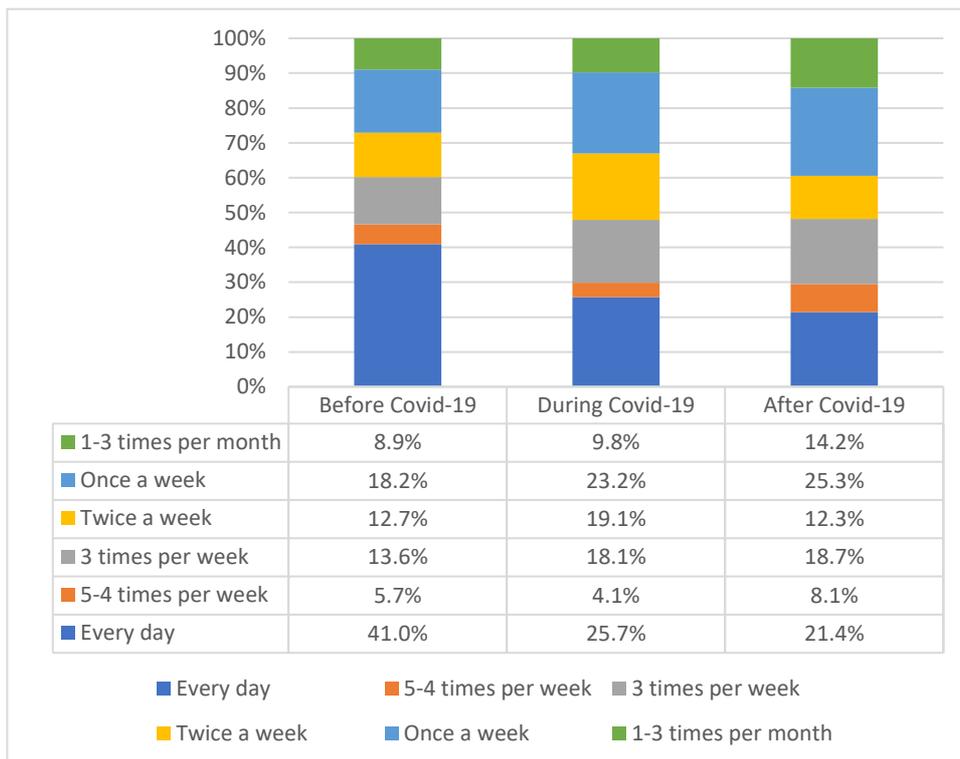


**Note:** During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when this survey was carried out. N = 949, 775 and 979. An N above the household sample of 901 means respondents reported travel habits for farming related activities and also for other economic activities.

An important mobility trend was the change in frequency of travel, and the lack of an immediate recovery of travel patterns once travel restrictions were lifted. Overall daily trips decreased during the COVID-19 restrictions period and were at even lower levels in December 2020, after restrictions had been lifted. Before COVID-19, almost 40% of people travelling to carry out economic activities (agriculture or other income generation) did so every day and almost one fifth travelled once a week. Those who travelled only a few times a month represented slightly less than 10% of travellers pre-COVID-19. The percentage of people travelling every day dropped by a half to 21% post-COVID-19 restrictions. Those travelling once a week increased to a quarter and those travelling a few times a month rose to 14%. This is illustrated in Figure 38.



Figure 38: Frequency of travel for all economic activities, during and after transport restrictions



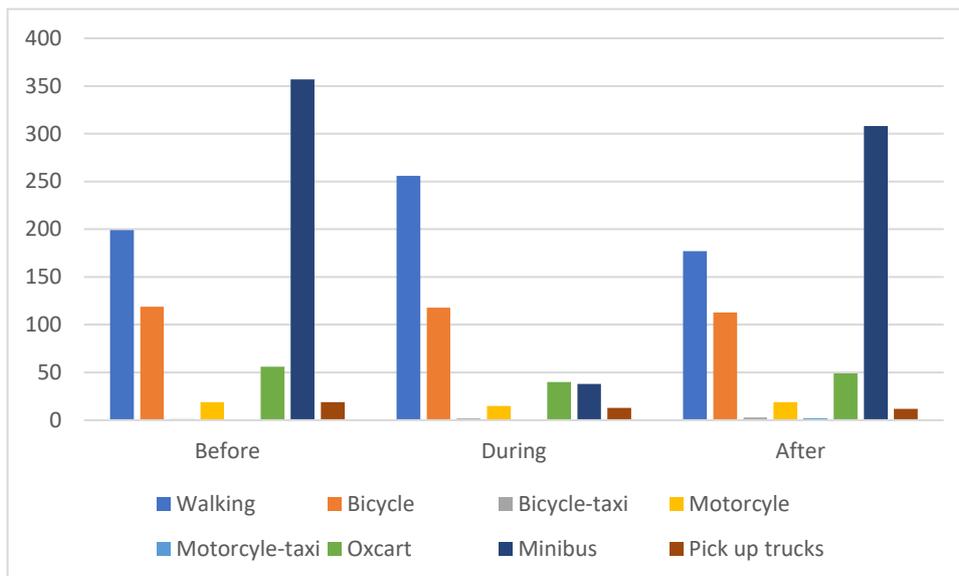
**Note:** During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. ‘After COVID-19’ refers to December 2020, after transport restrictions were lifted and when this survey was carried out. N = 774, 509 and 664

Another important trend observed was the fact that the large majority of transport users in our research municipalities resorted primarily to walking in the absence of minibuses: the number of people walking increased by 25% during the restrictions period and minibus users dropped by 80%, from 350 to less than 50 (see Figure 39). Minibus users represented more than half of all road users before COVID-19 and during the COVID-19 restrictions period represented less than 10%. By December 2020, the minibus passengers were not yet back to their pre-COVID-19 levels. Focus groups participants noted reduced incomes, increasing costs of living, the many expenses incurred at the start of the school year (in October) and the higher price of minibus fares. The cost of minibus fares in the lines serving the Antananarivo peri-urban areas increased by 100 MGA (2.5 USDc) after physical distancing measures were imposed, measures which were still in place in January 2021. This price increase represents a 10-15% increase on the pre-COVID-19 fare prices. In addition, reduction in the frequency of travelling in the group of people carrying out non-agricultural activities suggests job losses and a subsequent reduction in people’s travelling needs (see Section 6.3.3).

The use of bicycles remained constant between the three periods analysed here, suggesting that reported observations of an increase in bicycle traffic could result from bicycles becoming more visible in traffic during the COVID-19 restrictions period, when minibus were not allowed and thus bicycles represented a higher share of traffic (Figure 39). Use of handcarts or oxcarts also shows minor variation between the three periods. In these areas, motorcycles are only seldom used and primarily by those travelling for non-agricultural jobs (see Section 6.3.3)



Figure 39: Transport modes used by all travellers before, during and after restrictions



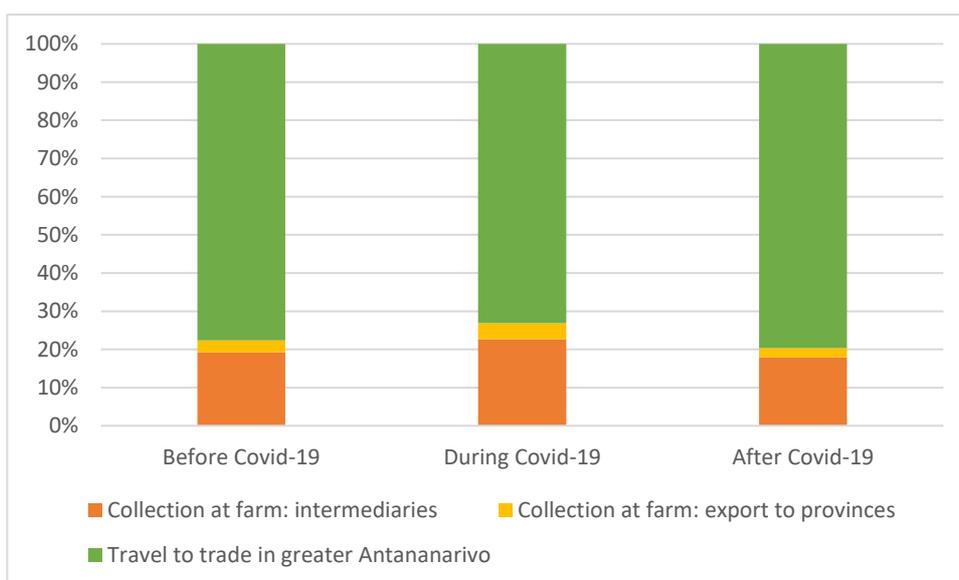
Note: During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. ‘After COVID-19’ refers to December 2020, after transport restrictions were lifted and when this survey was carried out. N= 770, 482 and 682

In the subsequent two sections, the analysis focuses on two groups of people: those travelling for reasons related to agricultural marketing and those travelling for non-agricultural work (formal and informal).

### 6.3.2 Impact on farmers and market traders

Nearly 80% of farmers surveyed travelled regularly to sell their products in the markets of greater Antananarivo before COVID-19. This figure declined only slightly to 73% during the COVID-19 restriction period. After the lifting of restrictions, by December 2020, the figure had returned to its previous level (Figure 40). Over 90% of farmers reported travelling with their goods, a figure that did not change before, during and after the COVID-19 restrictions.

Figure 40: Number of farmers selling produce at farm and travelling to trade



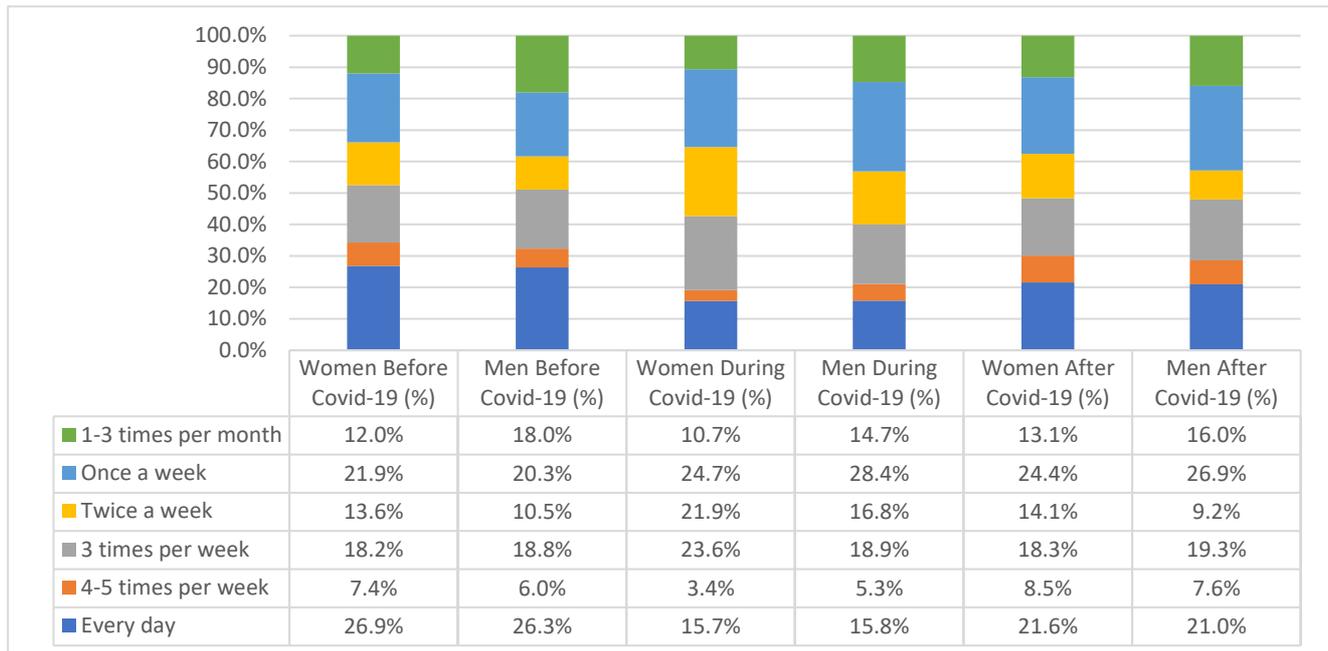
Note: During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. ‘After COVID-19’ refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 505, 406 and 447.

During the COVID-19 lockdown and partial lockdown periods, the frequency of daily travel decreased by almost half to 16%, although the percentage of those travelling at least once a week remained high at 88% (Figure 41). The patterns of travel frequency for men and for women travelling to sell produce were broadly similar and remained so during the three time periods. However, farmers reported losses in perishable



products that they were unable to sell during the strict lockdown periods, even when the markets were allowed to open in the mornings.

