Scaling Down to Lift Up: Financing Urban Walking Infrastructure

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Abstract

Urban upgrading projects typically include “access” sub-components, which construct transport improvements for pedestrians, such as stairways and footpaths. These have not been widely recognized as formal “transport” investments, despite their high return on investment. Some of the most notable intra-community slum access improvements have been made in Latin American cities. Three projects are examined: the La Paz Municipal Development Project (1980s), the Caracas Slum Upgrading Project (1990s), and the Bogotá Urban Services Project (2000s). From these cases, it is evident that substantial procedural improvements can be made in the areas of measuring targets and outcomes; fostering community ownership; planning for cost recovery, operation, and maintenance; and coordinating efforts between urban planning and transport sectors and agencies. Despite the geographic specificity of these cases, the underlying maxim of improving pedestrian infrastructure for the poor (who have no choice but to walk) applies across regions.
Vast improvements in overall transport access for both goods and people have resulted from transport loans and grants made by the World Bank Transport Sector. The majority of loans made by the World Bank through the transport sector have targeted grand infrastructure investments that indirectly benefit the poor through lower costs of goods and services (Gannon & Liu, 1997). Despite the fact that poverty reduction is the main directive of the Bank, relatively little attention has been given to transport investments that directly benefit the poor. Provision of pedestrian facilities has been identified as a way to combat transport problems faced by the urban poor.

As urbanization transforms the face of cities across the globe, the issues of urban poverty become even more acute. Access to affordable transport is largely unmet, yet it is one of the highest living costs that a family must bear. In many developing cities, the lowest income quintiles rely on walking as their primary form of transport. Basic walking (or pedestrian infrastructure) improvements, such as sidewalks and staircases, can mean substantial travel time savings, and in some cases, monetary savings from substituting walking trips for costly transit trips. In recent years, the World Bank has begun to identify the lack of transport investment for the poor as a key concern. A review of transport aspects in the poverty reduction strategy papers reveals that transport program measures do not properly analyze the relationship between poverty reduction and transport (Goller). The most recent Urban Transport Strategy Review highlights the demand for non-motorized transport investments that target the poor (World Bank, 2002).

Financing these simple, low-cost projects is at the heart of the paradox of the World Bank’s mission. On one hand, the institution must lend in large enough sums to recoup its costs of processing and risk. While, on the other hand, one of its main objectives is to fight poverty by promoting and encouraging solutions that address the Millennium Development Goals (MDGs).

In the transport sector, the needs of extremely low income urbanites have been addressed through policies and strategic reviews that emphasize the need to increase the Bank’s role in encouraging non-motorized transport. Few, if any, transport projects to date have focused solely on pedestrian needs. Although the transport sector has not funded projects, they can be found bundled into larger urban upgrading, slum upgrading, or municipal development projects. The objective of this paper is three-pronged: to investigate several non-transport sector-based projects that include improvements for pedestrian transport (particularly staircases), to analyze their methods of implementation and financial structure, and to recommend pedestrian-focused policies based on this analysis.

**Methodology**

In this report, the examination of staircase components of urban upgrading projects in Latin America focuses on three projects funded by the World Bank. The Bolivia, Venezuela, and Colombia cases were chosen out of World Bank funded projects to highlight examples in each decade starting in the late 1980s and extending through today. World Bank project documents, including policy papers, appraisal reports, and implementation completion reports form the technical backbone of the analysis. They are supplemented by telephone and personal interviews with task team managers and project specialists from all three cases, as well as the former mayor of La Paz (serving during the case implementation period).

**Background**

Transport loans and grants made by the World Bank fall chiefly under the Transport Sector. However, as this paper will illuminate, essential improvements are also made under the slum / urban upgrading
umbrella. An introduction to slum upgrading and the loan application process provide contextual background for the following discussion.

**Slum Upgrading**

Slum upgrading improves the environment of informal settlements by providing improvements to basic services (Imparato & Ruster, 2003). These projects can include water, sanitation, waste collection, drainage, and electricity. Accessibility measures for pedestrians, such as sidewalks, staircases, and small roads, are found in many projects. Some also include land titling, improvements to social programs (education, health care, etc.), and incorporation into the formal city. Urban upgrading projects are implemented by the Urban Development Sector and other partner groups, such as Cities Alliance.

