1. Why Accessibility for the Urban Poor Communities?

As more of the world's population becomes city dwellers, enabling equitable access for city dwellers to everyday services and opportunities will be vital to a city's development and that of the whole nation.

- Half of the world's population currently lives in cities
- It is projected that urban population in developing nations will continue to grow, reaching 80% of the world urban population by 2030.
- By 2020 it is estimated that 889 million people will live in slums.
- In Africa, 6 out of 10 urban residents are currently living in slums, many of these are on very low incomes and these informal settlements are frequently characterised by a lack of formal planning in all areas including environment & transport. City authorities and planners frequently lack appropriate resources and tools to manage rapid urbanisation
- A key step to managing rapid urbanization, reducing poverty and addressing equity and environmental issues amongst slum dwellers is meeting residents' needs for access to services and opportunities. In discussing equity issues in respect of urban mobility, it is essential to pay attention to issues of accessibility – if the spatial distribution of facilities and services necessary to the functioning of urban households are centralised rather than localised this will necessarily generate increased individual and household mobility in the accessing of them. Travelling to access essential facilities has consequences for household organisation and household organisation has consequences for the undertaking of urban mobility[1] - patterns of gender differentiation in travel organisation and in the gendered transaction costs associated with urban mobility are now apparent in a wide range of contexts and locations[2 3].

This Manual describes a rapid assessment tool that draws on widespread availability of new mobile communication technologies in cities across the developing world to promote the involvement of low-income urban residents in planning & management of city transport and understand the access needs of low-income city dwellers. The targeted audience for this Manual includes:

- City Transport Authorities
- Transport Operators
- City Planners & Decision Makers
- Low-income communities
- Civil Society Groups
- Donor Agencies

---

1 P.R. Fouracre, M. Sohail, S. Cavill, "A Participatory Approach to Urban Transport Planning in Developing Countries", *Transportation Planning and Technology* 29, no. 4 (2006), 315..

2 Asian Development Bank 2010 Sustainable transport initiative: operational plan. http://www.aecarretera.com/adb/Iniciativa_Transporte_Sostenible.pdf

3 Booth, D., Hanmer,L. and E. Lovell, 2000 Poverty and Transport A report prepared for the World Bank in collaboration with DFID Final Report http://www.odi.org.uk/resources/download/2689.pdf

2. Objective and actions


Figure 1 Informal public transport in Manila, Philipinnes
SOURCE: Authors

The urban poor accessibility assessment tool allows transport planners and public authorities to map and assess travel patterns (bus routes, walking and cycling paths) of low income communities at a minimum cost using limited number of people and resources.

While there is a clear need to develop greater understanding of urban mobility and poverty in developing cities, there is also a need to improve the toolkit for professionals to help with this need. Understanding the accessibility needs specific to the urban poor require a good deal of data; the frequent lack of this data and the inability of the urban transport planning profession in developing countries to regularly collect such data for low-income communities affects the delivery of accessibility that is affordable, available and acceptable.

Mobile technologies, increasingly available in cities across the world, can now offer a way forward by allowing the rapid cost-effective gathering of data that can aid planning for urban poor communities. They can be coupled with increasingly widespread participatory planning approaches to involving urban communities in planning basic services and enable them to generate data that can be used for the planning & operation of urban transport.

The methodology proposed in this manual is intended to be undertaken as a rapid assessment process over a short-period of time and can be used to identify where more assessment and effort is needed in order to develop robust solutions. This draws on the use of rapid assessment techniques in other areas of development practice (e.g. Rapid Rural Appraisal, etc.). It is not intended to provide a statistically representative picture of accessibility of the whole urban poor population, but rather identify the most problematic issues faced by urban poor communities in accessing basic urban services. The conclusions reached through application of this Tool can be used as a basis for further data gathering exercises as required.

The methodology has a series of objectives which are not intended to be hierarchical but to be considered in an inter-linked and inter-related manner. These objectives are:

- To gather information on where public transport is **available** in a city and what key basic services and opportunities are **accessible** and understand how that availability and accessibility changes by time of day, by social groups and by route. This information can identify gaps in where public transport is available, where services are accessible and allow for planning to fill those gaps.
- To gather information from users of different modes on how **acceptable** different means of transport are to different social groups at different times of day. This would include issues of safety and personal security. This information can help improve the quality of public transport
- To gather information from householders and communities on

how **affordable** public transport is in a city. This can help understand the cost of travel to low-income households and help design financial support if this is an option.