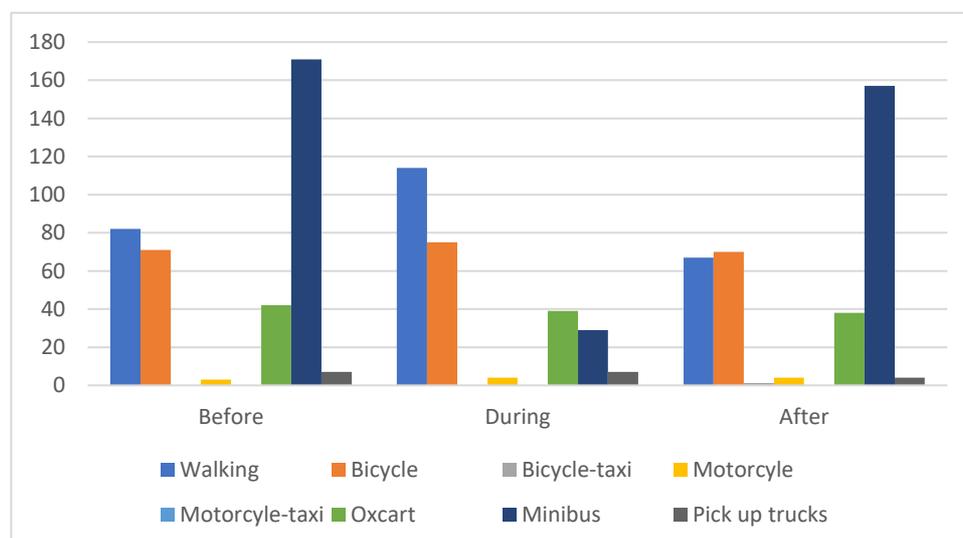
**Figure 41: Frequency of travel for farmers by gender before, during and after transport restrictions**



**Note:** During COVID-19 refers to March-September 2020. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 242 W, 133 M; 178 W, 95 M; W 213 W, 199 M.

Although many of the farmers in survey municipalities export their produce to other regions, this can be problematic for their cash-flows as the traders do not generally pay them at the time of collection but only after their vehicles have returned from the regions. Most farmers rely on regular sales though the Antananarivo markets for day-to-day expenses. Therefore, farmers continued to travel to market their produce during the COVID-19 restrictions period, even when their main mode of transport, minibuses, became unavailable and the markets were only open in the morning. Walking therefore became the most common mode of transport (Figure 42), with the number of people walking increasing by about 40% (from 82 to 114). Farmers continued using bicycles and oxcarts. Only 11% of farmers reported using minibuses during the COVID-19 restrictions period, a sharp decrease from pre-COVID-19 levels, when minibus users represented 45% of farmers travelling.

**Figure 42: Transport modes used by farmers before, during and after restrictions**



**Note:** During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 376, 268 and 341

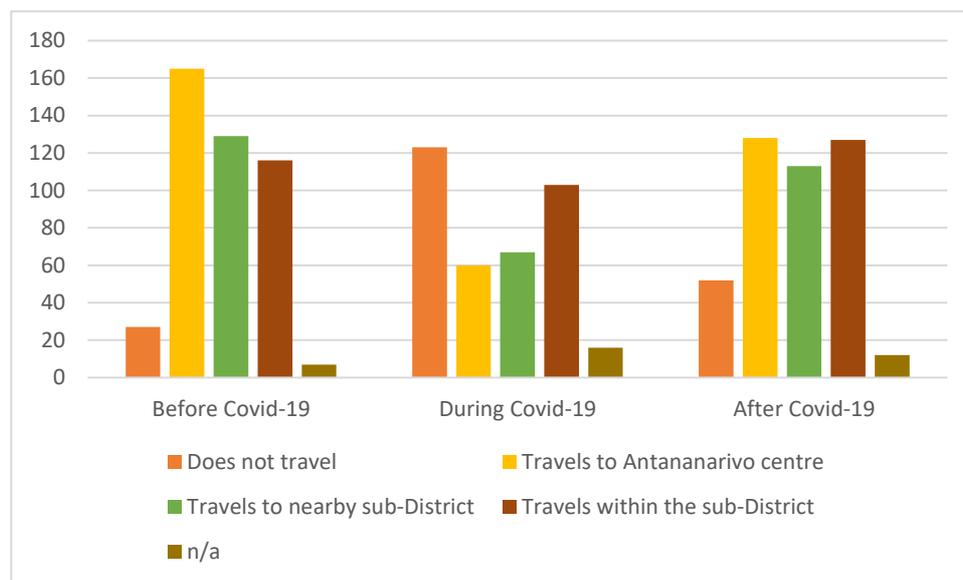


After the main COVID-19 restrictions to transport were lifted, travel movements increased to nearer their previous levels. By December 2020, 21% of farmers reported daily movements into the markets and 86% travelled at least once a week. The minibus was again the most used mode of transport, followed by bicycles, walking and handcarts or oxcarts.

### 6.3.3 Formal and informal workers

For non-agricultural jobs (formal and informal), there was an important six-fold increase in the number of people not travelling outside their village to carry out non-agricultural economic activities during the COVID-19 restrictions period. Travelling into the capital decreased by almost two thirds and movement to nearby municipalities nearly halved. By December 2020, the number of people travelling for non-agricultural jobs had started to return to near pre-COVID-19 levels, but the figure for those travelling into Antananarivo was still far from pre-pandemic levels (Figure 43).

**Figure 43: Number of people travelling to carry out non-agricultural economic activities**



**Note:** During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 444, 369, 432

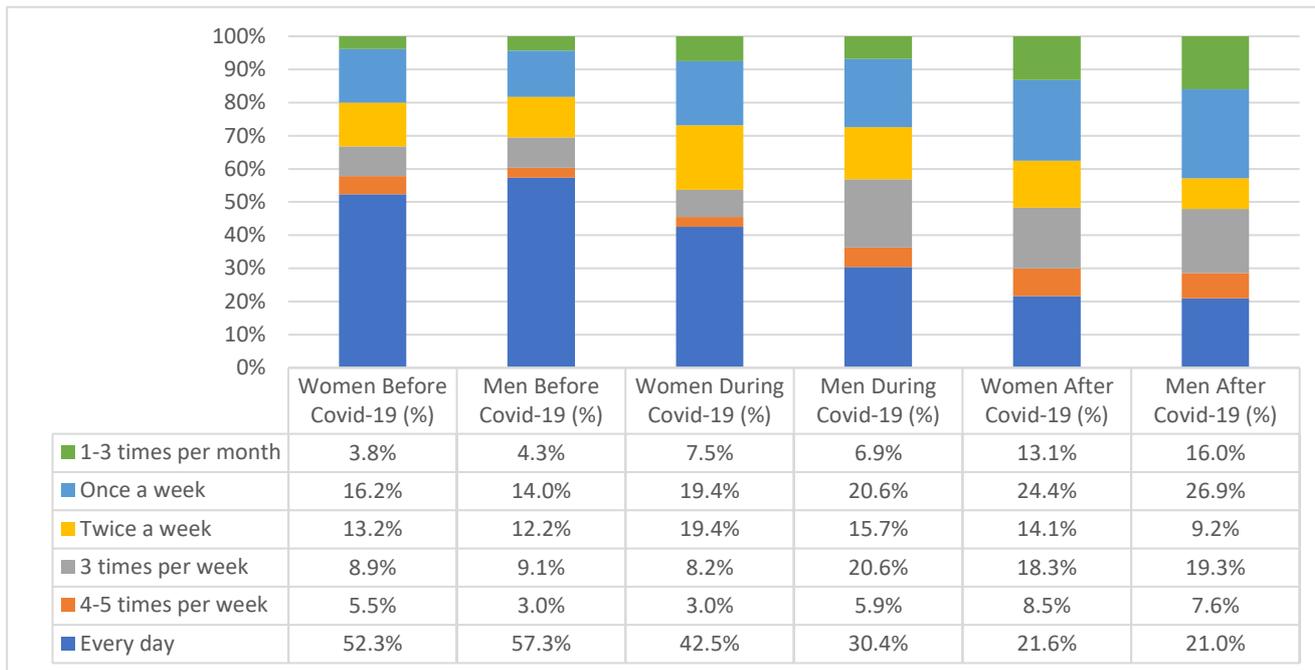
Like farmers travelling to urban markets, in pre-COVID-19 times those travelling for jobs made at least one trip a week (96%) and more than half (54%) made a daily trip (Figure 44). The percentage of people who travelled daily for non-agricultural work was almost double that of farmers who travelled daily (see Figure 41 and Figure 44). During the period of COVID-19 restrictions, those travelling for jobs kept doing at least one trip a week (93%), although daily trips decreased from 54% to 37%. In December 2020, daily trips further decreased to 22%, less than half the pre-COVID levels. Slightly fewer people were travelling for jobs at least once a week (85.8%), compared to the previous periods.

The patterns of travel frequency for non-agricultural work for men and for women were broadly similar and remained so during the three time periods. The main difference observed was that a higher percentage of women than men continued to travel daily during the period of lockdown restrictions.

The trends of fewer people travelling for non-agricultural jobs and people travelling less frequently during COVID-19 restrictions, and even less frequently after the restrictions were lifted suggest there have been job losses in non-agricultural economic opportunities as a result of the COVID-19 pandemic. These findings are in line with World Bank findings about the COVID-19 economic impact in Madagascar (4,8,9), according to which non-agricultural economic sectors (such as manufacturing, transport and tourism) have been more heavily affected than the agricultural sector, in which smallholder farmers produce primarily for the internal market. Agricultural market disruption was much more serious in African countries such as Tanzania and Cameroon that have agricultural markets that rely on regional trade (see Section 10.3).



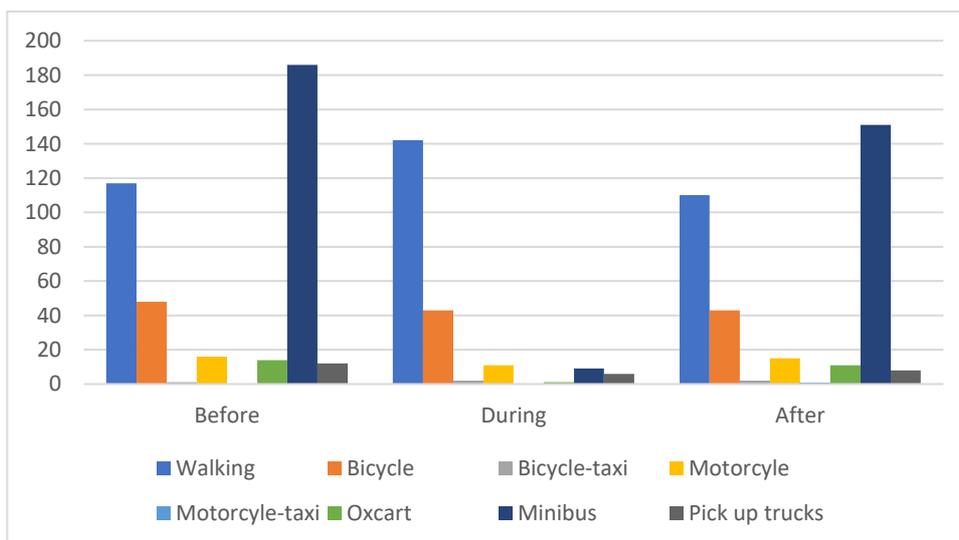
Figure 44: Travel frequency for non-agricultural work by gender before, during and after restrictions



**Note:** During COVID-19 refers to March-September 2020. ‘After COVID-19’ refers to December 2020, after transport restrictions were lifted and when the survey was conducted. N = 235 W, 164 M; 134 W, 102 M; 213 W, 119 M.

The modes of transport most frequently used by non-agricultural workers before the pandemic were similar to those used by farmers (minibus, followed by walking), except that there was more use of motorcycles and less use of carts (Figure 45). During the restrictions period, the changes were also similar: the number of people walking for non-agricultural activities increased by roughly 15% and became the most frequent mode of transport, while the number of people using minibuses dropped sharply. These figures are now returning to pre-COVID-19 levels, although the number of minibus users is still 20% lower (again suggesting job losses).

Figure 45: Transport modes used by non-agricultural workers before, during and after restrictions



**Note:** During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. ‘After COVID-19’ refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 394, 214 and 341.



## 7. Research findings: Gender-specific issues

### 7.1 Gender specific issues

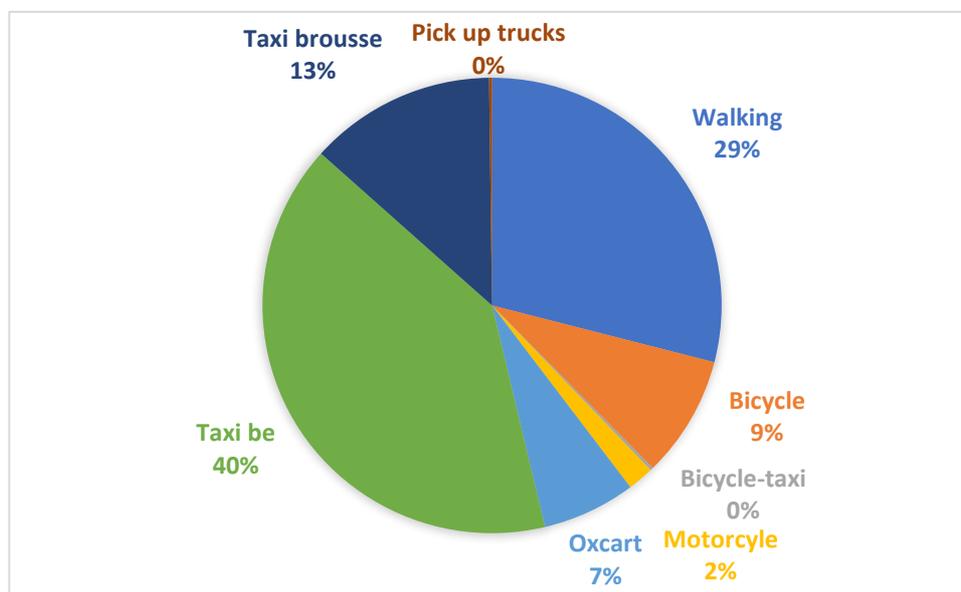
COVID-19 transport and mobility restrictions had different impacts on the travel patterns of men and women in the research municipalities. In the absence of minibus services, for most women, their only option was to walk, while men had more access to bicycles. This resulted in women, particularly female farmer-traders, complaining of exhaustion from working longer hours and in a reduction in their frequency of travel. Some female farmer-traders reported that men replaced them in their market trading roles, since they had access to bicycles that could be used to carry goods.