**World Bank Loan Application Process**

Beginning in 2003, countries seeking assistance engage in dialogue with the International Monetary Fund (IMF) and the World Bank to produce a Country Assistance Strategy, which outlines mutually agreed upon key goals and initiatives (Ortiz, 2007). Projects seeking assistance through loans from the World Bank are prioritized by the Ministry of Finance, based on input from the community and elected officials, as well as to the Country Assistance Strategy.

**La Paz Municipal Development Project**

An early example of urban upgrading with a substantial stairway construction component is the La Paz Municipal Development Project, implemented in La Paz, Bolivia in the late 1980’s under Mayor Ronald Maclean-Abaroa. Through the construction of staircases and pedestrian footpaths in one of the city's poorest areas, travel times (and thus cost) were, at minimum, cut in half. The project received overwhelming community support and participation and provides an excellent example of the effectiveness of investment in pedestrian infrastructure in poor communities.

**La Paz, Bolivia**

La Paz stands as the highest capital city in the world of the poorest country in South America, Bolivia. These two characteristics of the city present unique challenges to the transportation choices of its 1.2 million residents. La Paz is situated in a valley, and the majority of the urban poor live in on the hillsides of the Andes that ring the city (Maclean-Abaroa, Personal Interview, 2006). Steep topography, along with unstable soils, imposes extreme difficulties for those traveling to the center city. In addition to physical access challenges, hyperinflation gripped La Paz in 1985-1987, bringing economic activity in the city to a standstill.

**Project Components and Financing**

Initially designed to combat corruption in the municipal government and to improve the city’s administrative functions, the project took on five main components: municipal organization restructuring, financial planning improvements, administration and update of the cadastre, human resource management strategy development, and a civil works program. Improving the quality of services for the urban poor and providing temporary employment were two key benefits indicated in the original project appraisal report (World Bank, 1987).

Financing for the project came primarily from the International Development Association and the Municipality of La Paz, with grants from the German Technical Cooperation Agency (GTZ) and governments of France, the Netherlands, and Spain providing the balance. In total, $21.78 million (U.S. dollars) were disbursed over eight years (1988-1996) to the Republic of Bolivia (World Bank, 1997).
The civil works component of this project built off of its highly successful precedent, the first urban development project implemented in La Paz, which aided almost 30,000 families by upgrading low income neighborhoods (Wolfe, Fighting Corruption in La Paz, 1987-1996: A Tool Kit for Bank Task Managers, Forthcoming). Only approximately three percent ($0.6 million) of the total loan amount was dedicated to urban upgrading; yet, this small amount financed 4,000 meters of concrete staircase construction in the El Alto neighborhood of La Paz, as well as drinking water and sewerage systems in four zones and the construction of three markets (World Bank, 1997).

In total, 3,100 households received improvements in basic infrastructure.

Community Participation
Weaving an access component into the municipal development project evolved from intense community demand and participation. The upgraded area is primarily populated by the native Aymara people, who have a strong tradition of community decision-making (Wolfe, Fighting Corruption in La Paz, 1987-1996: A Tool Kit for Bank Task Managers, Forthcoming). According to Maryvonne Plessis-Fraissard, the project’s task team leader, this community had more capacity and better organization than the municipality (Plessis-Fraissard, Telephone Interview, 2007). “No one at the World Bank would have suggested staircases if the people had not asked for them.” Although members of the community were largely from the lowest income quintiles, they collectively paid for their own engineers and presented projects to the municipality.

Due to the social structure and capacity of the community, an urban “betterment levy” was assessed to community members to help recoup the cost of upgrading improvements. In the original staff appraisal report, this levy was to cover 100% of the cost (World Bank, 1987). Along with monetary contributions, community members donated stones, cement, and labor-hours to the project. A specific operation and maintenance plan was not defined in the scope of the project, but accompanying components of the greater municipal development project were designed to impart capacity to the municipal government to be able to take on the role of operation (Plessis-Fraissard, Telephone Interview, 2007).

Project Benefits
In terms of transportation improvements, benefits of the staircase project are astounding. Many residents walk downhill because they cannot afford two public transit fares per day (buses account for most uphill trips). Prior to the staircase construction, estimated walking travel times to the center city from El Alto ranged from one to two hours per direction (Wolfe, Telephone Interview, 2007). The staircases cut daily travel time by 45 minutes and give people the option of walking on a stable path in both travel directions. Women, in particular, gained substantial health and social benefits from the travel time savings (Plessis-Fraissard, Telephone Interview, 2007).

Not only did the staircases impact travel time, but they also increased the net income of some residents. A study of urban bus systems in Latin America at the time of this project (1988) states that bus fares consume 33% of minimum wage income in La Paz (Carruthers, Dick, & Saurkar, 2005). Thus, the replacement of lengthy, expensive bus trips with walking trips resulted in an enormous effective increase in income for some residents.