3. Estimate of Resources (time, staff, equipment, etc.)

It is estimated that to carry out the assessment set out in this manual requires the following resources:

- 20-28 person-days (composed of a 4 person team) for a city of a 1 million people
- 36-48 person days (composed of a 6 person team) for a city of 3 million people
- 60-90 person days (composed of a 6 person team) for a city of up to 10 million

- It will require at least one GPS tracking device or GPS enabled phone in order to track the informal public transport routes.
- If GPS-enabled smartphones are to be used, then there are a range of applications (Apps) that can be downloaded and used to track the path of the person using it. These include Transit Wand (http://transitdata.openplans.org/) RunKeeper (www.runkeeper.com) and GPS Essentials (www.gpsessentials.com).
- It will require preparatory work in order to secure the necessary official and community-level approval in order to undertake discussion groups and household surveys in a small number of illustrative low-income communities.
- Efforts should be made to work in conjunction with existing participatory urban or community planning processes that may be already happening in the city
- It will also require preparatory work in order to work with operators associations and community-based NGOs to secure approval to undertaken survey work on informal public transport and along walking routes within communities or have the work undertaken by authorities that have the legitimacy to undertaken such work.

4. Proposed Method

The proposed approach set out here consists of eight steps:

STEP 1 – A DESK EXERCISE

AIM: To identify which low-income communities across a city should be a focus of the rapid assessment.

In order to develop consensus on what defines low-income communities, this step should be carried out by the whole assessment team, which should include both men and women.

This step should draw on the significant work that has been done by UN-HABITAT and others to identify the characteristics of low-income communities. Low-income communities often feature:

- Lack of durable housing
- Lack of sufficient living area
- Lack of access to improved water
- Lack of access to sanitation
- Lack of secure tenure
- A peripheral location relative to the rest of the city.
- Newly established settlements or settlements of newly-arrived migrant populations
- Lack of access to internal road and street-lighting
- Lack of access to regular public transport services from either formal or informal operators

- Using these criteria, **all** low-income communities should be identified across the city, using the additional support provided in the accompanying indicators paper and mapped either on city maps, which can be used in the field to identify communities to survey or on GIS base maps that can then be used to integrate field data onto.

- Prepare geographical background information (maps, plans and air or satellite photos where available) for recording information and presenting findings
- From this mapping, select a small number of spatial communities upon which further exploratory analysis should be focused. Communities should be chosen to illustrate the range of conditions found across the city and could include:
  - low income communities that are centrally located;
  - those on the periphery and well-established low-income neighbourhoods including
  - newly-established informal settlements.

STEP 2 – ON-BOARD PUBLIC TRANSPORT

AIM: To map, measure and assess the **availability** of public transport in the city using mobile technologies.

This Step should cover all forms of urban public transport, formal and informal as well as public transport operations that have both formal and informal components.

It should be first assessed whether there is already a map of public transport in a city. If there is, it is useful to determine what types of service are included in this map.

There are three options on how this step can be conducted:

OPTION A If there is no mapping of public transport then all routes across a city should be measured at least once to develop an electronic map of public transport routes in a city.

OPTION B If there is some mapping, it makes sense to focus on the gaps in the existing maps, which is often the informal public transport or public transport which has both formal and informal elements to its operation.

OPTION C If there is no mapping and resources are not sufficient to do the whole city, focus should be placed on mapping the public transport that serves low-income communities across the city. This would involve starting from **all** the low-income communities identified in **Step 1** and mapping the services to and from these communities in order to inform the accessibility that public transport provides these communities.

In addition, if time and resources are available each route should be repeated more than once to capture variation between journey times in peak and non-peak times and between day and night so that a picture of how the network varies is developed. Here again, the idea is not to provide a statistical representation of variation in public transport performance, but more an illustrative picture. Think about when the extremes are and seek to measure on those occasions.