The impact of the crisis in women doing formal/informal salaried jobs and other economic activities appears to have been important, as seen in the reductions in the number of women travelling daily for this reason. In addition, while the modes of transport used by female farmers had largely returned to pre-COVID-19 levels by December 2020, the importance of walking for women travelling for non-agricultural revenue generation was greater than before the COVID-19 pandemic.

### 7.2 Women's mobility before the COVID-19 pandemic

Before the COVID-19 pandemic, slightly over 50% of female survey respondents travelled by minibus (*taxi-be* or *taxi brousse*) and 29% walked (Figure 46), depending on the distances, routes and reasons for travelling (as described in the travel patterns discussion in section 5.1). Inside their municipalities or travelling to nearby municipalities, walking was their main mode of displacement. Male survey respondents (Figure 47) reportedly used a more diverse range of transport mode. Nevertheless, minibus and walking were also the main modes of transport used by men, with bicycles being important at 27%. Ox carts are used by farmers inside the municipalities to bring produce from the farms to the villages, and some carry larger quantities to locations where they can be transported further by other modes of transport.

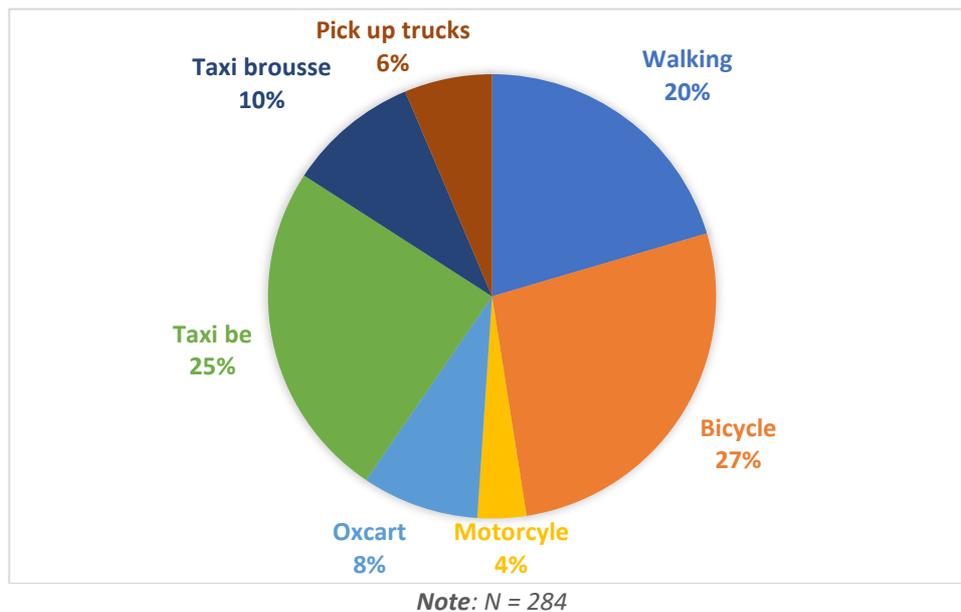
Figure 46: Transport modes used by women travelling for all economic activity before COVID-19



Note: N = 486



Figure 47: Transport modes used by men travelling for all economic activities before COVID-19



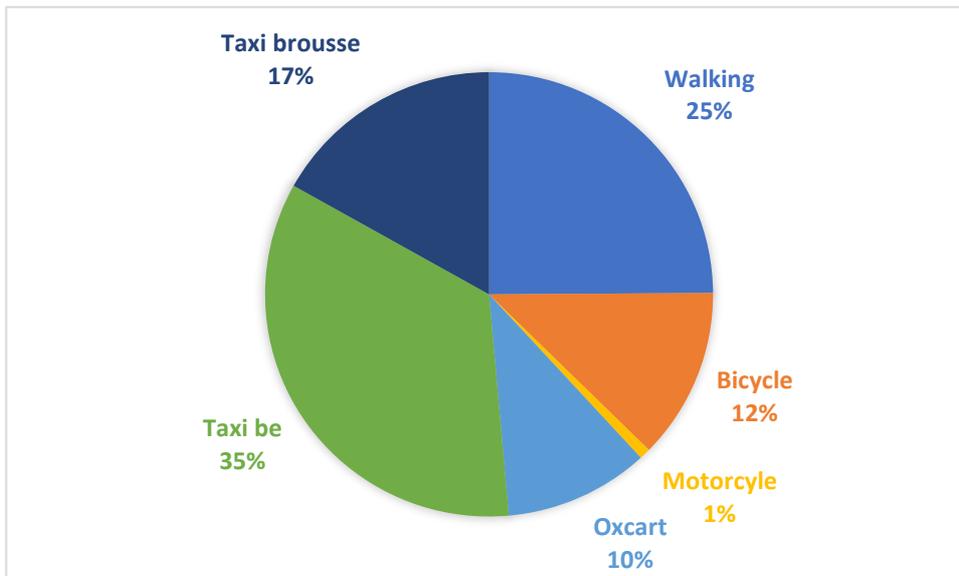
The following different travel and mobility patterns were identified:

- *Female farmers and female traders (intermediaries) travelling to sell their produce:* these women leave to the markets in the city centre in the night, as early as 1 am, so that they can reach the markets and sell their produce before the markets open at dawn. Many of them walk into the city centre and take the *taxi-be* back home, although those who can afford it travel by *taxi-be* both ways. While men usually deal with sales of produce to other regions (for which intermediaries usually pay after the sale in the region is completed), women are generally selling smaller quantities in urban and peri-urban markets, for daily revenue.
- *Salaried women working in factories and companies in Ampanefy, Soalandy, Anosiala and Ambatolampy municipalities:* they either walk to work (if they live in the same municipality or in a nearby municipality) or travel to work by minibus (between one and two hours).
- *Female artisans:* these women produce handcrafts that they sell to traders in Antananarivo's markets such as the large craft market known as '67 hectare'. Their travel patterns are similar to the female farmers and intermediaries, departing in the night walking or by minibus.
- *Women doing a variety of informal jobs:* these are women who are often heads of households, who work as washers, transporting headloads such as bricks, trading in second-hand clothes, collecting plastic waste or making stone chips.

Generally, women farmers used more oxcarts and bicycles than female salaried workers (see Figure 48 and Figure 49). However, the main modes of transport used by both female farmers and women travelling for other types of economic activities was still the minibus and walking.

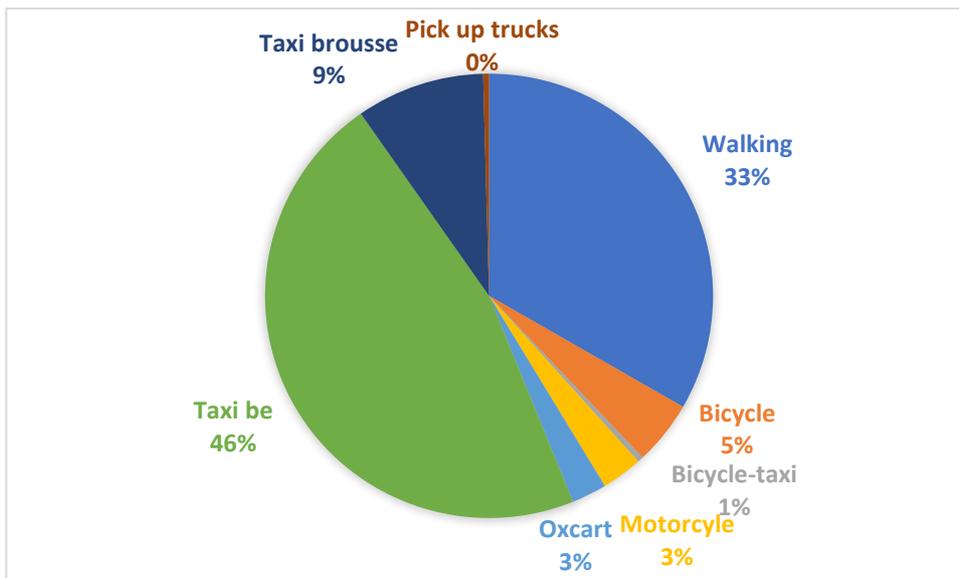


Figure 48: Transport modes used by female farmers travelling to sell produce before COVID-19



Note: N = 249

Figure 49: Transport modes used for women’s non-agricultural economic activities before COVID-19



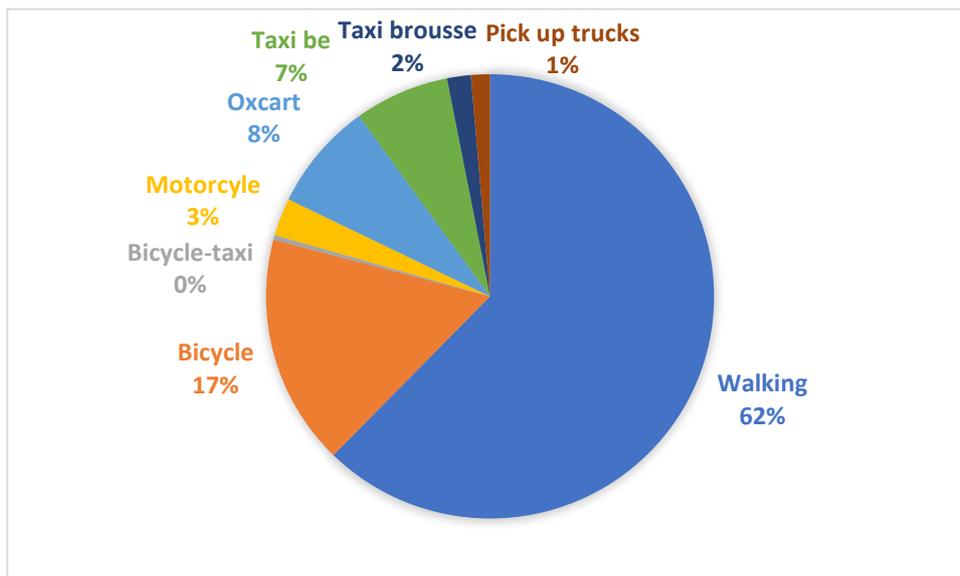
Note: N = 237

### 7.3 Women’s mobility during the COVID-19 transport and mobility restrictions period

During the lockdown periods, the ban on transport, especially on minibuses (*taxi-be* or *taxi brousse*), had a strong negative impact on the ability of women to carry out economic activities, since for most of them minibuses were the only real transport option for them before the pandemic. In general, transport bans, increasing transport costs and the decreasing revenues that many households experienced led to women travelling 40% less and to being forced to walk more and for longer hours. Walking was the main mode of transport for more than half the women travelling in this period (Figure 50). Bicycles were also reported as important (17%), although not as important as for men (36%) as shown in Figure 51. It is also important to note that survey results showed that bicycles were particularly important for female farmers during this period, although they were not mentioned as an alternative mode of transport by the focus group discussion participants.

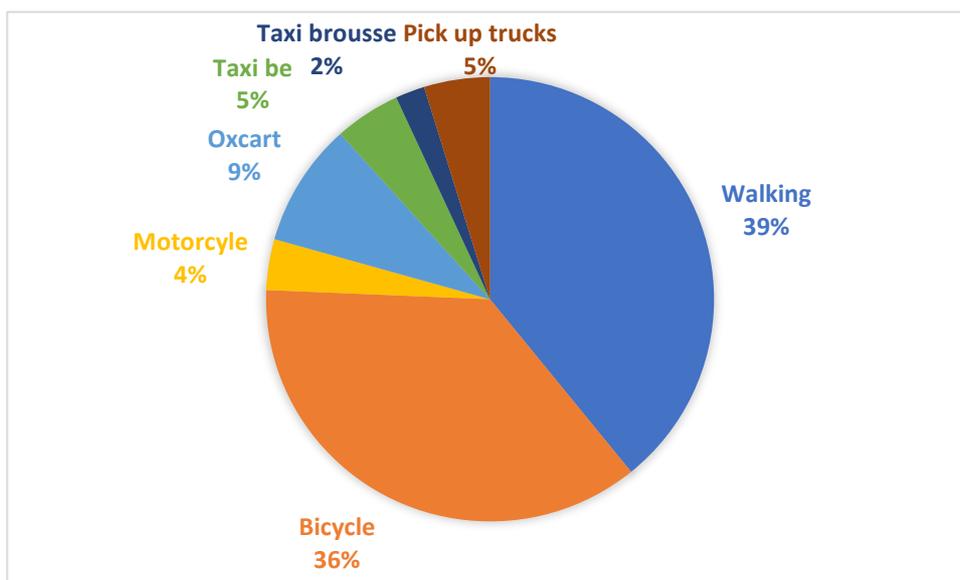


Figure 50: Transport modes used by women travelling for all economic activities during lockdowns



Note: N = 292

Figure 51: Transport modes used by men travelling for all economic activities during lockdowns



Note: N = 190



### Box 3 Women heads of household in Soalandy

Before COVID-19 measures were put in place, this group of women interviewed in Soalandy Municipality worked a variety of informal jobs for daily income: washers, agricultural workers, transporting leafy vegetables for sale by headload, collecting plastic waste (mostly bottles), transporting bricks by headload, trading in second-hand clothes and making stone chips to repair roads.