Caracas Slum-Upgrading Project
The Caracas Slum-Upgrading Project was proposed a decade after the work in La Paz and is of a much larger scale. As originally approved, the project proposed large resettlement efforts and structural

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1 El Alto is now considered a city in its own right but was previously a part of La Paz.
works; however, community demand shifted these investments to extend footpaths and staircases beyond the initial project allocation. Political instability, natural disasters, and institutional volatility threatened the implementation of the project, yet it ultimately serviced over 100,000 barrio residents.

**Caracas, Venezuela**
Like La Paz, Caracas sits in a valley high above sea level and is surrounded by mountains. Slum settlements, known as *barrios*, make up about a third of the total area and population (3.8 million) of metropolitan Caracas (Aleman, 2005). Most barrios are located on steep mountainsides outside of the formal city and have a severe deficiency of basic public services.

In 1994, the Venezuelan Urban Planning Ministry developed a plan to incorporate the barrios of Caracas, which combined barrios into “Physical Planning Units”, with each Planning Unit containing smaller, neighborhood-scale “Urban Design Units” (World Bank, 1998).

**Project Components and Financing**

The Caracas Slum-Upgrading Project focused on improving the lives of informal settlement residents in the barrios of Petare Norte (Municipality of Sucre) and La Vega (Municipality of Libertador). As approved, the project had three components: urban upgrading, institutional development, and housing microfinance, but the final component was not implemented (World Bank, 2007). Increasing pedestrian access to the barrios is explicitly set forth as a directive to implementing the project development objective, along with access to water, sanitation, electricity, construction of community service centers, community participation, and land titling.

As stated in the original project appraisal document, the funding from this project came from a variety of national, national-agency, and local sources, as well as the World Bank (World Bank, 1998). The Central Government, Municipalities of Sucre and Libertador, and State of Miranda were to provide 43% of the total estimated project cost of $152.2 million USD. The water company, Hidrocapital, committed to 13% of the project’s funding, and the National Housing Institute (INAVI), pledged four percent. The remainder of the total project cost, $60.7 million, was to be provided by the World Bank. Through the course of implementation, the total project cost was reduced by 60% to $59.1 million, but it from the project’s documentation, it appears that all parties still contributed funds.

Among the many deficiencies in barrio living conditions, access via footpaths is identified as a key problem. Primary (vehicular) and secondary (pedestrian and vehicular) access ways are included in the upgrading component, but secondary access for pedestrians was slated to receive 18% of the total upgrading package ($20.3 million)\(^2\). The project funded 14,353 meters of pedestrian paths and secondary access construction, serving about 118,000 people. Staircases composed much of the pedestrian infrastructure, due to the topography of the barrios.

**Community Participation**
Community participation played an integral role in the evolution of the slum upgrading project. Organization of neighborhoods within the barrios resulted from a formalized, government-led initiative.

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\(^2\) Disaggregated data, detailing the final subcomponent investment, is not included in the implementation report. The total upgrading package was reduced to $49.38 million, and it is assumed that the percentages of the original appraisal apply.
From the onset of the project, the community was to be the “central actor in the urbanization process – taking the lead in the process of negotiation, decision making, design and execution, as co-manager of the sub-projects” (World Bank, 1998). Unlike previous short-term interest groups, these community organizations appear to be sustainable beyond this project’s lifetime (World Bank, 2007).

Notwithstanding its level of interest and participation, the community was not directly responsible for financing any portion of this project (Ortiz, 2007). Local, voluntary labor was contributed, however, and many construction workers came from the neighborhoods (World Bank, 1998). This multiplies the economic return of the project, by providing employment, as well as infrastructure.

Neighborhood members do not hold long-term responsibility for maintaining footpaths or other upgrade investments. Operation / maintenance is listed as “the single most significant risk” to the successfulness of the project because it falls within the jurisdiction of the municipalities (World Bank, 2007). Since municipalities lack the institutional ability to charge fees or collect taxes in low income areas, it is challenging to finance operation and maintenance. They rely on transfers from the central government that have been plentiful due to oil revenues, but this type of transfer is highly volatile.

Project Benefits
Staircases and stable walkways facilitate movement within the barrios, as well as access to the public transport network. According to project team leader, Dean Cira, some families walk the equivalent of 22 stories to access workplaces and transit stops (Cira, 2007). The average hillside grade in Petare Norte is 40.15%, making trips on insufficient infrastructure long and arduous.