In order to share observations and notes and for security purposes this step should be carried out using several teams of two people. Step 2 and Step 3 can be carried out by this team simultaneously

- Each two-person assessment team should choose a route to travel on the public transport. As all routes should, ideally, be mapped it is not critical which route should be chosen first, but a good starting point would be to choose services connecting low-income communities in the city.
- A boarding point should be chosen.
- This can be nearest boarding point for the chosen service from where the assessment team are based or it can be a boarding point nearest to one of the chosen low-income communities.
- **Remember**: the boarding points are also locations where **Step 4** can be undertaken.
- Each two-person assessment team should ride the public transport to the end of the route. This is in order to capture whether vehicles terminating early is an issue.
- One person of the two-person assessment team should use a Smartphone GPS or GPS device to record the times of travel and route.
- At the terminal, each assessment team should get off the vehicle and return on next available public transport vehicle back to original starting point.
- This step should then be repeated for each route. Eventually until either the whole city is mapped, or at least the routes serving the selected low-income communities are mapped.
- The GPS tracks recorded by the device can then be downloaded and mapped onto mapping software such as *Google Earth*™, an organisation's own GIS or even software embedded in a smartphone's own GPS application.

Figure 2: Output from GPS tracking software of some surveyed informal public transport routes in Kigali, Rwanda © UN-Habitat

STEP 3 - ON-BOARD PUBLIC TRANSPORT

Figure 3: Waiting and loading for public transport in Nampula, Mozambique. Soruce: Author

AIM: To gather information on how **acceptable** different means of transport are to different social groups.

Talking with public transport users as they use the transport system can be useful source of knowledge. This information can help improve the quality of public transport.

Prior to any questions being asked of public transport passengers, drivers and conductors should be informed of approval secured from operators or owners and passengers should also agree to be asked questions.

In order to share observations and notes and for security purposes it is proposed that this step should be done using several teams of two people. This Step should be carried out in conjunction *with* ***Step 2****, so that one person of the team can be carrying out* ***Step 2*** *and one person can be carrying out* ***Step 3*** *simultaneously*

- Assessment team members should ask people (from different social groups such as men and women and young and old) travelling on the same vehicle as they are measuring the route what they think of the journey they make and what are the issues or challenges of using different means of transport. These could include:
    - Overcrowding
    - Reliability of transport service and occasions when routes are terminated short or deviate from route
    - Procedures for carrying loads such as from market or to supply small businesses (cost, acceptability etc.)
    - Attitudes of operators to passengers
    - Personal safety
    - Personal Security and Harassment
- They should try to ask about times when there are more issues than normal

Figure 4 Overcrowding of Chapas in Nampula, Mozambique
Source: M. Adzigbey

- Assessment team members should try and find passengers attitudes about
    - Informal public transport
    - Formal transport (where it exists) or larger informal public transport (if they exist)
    - Informal motorbike/Bike taxis or shared taxis (if they operate in the city)
- Assessment team members should also ask about the cost of travel; "*what happens when they change vehicles (if at all) whether that incurs extra cost and how*"?
- Men and women hold different views and so the assessment team members should ensure that they ask opinions of men and women in as equal numbers as possible.
- The aim of the information collected in **Step 3** is to explore the **range** of attitudes held by different social groups about different forms of public transport. So the intent is not to produce a statistical robust picture of attitudes but an image of the range of different views. As public transport improves the range between different groups will lessen as all people begin to experience the same service on public transport.

Step 4 - On-street at bus stops

AIM: To provide a rapid appraisal of the frequency of public transport, the waiting times for different categories of people and different weather conditions and to give an indication of passenger journey times and public transport **availability** for low-income communities across the city

In order to share observations and notes and for security purposes it is proposed that the following step should be carried out using teams of two people.

- Choose a bus stop to carry out waiting and frequency surveys. The initial point can be the boarding point chosen by the assessment team in **Step 2.**
- Following on from that, further bus stops for surveys should be considered on an exploratory basis.

These should include stops near to chosen low-income communities and record waiting and service frequency for all services available at local stops or roadsides. Consideration should also be given to surveying stops served by transport services going to or from particular low-income communities. Other consideration could include measuring at peak and non-peak times and during day and night times.