During lockdown, washers lost their clients, who became afraid of contact with people outside their own households. Women who used to transport bricks, for about 8,000-10,000 MGA (2.0-2.5 USD) per day were replaced by oxcarts, as these were allowed to operate during the partial lockdown and could carry more bricks during the half-day of work allowed.

Many of the other activities (including making stone chips) were halted because of the lockdown restrictions. Women trading leafy vegetables continued walking to trade their goods at the Tanjombato market, but their incomes decreased substantially: a bag that was previously worth between 10,000 and 15,000 MGA (2.5-3.75 USD) dropped to between 2,000 and 5,000 MGA (0.50-1.25 USD).

Transport restrictions played a major role in decreasing the revenues of women by reducing their ability to carry out their economic activities. Examples are provided in Box 3. While transport reductions severely affected all the economic activities identified in Section 4.2, there were two exceptions:

- Salaried women working in factories. During the public transport ban periods, some companies organised and provided private transport (buses) so that workers could travel to work (once movements for work reasons was allowed).
- Some intermediaries (men and women) bringing produce to the markets in the city and trading other goods upon their return. Even faced with increasing transport costs, they managed to come together to negotiate with transport operators and they took advantage of other businesses being closed to increase their trade.

### Box 4 Female farmers faced the biggest transport challenges during COVID-19 lockdowns

Even if agricultural producers were allowed to work during lockdown periods and markets were kept open, they faced serious challenges in marketing their produce due to the ban on public transport. Prior to the lockdowns, women in the peri-urban areas organised the transport of the produce to the urban markets, where they could sell it to market traders. Before the pandemic crisis, their journey to the market was in a minibus (*taxi-be*), although some walked back to save money.

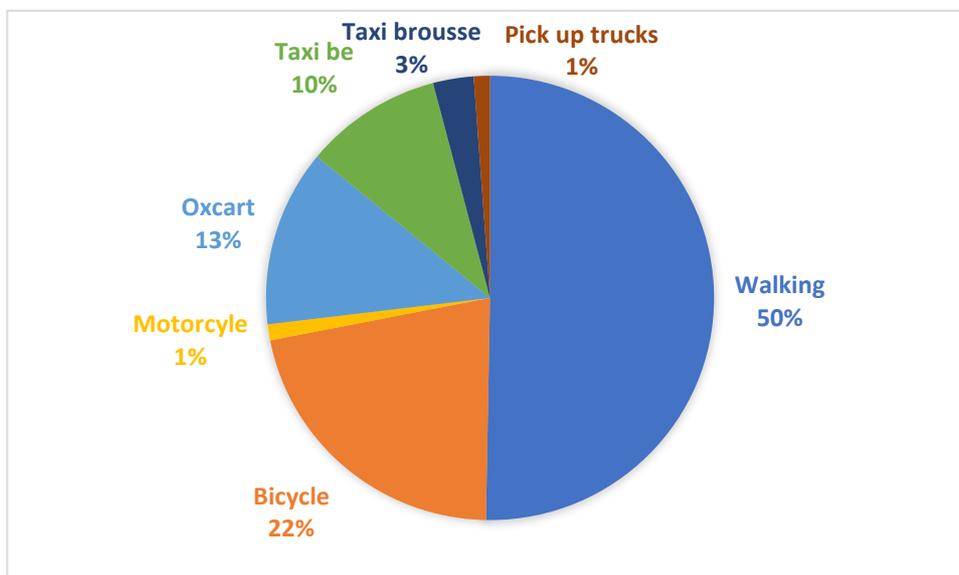
The women in the municipality of Masindray used to travel to sell their produce into the city by minibus. During the lockdown periods when there was a ban on public transport, they had no option but to walk and carry their produce or negotiate with minibus operators to carry their products without them. At this time, the cost of transporting goods increased from 500 to 1,500 MGA per bag (12-17 USDc). They would still have to walk to reach the market of Ankadindratombo (10 km away, taking two hours). At the market, the traders would take advantage of their problems by buying their produce at a low price, arguing also that time available for selling was short due to the early closure of the market. During the height of the crisis, the value of produce for these women decreased significantly: a bag of courgettes sold for only 5,000 MGA (1.25 USD), while it was worth 20,000 MGA (5 USD) before the crisis. Many women resorted to trading some of their produce at small neighbourhood markets in the city (Ambohipo or Ambanidia), which resulted in increasing times and distances for them.

In another example from the municipality of Ampangabe, female farmers used to travel two to three times a week to the large wholesale markets of Talamaty and Anosibe to sell their produce. Typically, they left at 1 am to walk to the market, arriving at dawn, and then returned by minibus. During the lockdown periods, they were forced to walk both ways, which was exhausting. After a while, the men took their place travelling to the market, using bicycles to carry the produce.



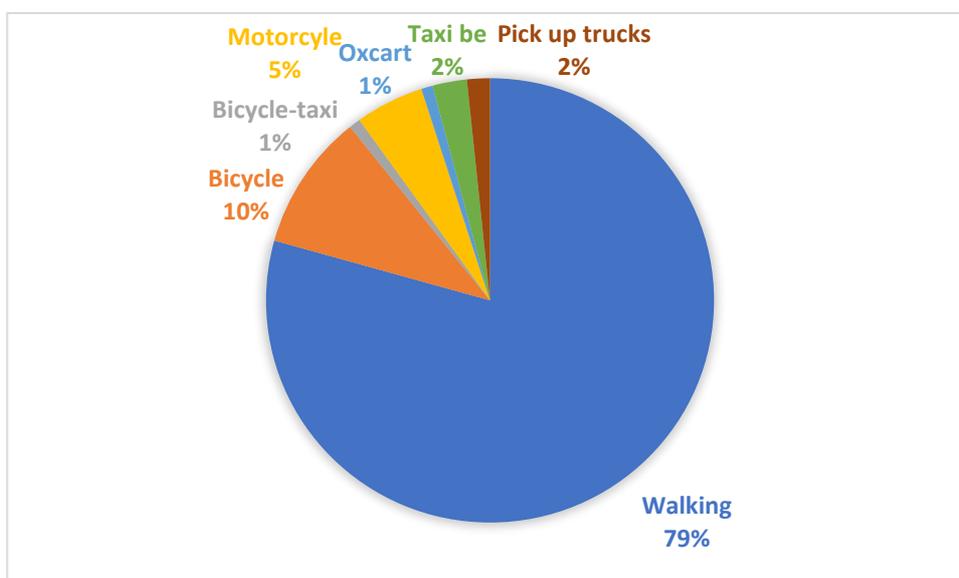
During the lockdowns, most female farmers and intermediaries bringing produce to the market had no option but walk both ways and to carry their produce. In some cases, they were able to negotiate with minibus operators who carried their produce to the market, while they walked. This is discussed in Box 4. The importance of walking for women farmers is shown in Figure 52. Walking was even more important for women involved in other economic activities, as shown in Figure 53.

**Figure 52: Transport modes used by female farmers travelling to sell produce during lockdowns**



Note: N = 171

**Figure 53: Transport modes used by women travelling for other economic activities during lockdowns**



Note: N = 121

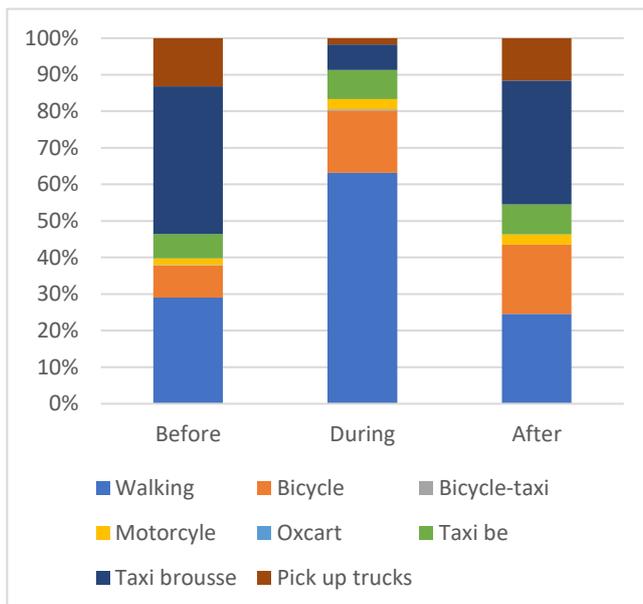
#### 7.4 On-going challenges to women's mobility

By December 2020, the number of both women and men travelling for their economic activities was slowly getting back to normal, with the exception of those women who used to travel daily for jobs outside their municipality. The modes of transport used by women (Figure 54) and men (Figure 55) were roughly back to their pre-COVID-19 patterns as minibus services were allowed to operate (with reduced passengers and mandatory mask wearing). The percentage of women using minibus services is still slightly lower than pre-COVID levels, which can be explained by higher fares prices, lower purchasing power and competing financial demands such as the educational costs required at the start of a new school year.

Based on Chi Square tests, the differences in transport use between men and women are statistically significant ( $p < 0.01$ ) in all three periods studied (before, during and after COVID-19 restrictions).

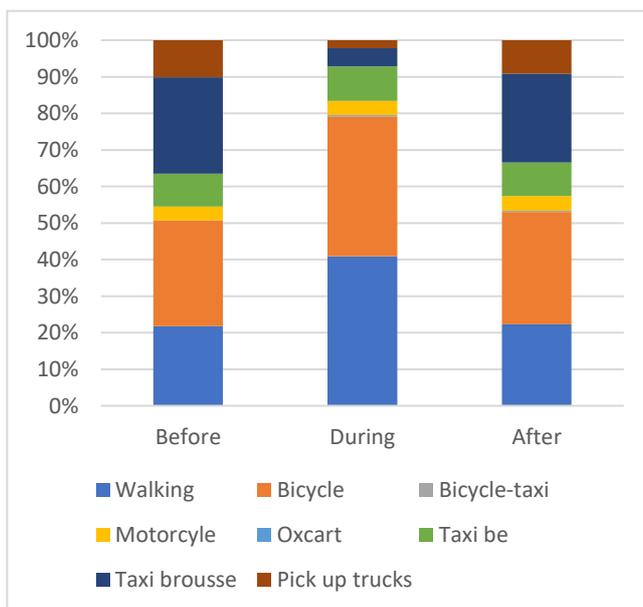


Figure 54: Transport modes (%) used by women before, during and after COVID-19 restrictions



During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 486, 292 and 420.

Figure 55: Transport modes (%) used by men before, during and after COVID-19 restrictions

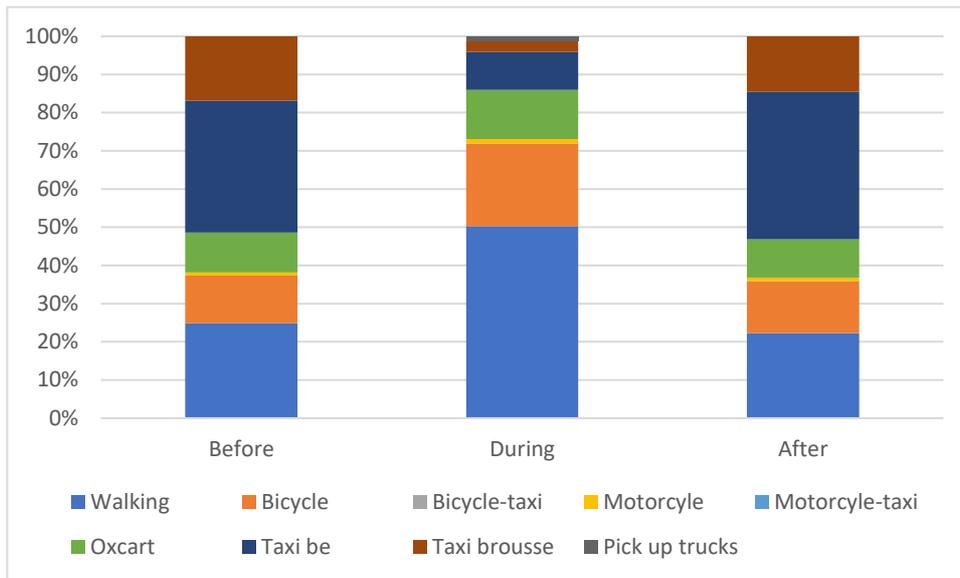


During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 284, 190 and 262.

The research data indicates that by December 2020, the travel patterns of women travelling for agricultural sales (Figure 56) and women travelling for other economic reasons (Figure 57) had largely returned to their transport movements before the COVID-19 pandemic.