As part of the project appraisal, studies were done to estimate the benefits of secondary access. Before implementation, travel time to reach a bus stop was about 16 minutes and ranged from 21-31 minutes for metro access. Experts projected a 20% reduction in travel time, roughly equivalent to $6.8 million in cost savings, based on the construction of internal sidewalks and access roads. About 118,000 barrio residents directly benefit from these access improvements, and “almost all participants to the workshops [post-project completion focus groups] showed satisfaction for the improvement of the quality of life after the works implemented by the project” (World Bank, 2007).

Bogotá Urban Services Project
In the wake of completion of Bogotá’s bus rapid transit system, Transmilenio, the urban services project has a broad target of improving the lives of the poor through investments in transport, urban upgrading, institutional components, and technical assistance. This project reveals the distinction between “transport” investments and the transport elements of “urban upgrading” projects.

Bogotá, Colombia
Over the past decade, the city of Bogotá has received world-wide attention for its strides in urban improvements, particularly in mass transport and public space. The poor compose 22% of the total population of Bogotá, and of the 1.2 million persons living within the selected upgrading areas, almost half live in illegal settlements (World Bank, 2003). This land is approximately 10% of the total metropolitan area and much of it is located in the precipitous slopes of the Andes that surround the city.

Every municipality in Colombia is required to prepare and implement a ten-year comprehensive land-use plan (Plan de Ordenamiento Territorial – POT), which provides a long-term vision for local development. Within the POT, neighborhoods with similar characteristics are grouped into planning units (Unidades de Planeamiento Zonal-UPZs). Informal areas lacking basic infrastructure adopted the Barrio Improvement Program (BIP) in 1998 and have completed a measures to improve barrio living conditions.
Project Components and Financing

The Bogotá Urban Services Project specifically targets three areas: transit and transport, urban upgrading, and institutional development. With a total project financing amount of $272.7 million, substantial loan funds are leveraged by monies from the District of Bogotá. Less than half ($100 million) is being supplied by the World Bank and is a direct loan to the Capital District, rather than to the country.

Of this total amount, 28% is dedicated to urban upgrading, which includes housing improvements, environmental measures, public space funds, resettlement, accessibility improvements, water and sewerage, and planning and legalization. Accessibility receives a significant proportion of the total amount at 11% of the complete project cost. Although the “transit and transport” portion of this project includes various road safety improvements that benefit pedestrians, it is entirely separate (and administered separately) from the urban upgrading component (Ortiz, 2007).

One of the goals of upgrading is to “increase intra-community, as well as intra-city mobility, thus facilitating greater access to jobs, education, and various social and public services.” Staircases and footpaths within the upgrading areas address “intra-community” access, while improvements to Transmilenio and feeder bicycle paths and sidewalks aid “inter-city” mobility. The staircases are an integral part of the accessibility initiative for the targeted UPZs, and were noted as a core piece of the upgrading component during interviews (Menckhoff, 2007), (Cira, 2007). Upon completion, these seemingly small pedestrian environment improvements are projected to benefit up to 600,000 of Bogotá’s poorest residents.

Community Participation

Established channels of community representation through the BIP provide access to community input (World Bank, 2003). Through this program, NGOs and social organizations participate in workshops to form an urban design framework and plan public spaces. Technical, social, and legal assistance are supplied to vulnerable groups as a foundation for greater community planning. According to Alexandra Ortiz, the project’s urban economist, the upgrading component was “completely community driven” (Ortiz, 2007). Stairs were requested as a result of direct community contact with project engineers.

Instead of requesting or relying upon donated labor or materials, a community bidding process has been established for small construction works, such as staircases and sidewalks. The social component of the project facilitated the internal formation of small construction companies, which received training focused on the preparation of bids. Bidding for low-skilled upgrading construction projects was opened only to these community enterprises; therefore, project-area residents gained not only infrastructure improvements, but also technical capacity.

The philosophy of urban upgrading applied in this project relies on the premise that improvements “should continue in line with the ability of the residents (direct or indirect) to operate and maintain the assets created” (World Bank, 2003). The agency executing each project component is stated as the

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3 The Capital District of Bogotá is classified by the Colombian government as both municipality and state.
responsible party for operation and maintenance, but the participatory process is designed to promote “sustainable operation and maintenance” of physical works.