- In undertaking the surveys an assessment should be made of the frequency of vehicles departing from the same boarding point and travelling along the same route as being measured in **Step 2**.
- This can be measured by one member of the two-person team recording the departure time from the boarding point of each informal or formal public transport vehicle going along the same route as being measured in **Step 2**. Recording frequencies at different times of day (especially between day and night) and between dry and rainy periods should also be conducted.
- The other person in the two-person assessment team should also measure waiting times at the selected stops by recording the arrival time of a randomly chosen person and the time that person leaves on a public transport vehicle travelling the same route as recorded in **Step 2** and repeat this for a 30-1 hour minute period, depending on how busy the stop is.
- This measure should also be repeated at different times of the day and week in order to explore how waiting times vary from peak to off peak times.
- It is often suggested that people carrying loads, older people and women with children often have a more negative waiting experience when using public transport and this experience varies over the day and by season. In order to determine if different social groups are experiencing different waiting experiences then care should be taken to record the waiting times for different groups of passengers, particularly vulnerable groups such as women, youth, older people and people with impaired mobility. The measurement should be repeated as described in the bullet point above for the different groups by seeking to select a random passenger from within the social group being measured.
- This method should then be repeated for the next stop chosen for exploration, until an exploratory picture has been developed of waiting for public transport It is not intended to build a representative picture of waiting and service frequency across a city, just an exploration of its variation for selected low-income communities.

STEP 5 - IN LOW-INCOME COMMUNITIES

AIM: To gather information from householders and communities on how **acceptable** different means of transport are to different members of the household. This would include issues of safety and personal security

In order to share observations and notes and for security purposes it proposed that this step should be carried out using the whole assessment team, which should include both men and women.

- Focusing on the communities selected for further analysis in Step 1, the whole Assessment Team should travel to these communities and secure official and community-level approval and agreement to undertake household interviews. This should also include a clear explanation to the community of what the data gathering will involve and what the information will be used for.

- The Assessment Team should then separate into two-person teams and should undertake a small number (say 2-3 depending on the size of the community) of community focus group discussions with both men and women in different locations across the community.
- Each team can chair a focus group discussion and depending on the context, the teams should be organised so that women can be interviewed separately from men if necessary.
- Each two-person team should ask community members of the focus group they are interviewing what they think of the journey they make and what are the issues or challenges of using different means of transport. This should include travel around the neighbourhood and outside to other parts of the city.
- Each 2-person team should be aware that they are trying to gather information from different members of the community. They should secure community agreement to allow the less-frequently heard voices to be spoken, particularly
    - women,
    - children and young people,
    - older people,
    - people with disabilities).
- Each two-person team should ask the community focus group about times of day or year when there are more issues than normal

Figure 5: Motorbikes taxi in Kigali, Rwanda **SOURCE Author**

- Each two-person team should find out people's attitudes about
    - Walking, both in the neighbourhood and on journeys across the city
    - Informal public transport
    - Formal public transport
    - Informal motorbike or bike taxis (where they exist)
    - Other means of transport
- Each two-person team should ask about "*times when different members of the community Focus Group have felt unsafe, either travelling in the neighbor-hood or in other parts of the city and why*"?
- Each two-person team should ask the community members "*what do they do to avoid feeling unsafe*"?

Step 6 - In Low-Income Communities

AIM: To ask householders and communities about how **accessible** different parts of the city are to them and how does that change with time of day and season


Figure 6: Head loading in Nampula, Mozambique SOURCE Author

- The whole Assessment Team should work with community members to construct rapid paper-based or electronic maps of regular travel routes on foot, by non-motorised transport or motorbike outside the neighbourhood across the rest of the city to key locations such as employment locations, wholesale and retail markets, central hospitals and secondary level schools. The background geographic material developed in **Step 1** can be used here
- The whole Assessment Team should work to construct rapid maps of regular travel routes across a neighbourhood by giving GPS-enabled devices to community members or by 2-person teams from with the Assessment Team members walking with community members to track walking or non-motorised transport routes to key services within a neighbourhood such as public transport, toilets, health facilities and schools, markets and places of worship.
- The Assessment Team should make sure that men and women, young and older people are represented in these discussions as different groups may use different routes for personal safety reasons. Differences in routes by time of day should also be recorded and questioned.
- The Assessment Team should then ask the community if a small number of households can be visited to be asked some questions about access to different services.
- It may be worth identifying a few categories of households to interview such as:
    - New households with small children
    - Household composed of multiple generations
    - Female-headed households
- No more than about 10 households per category should be visited and this can be undertaken by two - person teams. If multiple community focus group discussions are held within a low-income community in Step 5 then the household interviews described in this step should be repeated in every location a community focus group discussion is held
- The two-person Assessment Team should ask – "*how do you regularly travel to…?*"
    - Place of work
    - Places of worship
    - Toilets, Latrines & water-pumps
    - Health centres
    - Major markets
    - Hospital
    - Schools.
- Household members should be encouraged to show the routes they take to these locations using the background geographical material prepared by the Assessment Team in **Step 1**
- The Assessment should also ask – "*When does it become more difficult to access these places?*
    - Place of work
    - Places of worship
    - Health centres
    - Major markets
    - Hospital
    - Schools.
- The Assessment Team should ask "*are there times when they need to travel with goods? How is it to travel with goods and what issues do they face*"?
- The Assessment Team should ask – "*Are there any times when you don't make journeys even if you have to and why?*"
- The Assessment Team should ask different household members the same question as young people and old people may have different