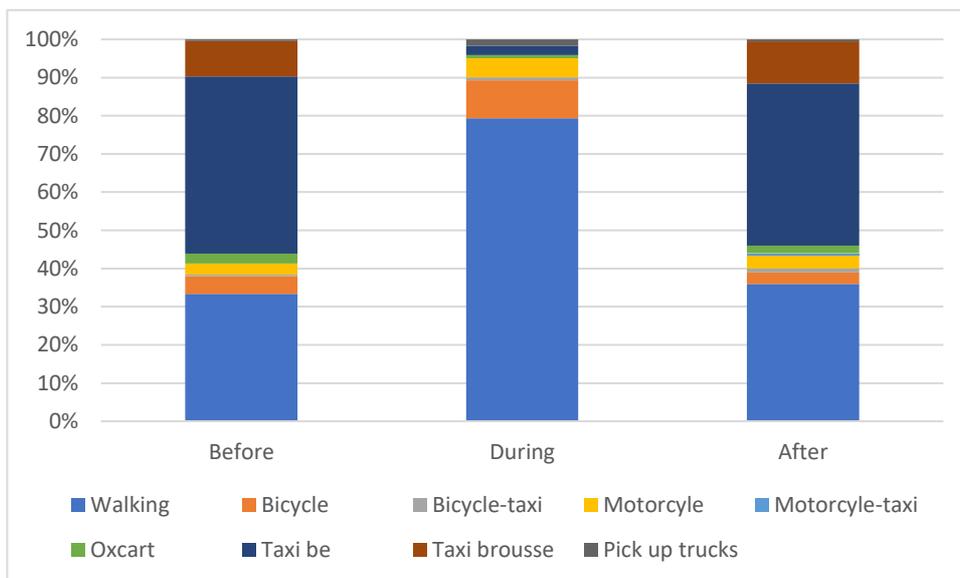


**Figure 56: Transport modes (%) used by female farmers before, during and after restrictions**



*During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 249, 171, 220.*

**Figure 57: Women's transport use for non-agricultural activities before, during and after restrictions**



*During COVID-19 refers to March-September 2020 when there were COVID-19 transport restrictions. 'After COVID-19' refers to December 2020, after transport restrictions were lifted and when the survey was carried out. N = 237, 121 and 200.*



## 8. Research findings: Perceptions of safety and security

An understanding of people's perceptions of safety is important for designing and enforcing more efficient transport regulations to contain virus transmission, and also for ensuring that the transport systems are addressing the needs of their users. Therefore, a section of the household survey was dedicated to recording user's perceptions of safety during travels regarding:

- The risk of contracting COVID-19;
- The risk of being injured in a crash;
- The risk of being sexually assaulted;
- The risk of suffering a robbery.

Survey respondents assessed each of these risks for the modes of transport that had recently used in the municipalities. Options included walking, bicycles, bicycle-taxis, motorcycles, motorcycle-taxis, oxcarts, minibuses and pickups. The five-point Likert scale had the following options:

- Not at all safe (1);
- Unsafe (2);
- Indifferent (3);
- Safe (4);
- Totally safe (5).

Results were analysed for those modes of transport with at a minimum of 200 respondents: walking, bicycles, minibuses. Each answer (per mode of transport, per type of risk) was given a score (the mean of all answers for that risk for each mode of transport). A score above three means an overall perception towards safe and a score below three an overall perception towards unsafe. It is important to note that no respondent used the option 'Totally safe' to describe the perceived risks for any mode of transport.

Table 9 presents the mean scores for all four risks and three modes of transport. Each risk has been ranked according to the mode of transport perceived as most unsafe. Regarding the risk of contracting COVID-19, minibuses are seen as the most unsafe mode of transport (both urban and rural types), while walking and the use of bicycles are considered relatively safe. However, walking and taking a bicycle are considered the most unsafe when considering the risks of being in a crash. This may be because road infrastructure is not well designed for pedestrians or cyclists. Walking and taking a bicycle are also identified as the most unsafe modes of transport regarding the risk of being sexually harassed or robbed. People are largely indifferent towards any of these risks when taking the minibus.

**Table 9: Mode of transport ranked according to safety perceptions**

Mode of transport	Risk of Contracting COVID-19		Risk of being in a crash		Risk of being sexually harassed		Risk of being robbed	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Walking	3.46	2	2.67	2	2.49	2	2.36	2
Bicycle	3.46	2	2.24	1	2.34	1	2.10	1
Minibus	2.65	1	2.99	3	3.00	3	2.82	3



## 9. Research findings: Institutional dialogue and workshop findings

### 9.1 Institutional stakeholder workshop

The team of researchers engaged with local government officials from the beginning of the research. There were early interviews with local government officials in all municipalities as well as initial discussions with the Ministry of Transport and its Land Transport Authority (ATT). The Ministry felt it appropriate that the ATT would be the body engaging with this research.

A stakeholder workshop was held on the 17<sup>th</sup> of December 2020 to share and discuss the initial results. Twelve participants attended the session: these included local government officials from the nine subdistricts, a representative of the transport regulator (ATT) and a representative of the directorate of minibus operators (UCTS).

Participants welcomed the initiative and the opportunity to discuss evidence generated by research in their communities. They were sympathetic to the view that the current transport system does not fully respond to the needs of their constituents, a situation that was aggravated by the COVID-19 pandemic crisis. The following reflections result from exchanges during the workshop.

Figure 58: The stakeholder workshop



### 9.2 Importance of multi-stakeholder dialogue

Currently, the ATT is responsible for decisions regarding public transport development in the greater Antananarivo area and at national level. It approves minibus routes and is responsible for determining regulations for intermediate means of transport (motorcycle-taxis, bicycle-taxis, oxcarts, three-wheelers). Local governments in urban centres, including the Urban Commune of Antananarivo (UCA, the municipality of the main urban area), have greater decision-making power in relation to traffic and transport and share some of the responsibility for public transport development with the ATT. However, local governments in the peri-urban municipalities do not have such responsibilities for transport. The relevant peri-urban municipalities must be consulted when new minibus routes are being developed, but examples from the workshop discussions suggested that this does not always happen. As minibuses (and other forms of transport) move between the municipalities, there is a need for more cooperation between the local government authorities.

### 9.3 Need to promote dialogue with the police

Participants noted that traffic police and the *Gendarmerie* (a militarised branch of the police that operates outside urban areas) should be involved in any discussion concerning transport restrictions. In a crisis period, restrictions can be an opportunity for excessive enforcement and abuses of power. The research had suggested this, and this was confirmed by the local government officials present.

### 9.4 Acceptance of intermediate means of transport (IMTs)

The research has shown that IMTs are still an important part of the transport system in the municipalities. They are appropriate to the needs of the suburban population that still has many rural characteristics. Previous research by ONG Lalana has noted the importance of IMTs, including motorcycle-taxis, in Madagascar's rural areas (14). Motorcycle-taxis and bicycle-taxis are not legally allowed to operate in the peri-urban municipalities, despite their potential benefits. This lack of authorisation and regulation is doing a disservice to the population.



The COVID-19 crisis has exposed this regulatory problem in Antananarivo: the personal use of bicycles and motorcycles has increased and so have bicycle-taxis and motorcycle taxis. Their increased use in the urban centre during this period was reported to have been met by harsh repression from the police (5). Motorcycle-taxi drivers protested for their right to work. Because their services are considered illegal, the research team found it very difficult to find motorcycle-taxi drivers who were willing to share their thoughts and experiences.

Local government officials believed that the IMT services (motorcycle taxis, bicycle taxis and oxcarts) could respond well to various needs of the users that are currently not met by traditional public transport services like minibuses. Permitting and regulating these would be valuable for the local population and should also ensure that their services would be safer for users. The representative of the transport regulator (ATT) was open to continue this discussion.

### **9.5 Decentralised government**

Local government officials noted the lack of decentralisation of transport regulation, in both administration and decision making could create difficulties in assuring the mobility of their local population. Again, COVID-19 further exposed this reality. For example, during the partial lockdown periods, people could request special permission to travel outside the Antananarivo region, but to obtain the permits, they had to make a special journey to one specific office in the city centre. If the municipality local governments could be granted more responsibilities in such matters, it would avoid unnecessary travel into the city centre. More responsibilities could be given to local governments in the authorisation and regulation of IMTs, including motorcycle taxis and bicycle taxis. During the restrictions period, one of the mayors gave written permission to farmers and local agricultural traders to use oxcarts to take their produce to peri-urban markets and collection points. Although this was not an official procedure and there was a transport ban in place, it helped the oxcart owners negotiate with the police along the route.

### **9.6 Actions in the case of a second wave of COVID-19**

According to the ATT, the movement of goods will be allowed if there is a second wave of COVID-19 and there will be different transport and mobility restrictions. There is always the possibility that all passenger transport will be banned during a new lockdown, with few exceptions, but all actors recognised the importance of good coordination and communication between all the stakeholders present, should this situation arrive.



## 10. Research findings: Situations in other low income countries

### 10.1 Scope of the investigations into the experiences of other countries

During this research, meetings were held over Zoom with transport researchers and practitioners in ten LICs in Africa and Asia: Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania, Uganda and Zambia. The discussions focused on the experiences of urban and peri-urban populations. Two rounds of meetings were held:

- **Round 1:** In the beginning of the research project, meetings were held to learn from the COVID-19 transport and mobility restrictions and the impact these restrictions had in the lives and mobility of people living in urban and peri-urban areas.
- **Round 2:** After data collection and the initial data analysis had been completed, the same experts in all countries were contacted again and were given a short summary of initial findings and invited to participate in follow-up discussions. In particular, the experts from countries which shared the greatest similarities with Antananarivo's urban and peri-urban transport system (Malawi, Myanmar, Nepal and Uganda) contributed ideas about the issues found in their countries and in Madagascar and to potential ways forward.

### 10.2 COVID-19 transport and mobility restrictions

Transport and mobility restrictions were imposed by governments in all ten countries. These restrictions are summarised in Appendix A. The main measures comprised:

- Lockdown or partial lockdown (closure of schools, non-essential shops and economic activities), sometimes restricted to the most affected areas;
- Curfews (usually during the night, starting at 7 pm);
- Public transport bans and movement restrictions (both inside cities and between regions);
- Measures to increase physical distancing in public transport (usually reduction of the number of passengers allowed to half of normal capacity), mandatory mask wearing inside public transport and provision of hand sanitiser.

The duration and scope of these restrictions varied between the different countries. Countries like Nepal, Myanmar and Uganda faced stricter and longer lockdowns and transport bans: in these countries there were total transport bans for at least two months early in the pandemic (March-April 2020) and restrictions were lifted in phases (and in some cases reinstated as cases resurged). In Liberia, Kenya, Malawi, Senegal and Cameroun there were no full transport bans, although there were restrictions to people's movement and measures to increase physical spacing in public transport were put in place. In contrast, Tanzania restrictions lasted only for a short period between April and early May 2020; in Zambia restrictions were not only light but also lasted for a short period.

By the time of our second round of discussions with our network of transport researchers and experts in January 2021, the transport situation had returned to nearly normal in most countries. However much public transport (particularly bus and minibus systems) still had load-carrying restrictions in place, with up to 50% reductions in the permitted number of passengers. This was true in Uganda and Myanmar, where mask-wearing was still mandatory and largely enforced. In Myanmar movement between regions was still limited and area lockdowns were being enforced. Senegal was considering new measures due to a recent resurgence of COVID-19 cases. In Liberia and Cameroun, vehicle operators and passengers started ignoring the rules after a few months and enforcement petered out.

The differences in restrictions and the characteristics of the different countries analysed resulted in different impacts on people's lives and mobility. Some common trends can however be observed:

- There was an increase in the number of people walking in almost all countries;
- There was a general increase in the use of motorcycles/scooters and motorcycle-taxis;
- There was also an increase in the use of bicycles in some countries (Myanmar, Nepal, Uganda);



- In countries where the public transport fares were not regulated by government, the price of public transport increased;
- In countries where the public transport fares are regulated by government, many transport operators were forced to stop working and lost their jobs (in Kenya, where more women are becoming transport operators, this problem disproportionately affected women, less inclined to travel along empty roads at night);
- Overall, transport operators complained of income and job losses;
- There are concerns that cities were not sufficiently safe or prepared (in terms of infrastructure) for a significant increase in pedestrians and cyclists.

The experiences that are closest to the situation observed in Madagascar are the ones of Nepal, Myanmar and Uganda. All these countries experienced full public transport bans for a period of at least two months; in Nepal and Myanmar there were periods of partial lockdown followed by severe lockdown, just like in Madagascar. Also, the main cities in these countries experienced an increase in people walking and using bicycles, even if infrastructure is not adapted for these road users.

### 10.3 Impact and changes to women's mobility

Across all countries involved in this research, women are involved in market trading, either as farmers living in peri-urban areas (countries like Nepal, Myanmar and Malawi) or as vendors in the markets (in all countries surveyed, except Myanmar, most vendors in the markets are women). Since many women in the peri-urban areas of Antananarivo in Madagascar depend on selling into the urban markets (either as farmer-producers or traders), specific questions about gender issues in urban market transport and trading were asked of the international respondents concerning market practices and changes in their countries. Their observations are summarised in Appendix B.

In the countries of our international colleagues, the urban market supply-chain were organised in two different ways:

- *Wholesaler market hubs:* Large trucks, smaller trucks and pickups transport produce from rural areas into the larger wholesale city markets (usually more than one), where intermediary traders buy the produce and transport it to other smaller urban and peri-urban markets. While transport operators driving larger vehicles are mostly men (Kenya being an exception as women were increasingly becoming transport operators), intermediary traders are often women, who use minibuses, motorcycle-taxis, three-wheelers and head loading, as their main modes of transport (depending on the city). This is the model in most large cities in the LICs in our network: Douala (Cameroun), Nairobi (Kenya), Monrovia (Liberia), Dakar (Senegal), Kampala (Uganda) and Lusaka (Zambia).
- *Mix of wholesaler market hubs and farmer-traders:* in some cities with important agricultural areas surrounding them, some trucks bring larger quantities to wholesale markets (also from more distant regions), but small farmers from the surrounding rural and peri-urban areas bring their goods to smaller urban and peri-urban markets in search of better prices and lower intermediary costs. Depending on the city, they use three-wheelers, motorcycles, motorcycle taxis, bicycles, minibuses and head loading. Many of these farmer-traders are women. This is the model in cities such as Lilongwe (Malawi), Yangon (Myanmar) and Kathmandu (Nepal), as well as many smaller cities in Uganda and the other LICs.

Antananarivo's agricultural market trading system appears close to those of Kathmandu, Lilongwe and Yangon, as well as smaller cities in the other countries.

The main impacts and change's to women's mobility mainly comprised:

- As agricultural producers, women in countries like Cameroun and Tanzania were affected by drastic price drops in export crops that were unable to move due to border closures. In Cameroun, 20 kg of tomatoes sold for about 26 USD. However, the market for these collapsed and during the period of heavy restrictions and the price plummeted to 3 USD. Similar prices crashes occurred in Tanzania when the border with Kenya was closed. Prices of basic food crops reportedly increased in most countries in our network.
- Movement and transport restrictions, as well as partial market closures and other market restrictions, caused women farmers to have fewer transport options, lose revenue and for their produce to spoil. In



Uganda, market traders were asked to sleep at the markets for over a month, to stop the spread of the virus.

- In Kenya, female transport operators stopped working, the imposed curfew led to roads with few traffic moments and this situation was considered dangerous and risky for women operators.
- In countries like Myanmar and Malawi, due to increasing transport prices and movement restrictions, farmers often had little choice but to sell to intermediaries and this reduced their incomes.

#### **10.4 Solutions, innovations and reflections**

Load consolidation is the main trend identified as an immediate response to COVID-19 transport and mobility restrictions by our network of researchers and transport experts. This seems an efficient solution to ensure product movement while reducing the flow of people travelling to trade in markets from the peri-urban areas and rural areas surrounding the cities. However, it led in many cases to higher intermediary costs for farmers, already affected by negative price fluctuation. One of the most efficient examples comes from Yangon, where different stakeholders (farmers, intermediaries, transport operators, local government and police) were coming together to organise collecting points and to ensure that everything is done in a COVID-19 safe way.

There was also a reported increase in door-to-door agricultural produce sales in Nepal, where women traders (sometimes with support from NGOs) filled the gap left by Indian migrants (who returned home to India or lost business due to fears of disease coming from abroad) and established door-to-door businesses using bicycles equipped with trailers.

Online businesses (apps to bring produce to market or households) appeared in Tanzania and Nepal, but they appear to be mostly connected with larger retailer business and used by a minority of people who could afford it.

The fast return to normality in Cameroun led to our colleague there observing that COVID-19 was just another disease to the already long list of prevalent diseases (malaria being the most obvious, but also other notable mosquito-borne diseases like dengue and infectious diseases like cholera and typhoid) that regularly afflict people living in Africa. As such, it was more logical for people to learn how to deal with this disease than to stop their lives because of it.

Colleagues in Zambia, Nepal and Senegal noted that the response to the COVID-19 pandemic has accentuated the fragilities of transport systems and overall inequality. Transport and mobility restrictions had a stronger negative impact on women from vulnerable households, more likely to carry out activities like market trading between urban and peri-urban areas and who do not own individual modes of transport (such as bicycles or motorcycles). These women had walking and head loading as their only alternative and saw their daily revenues heavily affected.



## 11. Solutions and policy recommendations

### 11.1 The relevance of this research and the need for appropriate policies

Our research shows that COVID-19 transport and mobility restrictions had a strong negative impact on the lives of vulnerable households living in peri-urban Antananarivo, particularly women. These populations lost income because they were unable to travel and resorted primarily to walking in the absence of public transport, in a trend also observed in other LICs with similar contexts. The consequences in terms of stress, anxiety and time poverty caused by longer working hours, particularly for women, are yet to be studied, but data from qualitative interviews suggest they are important.

This section provides a reflection on possible solutions and policy recommendations to improve the transport systems in greater Antananarivo, making it safer and more inclusive, in the short-term and in the long-term.

### 11.2 Rapidly implementable recommendations if a second COVID-19 wave occurs

If a resurgence in COVID-19 cases leads to new transport and movement restrictions, central government should consider the following issues.

#### 11.2.1 Importance of allowing transport to operate to transport agricultural goods into the city

Over 60% of people living in the municipalities researched are engaged in agricultural production and trade in agricultural goods, living on daily revenues from this trade. Dialogue and consultation between the Land Transport Authority (ATT) and transport operators, local government officials, farmers, intermediaries and market traders could help reduce the number of people circulating for these activities, while ensuring that farmers can still gain revenues from selling their agricultural produce. Collection points could be organised in the municipalities that would allow load consolidation, with specific transporters carrying them into the city (this has been successful in Myanmar). Almost every household has access to a mobile phone, which can be used to coordinate pick up times, places and to communicate price information.

#### 11.2.2 Increasing roles and responsibilities of local government

Local government officials in Antananarivo's peri-urban municipalities had no jurisdiction over transport and mobility restrictions during the lockdown and the partial lockdown periods. However, they could play a more active role, for example giving authorisation to specific transport operators and designated farmers to carry goods into the city. They could also review and approve requests for travelling to other regions, thus reducing unnecessary travel into central offices.

### 11.3 Long-term recommendations

With or without COVID-19 constraints, there is need to promote more gender-sensitive, inclusive and safer transport systems. The following recommendations could be a useful starting point.

#### 11.3.1 Accept and promote the use of intermediate modes of transport.

##### *Bicycles*

This research has highlighted the importance of bicycles in the lives of vulnerable households in the peri-urban areas. Over eighty percent of households that own a mode of transport, own a bicycle. Bicycle use continued throughout the COVID-19 restrictions, carrying primarily agricultural goods, but also helping those with salaried jobs to reach their workplaces. As other traffic decreased, bicycles accounted for a higher percentage of all traffic. However, infrastructure in the peri-urban areas, along the main arterial roads going into the city and along the urban streets that lead to markets is not adapted to bicycle traffic. Investment in infrastructure that is more suited to bicycles is important and should be planned to ensure there is also good and safe pedestrian access. Such investments should also be appropriate to the increasing numbers of motorcycles anticipated. In countries like Malawi, there are micro-loan programmes in place to promote the purchase and use of motorcycles. Similar programmes could be developed in Madagascar and be expanded to cover bicycles. Bicycle credit and investment programmes should be designed to encourage women's use of bicycles, since women are less likely to have access to bicycles than men. Bicycles respond well to the needs



of vulnerable households in these areas, they are affordable, environmentally friendly and adapted to the physical distancing requirements of COVID-19.

### **Motorcycles**

In the peri-urban areas, motorcycles (including motorcycle-taxis) are not commonly used, although their use increased in the urban city centre during the COVID-19 restrictions period. Motorcycle taxis remain illegal throughout Madagascar and there is little understanding among the municipalities and the transport authorities about their potential role and how they can be regulated. In the rural areas of Madagascar, motorcycle taxis are increasing, and the local municipalities and police do not appear to be cracking down on them to the same extent as is seen in and around Antananarivo.

Motorcycle taxis have proved extremely popular and valuable as small-scale and relatively COVID-safe transport services in many countries (as confirmed by collaborating colleagues in Cameroun, Liberia, Malawi, Kenya, Tanzania, Senegal and Uganda). Other countries have developed COVID-secure guidelines for motorcycle taxis. Several countries have training manuals and resources to assist the appropriate safe use and regulation of motorcycle taxi services. In Madagascar, there is a gap in research and understanding in this field. It is recommended that the stakeholder dialogues initiated by this research should be developed and building on resources and experiences from other countries, the options for allowing the safe use of motorcycle taxis should be discussed and understood. The aim would be to have motorcycle taxis accepted as an additional transport option, to be introduced with appropriate training and safety provisions and with regulations that would be acceptable to riders, passengers and other road users.

### **Carts**

Oxcarts and handcarts are still widely used and very relevant in many places around Antananarivo. Their roles should be considered by urban and transport planners. Consideration should be given for allowing them to travel to certain markets or collection points, with clearly determined routes and allowable time periods.

### **Motorised and non-motorised three-wheelers**

Only a few bicycle rickshaws and motorised three-wheelers (tuk-tuks) were observed in the research municipalities. However, such vehicles are commonly used in other cities in Madagascar (including Antsirabe, Antsiranana, Morondava). Motorised three-wheelers for passengers and/or freight are widely used in other countries (including Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania and Uganda). This type of public transport allows more well-ventilated, physical distancing than minibus services and appears well-adapted to short-distance travel needs within and between municipalities. In particular, three-wheelers could complement the current minibus services, providing feeder services to and from the villages that are not on the minibus routes.

#### **11.3.2 COVID-19 safety in minibus services**

Minibuses are the public transport mode that most people rely on in peri-urban Antananarivo and the only authorised mode of transport in these areas. However, it is also the mode of transport considered least safe by residents in terms of the risk of becoming infected with COVID-19. Transport operators are now much more relaxed in terms of the hygiene procedures and they complain that they have yet to receive support from the government to compensate them both for revenue losses due to passenger restrictions and their extra expenses for hygiene materials and masks. Minibus transport is one of the most affected economic sectors in Madagascar. Therefore increased support to this public transport sector could be important as a means to keep people safe and to reduce the risk of increasing virus transmission.

#### **11.3.3 Transport planning and stakeholder dialogue**

This research highlighted the need for greater dialogue and understanding between transport users, operators, regulators, local government and the police. Such participatory processes should become the norm in all transport planning exercises in greater Antananarivo. Greater coordination between urban and peri-urban stakeholders should also be sought.



## 12. Research uptake, dissemination and next steps

### 12.1 Dissemination activities

The following dissemination activities have been undertaken:

- ONG Lalana presented initial research results at the virtual Women and Transport Africa Conference, on 26 November 2020;
- Initial research results were shared with other HVT-funded projects during a virtual knowledge exchange event on 8 December 2020;
- Research findings were shared and discussed in January 2021 with a network of transport practitioners and researchers from ten LICs in Africa and Asia: Cameroun, Kenya, Liberia, Malawi, Myanmar, Nepal, Senegal, Tanzania, Uganda and Zambia.
- ONG Lalana was selected to present the final research findings at the special interest group (SIG F01) of the World Conference on Transport Research (WCTR) online workshop on the impact of COVID-19 on the interaction of transport and spatial development. The virtual event took place on 25 February 2021.

As part of its ongoing advocacy activities, Lalana will continue to use the research findings when engaging with policy makers, transport users and transport operators. Lalana also plans to continue dissemination through:

- A journal article for the Transport Research Record special issue on COVID-19 and transport;
- A policy brief (in English/French);
- Blog posts in Lalana's blog and other transport and development blogs/websites (in English/French);
- Social media content (primarily LinkedIn);
- A webinar on the impact of COVID-19 transport restrictions on vulnerable households living in peri-urban areas in low-income countries (currently discussing a possible collaboration with the African Development Bank Civil Society and Social Innovation Unit).

### 12.2 Planned next steps

ONG Lalana is planning a second stakeholder workshop in Antananarivo to discuss policy recommendations, possible solutions and next steps (both in the case of a second wave of COVID-19 cases and in terms of general transport system improvement). If promising solutions for post-COVID-19 transport system improvement are identified through this collaboration with local stakeholders, Lalana will look into funding solutions to put those solutions into practice.

Lalana will also look into doing further research for gaps identified during this research. Motorcycle-taxis in the urban centre of Antananarivo are an important research gap, since their use increased during the pandemic crisis (in the urban centre, not in the periphery where this research was conducted) and they are currently illegal and unregulated. Bicycles are another area that could benefit from further research, as they have been identified as a key mode of transport for men trading agricultural goods and are of increasing importance for women engaging in activities other than agriculture. They are perceived as safe in terms of the risk of contracting COVID-19 (contrasting with perceptions towards minibus services), but they rank poorly in people's perceptions relating to road safety, sexual harassment and safety from robbers. Understanding the needs and habits of women (and other) transport users is key when planning to improve infrastructure for these vulnerable road users. Investment in infrastructure appropriate to pedestrians, cyclists and motorcyclists should be a priority for the city of Antananarivo.