answers; men and women will also likely have different answers.

- Different household members should be encouraged to speak by including women in the Assessment Teams, by making it clear in community consultation that all household members have a voice and by interviewing people separately from the household setting.

Further information is available on a range of community-level survey techniques, including Women's Safety Audit and Participatory Methods that can be used to gather information from households and residents.

Step 7 - In Low-Income Communities

AIM: To understand how **affordable** public transport is in a city

As the community-level surveys are being undertaken, the Assessment Team should also ask different household members how much they spend every month or week on travel.

- The Assessment Team should be aware that research typically shows that not all members within a household have equal access to money within the household. There is a possibility that certain household members (e.g. women and young people) may not have equal access to money or household assets such as bicyles, motorbikes or cars.
- The Assessment Team should ask different household members what happens if there is not enough money for everybody to make the journeys they want and in such cases which journeys, made by whom, take priority.
- The Assessment Team should ask different household members whether there are any differences in how much it costs to travel, how much are these differences and when do they occur (e.g. late at night, wet weather, when carrying loads etc.).
- The Assessment Team should ask different household members about if and when they travel with goods or "if they have to travel with goods how much does this cost? Does this cost vary and how?

Step 8 – A Desk Exercise

AIM: To develop a Monitoring & Evaluation Framework

The assessment described in this manual is designed to be a rapid, low-cost, exploratory exercise designed to highlight some of the issues in urban transport for low-income communities. It is not designed to provide a representative measurement of the performance of a city's transport.

Findings can be presented using a variety of means but the use of geographical instruments such as maps, plans and air or satellite photos can be very useful in presenting findings.

Furthermore, if repeated on a regular basis it will provide a significant amount of data about the performance of a city's transport system as experienced by low-income communities. Repeated regularly it may be possible to monitor the impact of policies and projects over time.

The use of the Tool over time will provide the benefit of building up a statistically robust picture. It will highlight where best to target extra monitoring resources as they become available. It will also provide a useful qualitative narrative in context where large quantitative data gathering is possible.

Proposed approach

The data gathered by the Tool should also where possible be made widely available, to encourage informed actions by other urban actors including communities, transport operators, entrepreneurs, private sector, etc.

It is thus suggested that the data collected can inform a series of indicators or measures of urban transport. These could be:

Objectives		Indicators
Affordability of Urban Mobility	1.	Percentage of the poorest 10% in the city for whom a urban transport system is affordable (requiring less than 10% of monthly household expenditure
Availability of Urban Mobility	2.	Distance travelled to reach nearest bus stop (km/miles)
	3.	Average waiting time at bus stops (minutes / hours) for different time of day and for different social groups (men, women, children and older people)
	4.	Average frequency of buses serving the same route (minutes/hours) for different times of day & night
Acceptability of Urban Mobility	5.	Average ratio of the number of passenger to vehicle capacity by different times of day/night
	6.	Percentage of services that terminate early by different times of day or night
	7.	Average additional cost to passenger of travelling with loads
Access within community	8.	Is it safe to walk around a neighbourhood (YES/NO) for different social group and for different time of day and night
	9.	What services can you access in 30 minutes from your home for different social groups and different times of day/night

Table 1 Possible indicators for urban transport for low income communities

If resources are a serious constrained then one key indicator for low-income communities should be access to services and opportunities. It could be argued that if one was to choose a single indicator and that assessments are regularly repeated then it would be Indicator 9 – "*What services can you access in 30 minutes from your home*?' reported for different social groups and by time of day or night.