## 13. Conclusion

### 13.1 Research scope and goals

All over the world, the COVID-19 pandemic crisis exposed and aggravated the social, economic and political vulnerabilities and inequalities already present in most countries. Due to the way the virus spreads, public transport was one of the sectors most affected by virus containment measures such as mandatory reduction of passengers to increase physical distance inside public transport vehicles, mandatory disinfection and mask wearing and full transport bans. In addition, mobility restrictions measures, from full lockdowns to curfews, were also imposed in many places.

The impact of these measures on the lives of the population of low-income countries like Madagascar is still to be fully quantified. The goal of this research project was therefore to answer the following questions in the peri-urban areas of Antananarivo, where its most vulnerable population lives:

- How have the lives and the mobility of women and vulnerable households been affected by the transport-related COVID-19 containment measures?
- How do these changes and COVID-19 impacts compare to experiences in other LICs in Africa and South Asia?
- Are there solutions, identified by users and local stakeholders or inspired by experiences in other LICs, that can be implemented in Madagascar in the short-term and in the long-term?

This research was carried out over a period of three months, between October 2020 and January 2021, in a sample of nine peri-urban, semi-rural municipalities surrounding Antananarivo to the north, west, south and east: Ampangabe, Anosiala, Ambatolampy and Merimandroso (Ambohidratrimo District); Soalandy and Ampanefy (Atsimondrano District); and Manandriana, Masindray and Ambohimalaza (Avaradrano District). A mix of qualitative and quantitative research methods was used and over 1,100 people were surveyed. Throughout the research, the team engaged with a network of transport researchers and practitioners in ten other LICs in Africa and Asia, to discuss experiences and find similarities that could lead to possible solutions.

### 13.2 Economic impact of the pandemic crisis

The households in the peri-urban municipalities included in this research have experienced heavy negative impacts of the COVID-19 pandemic crisis and its subsequent economic repercussions. The studied municipalities have a mix of urban and rural characteristics. Agriculture is still a key economic activity in these municipalities, with an estimated 54% of the households engaged in farming. Over half of these farmers do not engage in other economic activities. Most farmers are involved in the agricultural trade with the urban markets in and around the city centre. Salaried workers (in both formal and informal jobs) account for an estimated 18% of the working age people and those working as traders or in small commerce account for another 12%, showing a growing importance of diversified economic activities. The diversification has been greater in those municipalities closer to the urban centre.

Households reported a 60% reduction in declared daily revenues during the period of COVID-19 lockdown and partial lockdown. Before COVID-19, nearly 65% of the households reported daily revenues under 20,000 MGA (5 USD). This figure increased to nearly 80% during the COVID-19 restrictions period. Top put this in perspective, the poverty line for households (that comprised an average of 4.8 people) is 27,740 MGA (or 6.9 USD) per day.

Households reliant on monthly revenue also reported a sharp fall in monthly revenue after the start of the COVID-19 restrictions. The percentage of households in the survey's lowest monthly revenue category (up to 100,000 MGA or 25 USD) doubled, from 37% to 65.9%. That level of monthly income is just 10% of the estimated household poverty line of 6.9 USD per household per day. The increase in the households in this low-income category suggests losses of salaried jobs among the households in the research municipalities. Sixty percent of surveyed households stated that their revenue had yet to return to pre-COVID-19 levels.



### 13.3 Impact on transport and mobility

The most important modes of transport for the people living in these municipalities are minibus services (locally called *taxi-be* for those in predominantly urban areas and *taxi-brousse* for those working in still largely rural areas), walking and bicycles (which are predominantly used by men). Ox carts are also still used by farmers to carry large quantities of produce from farms to collection points and to some markets.

Between March and September 2020, the Malagasy government imposed transport bans and mobility restrictions to contain virus transmission. These measures varied in intensity throughout this six-month period. They led to important changes in people's transport and mobility patterns:

- Unable to carry out their economic activities from home, people in these areas continued moving at least once a week for work reasons, although they reduced their frequency of travel. This was especially noticeable for people doing salaried jobs or small commercial activities: the majority of these people were travelling daily outside their municipality before the COVID-19 pandemic. The numbers of such people travelling for work or commerce reduced to about 20% of travellers, suggesting job losses.
- While minibus services were the most important modes of transport in these areas, used by almost 50% of those travelling, during the restrictions period walking became the most common mode of travelling, used by over 50% of those surveyed (a figure that doubled compared to the pre-COVID-19 period). Bicycles continued to be important during the restriction periods, particularly to transport agricultural goods to markets in the city. Bicycles were also continued to be used as a mode of transport for those with salaried jobs. In December 2020, bicycle use, as a percentage of all journeys, continued to be higher than pre-COVID-19 levels.

The impact of transport restrictions was especially heavy on female farmers and women trading in agricultural produce between the municipalities and the urban and peri-urban markets. Prior to the COVID-19 restrictions, the majority (60%) of minibus passengers in the peri-urban municipalities were women. Without minibus services, which they regularly used before the COVID-19 pandemic, they were forced to walk both ways carrying their loads. Some were able to negotiate with minibus operators to carry their produce while they walked (freight services were permitted). The use of bicycles remained constant during this period, but they increased as a percentage of the overall traffic. Some women reported that men started undertaking their role of carrying produce to the urban/peri-urban markets using bicycles to transport the goods. Higher transport and intermediary costs also reportedly increased the expenses incurred by farmer-traders, already affected by transport bans and mobility restrictions.

Due to restrictions of the number of minibus passengers still in place, as well as mandatory disinfection rules, minibus transport operators have increased the passenger fares by 10-15%.

### 13.4 Perceptions of transport safety

Although minibuses are the main mode of transport for the populations of the nine peri-urban municipalities involved in this research, people perceive that the risk of contracting the virus is greater in this mode of transport, compared to walking or taking a bicycle. Walking and cycling are generally considered safe in terms of the COVID-19 risk. However, walking and using a bicycle are perceived as the most dangerous modes of transport regarding the risk of there being in a crash, the risk of being sexually harassed and the risk of being robbed. The lack of appropriate infrastructure adapted to the safety and transport patterns of these road users (who are more vulnerable and frequently travel during the night) might contribute to the high sense of insecurity felt by the people.

### 13.5 Similarities with other countries

The transport-related virus containment measures adopted between March and September 2020 by the ten other LICs involved in this research did not differ substantially from the measures adopted by the Malagasy government, although their scope and duration varied. While there were no full transport bans in some countries (Cameroun, Kenya, Liberia, Malawi and Senegal) other countries, notably Uganda, Myanmar and



Nepal, imposed full transport bans, lockdowns and mobility restrictions similar to Madagascar. Only Tanzania and Zambia experienced very light measures.

Overall, the transport restrictions (aided by reduction of purchasing power due to wider negative economic effects of the pandemic and by higher transport prices in many countries) led to an increase in the number of people walking in almost all countries, as well as a general increase in the use of bicycles, motorcycles and motorcycle-taxis.

The experiences of Madagascar and its peri-urban population of farmers appear most similar to the situations in Nepal, Malawi, Myanmar and Uganda. The agricultural market trading system of Antananarivo and its peri-urban areas appears similar to those of Kathmandu, Lilongwe and Yangon, as well as smaller cities within other countries, such as Uganda. All these countries experienced full public transport bans for a period of at least two months; in Nepal and Myanmar there were periods of partial lockdown followed by severe lockdown, just as in Madagascar. In addition, the main cities in these countries experienced an important increase in people walking and using bicycles, even though their infrastructure was not adapted for these road users.

### **13.6 Possible solutions and policy recommendations**

The COVID-19 transport and mobility restrictions put in place by the Malagasy government between March and September 2020 seem to succeed in curbing the spread of the virus, but they also had an impact on the lives of vulnerable households in peri-urban Antananarivo, particularly the lives of women. Possible solutions and policy recommendations can be divided into short-term (in case of a resurgence in the number of COVID-19 cases) and long-term recommendations (in terms of improving the transport system in these areas making them more adapted to the needs of its users, safer and more gender-inclusive).

In case of a second wave of COVID-19 cases, it is important to include the local governments in the design of new measures and even have the local governments play more active roles in managing new restrictions. It will also be important to ensure that transport continues to be allowed to carry goods into the markets of urban and peri-urban municipalities. The majority of the people living in peri-urban Antananarivo depend on agricultural trade for an important part of their revenue and their revenue decreases dramatically when they are unable to carry out these economic activities. It is also recommended that, through close collaboration with transport operators, local government officials and police, the number of people travelling into the city for agricultural marketing is reduced by organising collection/delivery systems, coordinated through mobile phone communications.

In planning for an improved transport system in the greater Antananarivo area, an important starting point would be to recognise the importance of intermediate means of transport like bicycles, motorcycles, three-wheelers, oxcarts and handcarts. These modes of transport are currently ignored by transport regulators, but they respond to many of the needs of people living in the peri-urban areas and can valuably complement the existing minibuses services. These modes of transport also allow for more ventilation and physical distancing than minibus vehicles, making them safer in terms of virus transmission. Minibus operators have had increased expenditure but reduced incomes and so support to this sector should be considered to keep operators compliant with COVID-19 measures and thereby reduce the risk of increasing virus transmission. Finally, increasing dialogue, understanding and coordination between the many stakeholders (women and other transport users, operators, regulators, local government and the police) will be an important step towards improving transport planning for those living in greater Antananarivo.



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## APPENDIX A: COVID-19 TRANSPORT RESTRICTIONS AND IMPACTS ON MOBILITY IN TEN COUNTRIES

Country and city	COVID-19 transport and mobility restrictions / Government measures	Changes in people's mobility (trends)
<b>Cameroun</b> (Douala)	<p>From March 2020, restrictions were in place for 4-5 months. Initial compliance good but gradually reduced, particularly when restaurants and bars reopened. Not more than 50 gathered in public places (markets, churches, etc.). Restaurants/bars were closed. Transport one of the most affected sectors in Douala:</p> <ul style="list-style-type: none"> <li>- Taxis that function similar to buses (on a fixed route) had to reduce the number of passengers (from the usual 4);</li> <li>- Operators in inter-city routes also had to reduce the number of passengers;</li> <li>- Motorcycles were allowed to take only one passenger;</li> <li>- In all public transport, face masks and hand sanitiser are mandatory;</li> <li>- Fares remained the same (government controlled), but there were no subsidies.</li> </ul> <p>Although physical distancing measures, face masks, etc. are still in place, most people do not abide to them and police controls are more relaxed.</p> <p><i>Note: Bicycles are not common in Douala (a humid, coastal city). They are common in the drier north of the country.</i></p>	<p>Increase in use of motorcycles, perceived as safer (from risk of contracting virus) Income of taxi drivers decreased, and some decided to stop operating More use of private transport More walking (even with unfavourable weather, hot and humid)</p>
<b>Kenya</b> (Nairobi)	<p>Transport was allowed only for basic goods. Rules for minibuses (matatus) designed to avoid spreading the virus:</p> <ul style="list-style-type: none"> <li>- 50% of normal number of passengers allowed (7 instead of 14)</li> <li>- Mandatory mask wearing</li> <li>- Provide water for hand washing</li> <li>- Measuring fever</li> </ul> <p>Prices for matatus did not change (controlled by government). Mandatory mask wearing even when walking. Motorcycle-taxis (boda boda) allowed to carry only one person. They also must provide sanitiser and the passenger has to wear a mask (and a helmet, that people are sharing). Prices did not change – people wouldn't accept a rise in prices. Long-distance (inter-county) travel was not allowed. Curfew from 7pm. Measures enforced in urban areas more than in rural areas Restrictions in place from April to October. Now inter-county movement is allowed and curfew from 11pm. Things are mostly back to normal now.</p>	<p>More walking (people cannot afford walking) Many matatus decided to stop operating During the period with heavier restrictions, there were no traffic jams</p>
<b>Liberia</b> (Monrovia)	<p>From April, state of emergency for 60 days. Restrictions in public places: people cannot leave their neighbourhoods (except the head of household, to purchase food). Curfew from 3pm.</p>	<p>Prices of transport increased during heavier restrictions period, even if fuel prices decreased. Example: Monrovia-</p>