This rapid assessment tool also provides a range of useful additional data that can help in decision-making. The assessment tool provides a range of maps that can be easily understand by a wide range of audiences, both political, professional and community.

It also gathers information using the voices of transport users which again can be easily understood by a wide range of audiences if reported without manipulation. An example of this is Table 1 where an interpretation of acceptability can be shown in a table, but the voices of users can be presented to support the professional assessment made in the table.

Finally, it is possible to develop a range of simple indicators (as shown in Table 2) from the data as long as the rapid assessment is regularly repeated, which will aid decision-making. Indeed, from this, it is possible to support just one key indicator – access to services.

Further information on how to develop the indicators from the Steps above can be found in *the **indicators paper** associated with this Manual.*

5. Resources

There have been a range of resources and tools developed that focus on the improvement of informal public transport, regulation of motorbike taxis and improvement of walking and cycling environments. Some of these include:

- Partnership on Sustainable Low-Carbon Transport (SLOCAT). This is an international partnership to advocate for policy responses, share research and best practice on the promotion of urban transport in developing countries. It has a particularly focus on Asia and Latin America.
- GIZ funded Sustainable Urban Transport Project (SUTP): This is a web-based project to develop practice and professional capacity on delivering sustainable urban transport. It provides a coherent practitioners manual on implementing measures around urban planning for formal public transport and non-motorised modes in an Asian context.
- EMBARQ. This is an initiative of the US-based environmental think-tank, the World Resources Institute. It provides advocacy material for sustainable urban transport in a range of transition economies, particularly in Latin America and Asia.
- Institute for Transport & Development Policy (ITDP). ITDP is a US-based environmental think tank that advocates for sustainable urban transport globally. The website provides advocacy material and practical guidance, for promoting urban cycling and implementing bus-rapid transport. It also provides a regular magazine and useful news of developments globally.
- In some regions, animal-drawn transport also offers urban access solutions and more information can be found at: www.animaltraction.com

6. Case studies

The proposed tool was piloted in Nampula, Mozambique and Kigali, Rwanda with the generous assistance of city and provincial authorities, bus union representatives and public transport operators and users. A workshop was held in each location to discuss the data recorded through the above mentioned process.

Mozambique Case

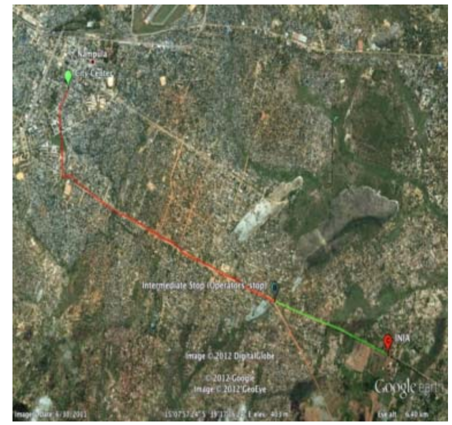

Figure 7: Mapping by participants of Nampula workshop of an informal public transport route that terminates before its planned destination. The red route shows the journey made using the Chapas and the green route, leading to the community, was made by foot. The distance from [BC] is 1.83 km

In Nampula for example, it became clear from the GPS tracking and from the public transport field exercises that there is a problem of informal public transport (Chapas) terminating short of the official route terminus.

The operators' behaviour had an impact on passengers living in peripheral communities causing them to walk considerable distances and/or paying twice to change onto another operator that would take them all the way, including the extra time needed to step down from one vehicle to another.

SOLUTIONS

a. **Users should be involved on reporting on the performance of operators to enable better enforcement.**
b. **Promotion of regulated motorbike taxi services within neighbourhoods.**
c. **A 'Green Line' telephone service to be set up by the city council to enable people to report operator practices such as terminating routes.**
d. **Ways of using mobile phone technology to capture problems in the system should be explored.**

The Rwanda Case

The Assessment pilot in Kigali found that the outskirts of the city are not well served. People are in desperate needs of public transport reaching and serving their settlements. GPS tracking of bus routes to three low income settlements on the edge of the city showed that communities can be as far as 1.83 km away from the nearest bus stop.

SOLUTION- extending public transport services to acceptable walking distance (400-600 meters) to the settlements would greatly reduce transportation costs.