Country and city	COVID-19 transport and mobility restrictions / Government measures	Changes in people's mobility (trends)
	<p>Commercial vehicles not allowed in towns.</p> <p>After these initial 60 days (21<sup>st</sup> June), measures changed: masks and hand sanitiser mandatory. State of emergency for another month.</p> <p>Food distribution (government and UNHCR) to vulnerable people during the lockdown (oil, beans, rice). Free electricity during a period as well.</p> <p>Liberia already had a structure to manage viral outbreaks from the Ebola crises, making it easier to enforce some measures like hand washing, not touching people, etc.</p> <p>Transport restrictions (cities like Monrovia):</p> <ul style="list-style-type: none"> <li>- Reduction in number of passengers allowed: three-wheelers (from 3-4 passengers to only 2 at the back, next to the driver prohibited); taxis: only 3 passengers in the back (previously 4) plus 1 in the front. Motorcycles could only take 1 passenger. Minibuses: only 3 passengers allowed per row (before up to 5 people).</li> <li>- Face masks mandatory</li> </ul> <p>For long distance travel, stop points where all passengers had to wash their hands. Face masks mandatory. After 3pm, no inter-city transport allowed. Police enforced.</p> <p>Commercial vehicles (trucks, pickups, taxis) carrying goods from the rural areas were an exception. People could travel with their goods.</p> <p>Monrovia was quarantined – people could only travel for commercial reasons (basic goods). Inside the neighbourhoods, only one person per household was allowed go out at one given time to purchase basic goods.</p> <p>Restrictions slowly relaxed after July. Masks are still mandatory, but they are less enforced on the streets (inside shops, banks, government buildings this is enforced).</p> <p>Transport restrictions are still in force, but people are not really following them anymore.</p>	<p>Banga, from 900-1.000 Liberian dollars to 1.500 Liberian dollars.</p> <p>More use of motorcycles</p> <p>More use of taxis</p> <p>More walking</p> <p>Traffic jams were a problem before 3pm curfew, people used motorcycles to get home faster.</p> <p>Outside the communities on curfew one could see more men than women hours (in motorcycles, for example) – women would go back home before curfew, avoiding controls by police and military.</p>
<p><b>Malawi</b> (Lilongwe)</p>	<p>Restrictions to the number of passengers (50% capacity on minibuses), restrictions to travelling and to the number of vehicles allowed to run. Masks are mandatory.</p> <p>Restrictions to lorries or small trucks travelling from villages into the cities to carry goods.</p>	<p>Increase in public transport prices (double in the case of minibuses)</p> <p>Number of motorcycles increased</p> <p>Number of bicycles increased</p> <p>Especially in the periphery of cities, less minibuses working (restrictions/lower demand), some operators running out of business</p>
<p><b>Myanmar</b> (Yangon)</p>	<p>Shops closed and markets only allowed to open between 6am and 11am. Measures different for rural and urban areas, COVID-19 affected / non-affected places.</p> <p>Travelling between cities and regions heavily controlled, quarantined enforced (April-July 2020 and since October). Public transport between Yangon and peri-urban villages banned. Urban transport reduced, masks mandatory, hand sanitiser at bus stops.</p> <p>Subsidies for people in affected areas (20 dollars per person). Transport operators can borrow money from government.</p>	<p>People moving less (in the city, telework)</p> <p>More walking</p> <p>More cycling</p> <p>More use of private cars (less use of public transport)</p>



Country and city	COVID-19 transport and mobility restrictions / Government measures	Changes in people's mobility (trends)
<p><b>Nepal</b> <i>(Kathmandu)</i></p>	<p>Periods of severe lockdown, total transport ban and curfew and partial lockdown with total transport restrictions (only half the usual number of passengers allowed in public transport). Restrictions stronger (easier to enforce) in the cities, like Kathmandu.</p>	<p>Increase in public transport prices More walking More cycling More motorcycles/scooters More people using tuk-tuks (city safaris) Increase in sales of second-hand vehicles</p>
<p><b>Senegal</b> <i>(Dakar)</i></p>	<p>During the emergency state period: curfew, travel restrictions between regions and transport restrictions (less passengers allowed) for urban and interurban transport. Government provided subsidies to formal transport operators so that they wouldn't increase prices – but informal operators provide 40% of service. From August 2020, the only restriction in place is the mandatory mask wearing in vehicles carrying more than two persons.</p>	<p>Increase in transport prices Likely more walking</p>
<p><b>Tanzania</b> <i>(Dar es Salaam)</i></p>	<p>Restrictions period only between February and early May 2020: - Restrictions to the number of public transport passengers on both urban/rural areas (50% capacity on minibuses – one person per seat); - Mandatory to wash hands before entering buses; - Transport fees not allowed to increase by the government; - Travelling only for basic needs – avoid travelling recommended. Since early May 2020, everything is back to normal, no restrictions, even if there are still impacts on the economy, private sector is struggling to recover (tourism, export market, companies working with international partners).</p>	<p>Minibus operators lost income during restriction period. More telework, less travelling. Motorcycle travelling seen as dangerous (exposure to virus) Economy was affected (also due to international downturn), purchasing power has reduced and people are not moving (between regions or even walking).</p>
<p><b>Uganda</b> <i>(Kampala)</i></p>	<p>Severe lockdown, total transport ban and curfew for two months (March-May 2020). Exceptions: - trucks bringing agriculture goods into towns; - HGV trucks carrying goods across the country and to other countries - transport bringing workers to industries declared essential (hand sanitizers, masks, etc.) Since June 2020, transport restrictions were lifted in phases: private cars first, then motorcycles (carrying one passenger), then minibuses.</p>	<p>More walking More cycling More canoes and boats using illegal landing sites Increasing risks (impact on safe mobility) for road users (pedestrians and cyclists – lack of infrastructure) and water transport users</p>
<p><b>Zambia</b> <i>(Lusaka)</i></p>	<p>No public transport bans or restrictions. Schools and non-essential shops were closed for a period.</p>	<p>Increasing transport prices (due to wider economic factors such as currency fluctuations, international trade) More walking</p>



## APPENDIX B: COVID-19 IMPACTS ON MARKET TRADING IN CITIES IN TEN COUNTRIES

Country	Urban / Peri-urban market trading system for agricultural goods	Changes due to COVID-19 transport/mobility restrictions
<b>Cameroun</b> ( <i>Douala</i> )	<p>In Douala, there are main (official) markets, then smaller markets in town. Products come from rural areas close to Douala and from other regions as well, in small trucks (5tn) or larger ones (up to 20tn). There isn't a main market, there are several ones.</p> <p>Market trading is mostly done by women (retail), wholesaler/intermediary bringing goods into town are men.</p> <p>Transport operators are mostly men.</p>	<p>Because of border closures during the restrictions period, export of produce stopped, so the local market was flooded with agricultural products and prices dropped. For example: 20kg tomatoes now costs 26 dollars, during the heavier restrictions period it costed 3 dollars.</p>
<b>Kenya</b> ( <i>Nairobi</i> )	<p>Nairobi market is supplied by smallholder farmers living in surrounding counties, who bring their goods in small trucks and pickups.</p> <p>Market trading is 90% done by women.</p> <p>Especially in central Kenya, many women are becoming transport operators and carry goods between the regions.</p> <p>There is a main central market in Nairobi, but also satellite markets.</p>	<p>Food was allowed to move, but movement was made difficult by corruption on the road.</p> <p>Some markets were closed. The number of sellers was reduced (rotation every week). Hand washing mandatory at the entrance. Due to corruption in the rotation system, many women could not continue their trade – many stopped working at the market.</p> <p>Roads had less movement at night (curfew), so they became more dangerous and many women working as transport operators stopped doing it.</p> <p>Many smaller markets had to close because they weren't able to follow the rules and regulations.</p> <p>Prices of food increased, so some vendors stopped working and people were buying less.</p>
<b>Liberia</b> ( <i>Monrovia</i> )	<p>Goods come to Monrovia from the countryside in trucks, pickups, on top of minibuses.</p> <p>Market trading is mostly done by women.</p> <p>Three major markets in Monrovia, where goods are carried to from outside of town and then transported to smaller markets.</p>	<p>Food and vegetables could be transported during the pandemic and people used the commercial goods as an excuse to travel.</p> <p>There were shortages of certain products, leading to an increase in prices of products like pepper, onions, dry fish. Pepper used to cost 350 dollars and during the restrictions period costed 600 dollars (bag). The price of one large bag of cassava increased from 750 to 1.000 dollars.</p>
<b>Malawi</b> ( <i>Lilongwe</i> )	<p>In Lilongwe, there are three main markets in the city and many smaller markets in the periphery, where farmers bring their produce.</p> <p>Some markets were closed, restrictions to the number of people who can sell products in the market. Masks are mandatory, there are sanitizers and hand washing facilities outside markets.</p> <p>Restrictions to lorries or small trucks travelling from villages into the cities to carry goods.</p>	<p>Market trading business affected (closed markets, less demand)</p> <p>Spoilt agricultural goods</p> <p>Farmers selling to intermediaries who are increasing the price of transport</p> <p>Farmers selling less quantities</p>



Country	Urban / Peri-urban market trading system for agricultural goods	Changes due to COVID-19 transport/mobility restrictions
<b>Myanmar</b> (Yangon)	<p>Large trucks bring produce from regions that are further away.</p> <p>Small farmers bring products who are closer to the city travel to urban markets where they get better prices.</p> <p>Government controls the price of the products at the market.</p>	<p>Urban markets suffer partial closures.</p> <p>Farmers in Yangon regions especially affected – using brokers who consolidate loads in small/medium trucks.</p> <p>Produce was spoiled because of restrictions to the movement of trucks.</p> <p>Less demand</p> <p>Farmers losing income</p>
<b>Nepal</b> (Kathmandu)	<p>Farmers living in Kathmandu valley travel to sell their produce to the larger markets in Kathmandu, using public transport.</p> <p>Many farmers and traders are women (in recent years, men have gone to work in Gulf countries and women stayed back in the villages taking care of all other business). Women have access to less transport options than men: they do not ride motorcycles, few have scooters, and they cannot afford a four-wheeler.</p>	<p>Markets never closed (basic needs). The largest wholesale market in Kathmandu (Kalimati) reported less quantity – farmers unable to supply between March-April (stricter lockdown).</p> <p>Farmers reported a lot of spoil goods during this period.</p> <p>During partial lockdown, fewer vehicles and higher prices led a lot of farmers/market traders to resort to carrying their loads by walking.</p> <p>Increase in direct buying from farmers</p> <p>Increase in women delivering to houses in residential areas using bicycles</p> <p>Increase in e-commerce and apps</p>
<b>Senegal</b> (Dakar)	<p>A lot of agricultural products come from the agricultural regions to wholesale markets outside Dakar.</p> <p>Market traders working between wholesale markets and urban markets are primarily women and they use mix modes of transport, mostly informal, like taxis, pickups and minibuses, that can carry people and goods.</p>	<p>Trade between those regions and the wholesale markets in the periphery of Dakar was affected by regional travel restrictions.</p> <p>Female market traders were affected by urban transport restrictions and curfew rules (between 9pm and 6am).</p>
<b>Tanzania</b> (Dar es Salaam)	<p>Kariakoo is the main market in Dar es Salaam: wholesale market for produce and other goods coming from the regions. Goods are brought by 5tn, 7tn trucks. From there, vendors go to other big District markets (using small pickups or trucks, depending), where vendors from smaller markets in town come to buy their produce (they use minibus, handcart, three-wheeler, head loading, motorcycles).</p> <p>There are farmers around Dar es Salaam. Either buyers come directly to their farm or they use three-wheelers or head loading to carry their products (shorter distances) – they don't supply to the big markets; just smaller markets or buyers directly (who then sell to markets or door-to-door).</p> <p>Those selling (and buying) agricultural produce in Dar es Salaam are mostly women.</p>	<p>Lower prices for agricultural products in Tanzania, due to multiple factors:</p> <ul style="list-style-type: none"> <li>- Border closures (stop to international trade in products like tomatoes)</li> <li>- Lack of demand in cities like Dar es Salaam (lost jobs, income reduction, impact on people's purchasing power)</li> </ul> <p>Produce was spoiled in some regions (at farms and collection points, because there was no buyer in the international market)</p> <p>Price of lemons went up (seen as cure for COVID-19)</p> <p>Increase in use of supermarkets, where there was mandatory use of masks, sanitizers – people feel safer.</p> <p>Online businesses also appeared, used by a minority of people who can afford it.</p>



Country	Urban / Peri-urban market trading system for agricultural goods	Changes due to COVID-19 transport/mobility restrictions
	International trade is very important for certain products in some agricultural regions. These products are transported by truck to neighbouring countries like Kenya.	Trips to markets from rural areas decreased and buyers used the opportunity to consolidate loads. Even if the situation has gone back to normal since early May, there is still some disruption to international trade, and this has impact on national trade.
<b>Uganda</b> <i>(Kampala)</i>	In large cities like Kampala, trucks bring produce from agricultural areas to town. In smaller cities, farmers themselves bring the goods into the towns (on bicycles, boda bodas and pickups). Many of the market traders are women.	Markets were left open (basic needs). Market traders asked to sleep in the markets during lockdown, to prevent spreading the virus. Curfew made it harder for vendors to purchase produce (have to wait for trucks to arrive in the morning)
<b>Zambia</b> <i>(Lusaka)</i>	In Lusaka, trucks bring goods to city and traders pick up the goods from the trucks to take them to the markets. There are also small flatbed trucks that come in with produce, park the truck and set up a stall by the side of the road. Markets didn't close, their business might have been reduced because people might have been reluctant to go out to them.	Masks mandatory, but many people not wearing them. With time and numbers not increasing, things seemed to have gone back to normal.



## APPENDIX C: SAMPLE SIZE CALCULATION

Using the official population numbers for the research municipalities (Table 4), the sample size was calculated using the following formula:

$$n = \frac{\frac{z^2 p(1-p)}{e^2}}{\frac{z^2 p(1-p)}{e^2 N} + 1}$$

- n: sample size
- N: total population number
- e: precision or margin of error, e=5%
- z: critical value for confidence level 95%, z=1,96
- p: sample proportion (uncertain) p=50%

Examples of the margins of error for different sample sizes are shown in Table 10.

**Table 10: Margin of error for various sample sizes**

Margin of error	Sample size (n)
5%	383
4%	597
3%	1056

The sample size used (901) provides a margin of error close to 3%. Therefore, the household survey sample used in this research was considered to be representative.

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