Project Benefits
Benefits anticipated at the close of the project are reduced travel time (thus time cost) and increased accessibility to essential services. One of the performance indicators, number of kilometers/lane of new or rehabilitated access roads, sets the target at 120 km. This infrastructure will connect the fourteen development areas to other parts of the city and help incorporate residents into the city’s public services. A hedonic price model estimates that paving roads in the UPZs increases property values by 30%, particularly for properties located on heavy slopes. For commercial properties, sidewalks are estimated to raise prices by 64%.

Comparative Analysis
Since the completion of the earliest projects that included staircases, subsequent projects have incorporated this simple solution into their framework. Styles of community participation have changed, and the proportion of loans dedicated to inter-neighborhood access and mobility has increased. A comparison of scope, financing, community participation, and operation strategy, will provide a platform for analysis.

Scope
Although the La Paz, Caracas, and Bogotá projects contain upgrading components (with small pedestrian access subprojects), their focus is much broader. Initiatives targeting institutional development are found in each of the example projects. In Bolivia, for example, the most widely-touted outcome is not that of improved urban services, but of the reduction in corruption resulting from investment in the city’s financial systems and administration (Wolfe, Fighting Corruption in La Paz, 1987-1996: A Tool Kit for Bank Task Managers, Forthcoming). Building municipal personnel capacity to manage the work at hand, as well as future works, boosts the ability to independently undertake activities and accomplish basic city-functions, such as collecting taxes and maintaining infrastructure.

“Urban transport” is also found in two of the three cases (La Paz and Bogotá). It is interesting to note that, while non-motorized transport is found in the World Bank’s most recent urban transport strategy paper, neither of these projects included staircases in the “urban transport” component. On the surface, this may appear to be mere semantics, but it indicates the level of coordination (or lack thereof) between formalized transport systems and the pedestrian networks found within informal settlements. Even in Bogotá where bikeways, sidewalks, and public plazas have recently been completed, efforts are uncoordinated between the transport and upgrading components (Ortiz, 2007).

Basic sanitation/sewerage and access to drinking water are common upgrading sub-components. As pointed out by Ortiz, the proportion of funds available to be spent on access within slums is highly dependent on the state of the water and sanitation systems. This does not seem to be reflected, however, in the proportion of the upgrading projects. Bogotá, for example, has much better coverage of these systems than Caracas, but 44% of its upgrading project is dedicated to water/sanitation, as opposed to 34% of the upgrading funds in Caracas. The following figure illustrates the proportion of upgrading funds allocated to each subcomponent in these two projects.

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4 “Access roads” includes sidewalks and staircases.
FIGURE 3: Comparison of urban upgrading subcomponents in the Caracas and Bogota cases. The separate pie wedge highlights the component funding stairways and pedestrian access.

Financing

The total loan amounts and percentages dedicated to upgrading and staircases differ among the packages, but more importantly, these projects are founded upon disparate theories of cost recovery (i.e. loan payback). Despite enhancing low income quintile neighborhoods, the La Paz project imparted a direct user fee (“urban betterment levy”) to those community members receiving benefits (World Bank, 1987). The internal community organization of the Aymara people took into account those families that did not have the monetary resources to contribute, and arrangements were made within the neighborhood groups to address this issue (Plessis-Fraissard, Telephone Interview, 2007).

Direct fees for the access component, however, were not assessed in either the Caracas or Bogotá projects. In these cases, cities either rely upon property taxes as the primary method of recouping infrastructure investment costs (excluding water and sanitation, which are regained through public service fees) or absorb the costs within government agencies. The Caracas case states that almost full recovery of the cost of drainage, slope stabilization, land titling, and accessibility can be made by charging a fee per parcel in each neighborhood, but it seems that this fee is primarily for land title acquisition, rather than a direct earmark for access infrastructure financing (World Bank, 2007). In the UPZs of Bogotá, where the majority of the residents affected are of the two lowest income strata, the District will have only a limited ability to recover investment through increased property taxes (World Bank, 2003)\(^5\). Bogotá has a gas tax, but it can only finance road maintenance and mass transit system construction; therefore, it cannot be applied to upgrading access improvements.

At the macro-level, funding sources for projects as-a-whole follow different models. Perhaps related to the then-current economic state of the country, the La Paz project received not only a loan from the World Bank, but also grants from three Western European governments and the GTZ. In Caracas, funds were explicitly drawn from public agencies, municipalities, and one state to leverage the loan to the Republic of Venezuela. The final model reflects a new stage of funding capability, whereby a municipality can leverage funds directly with the World Bank, as opposed to receiving a country loan. This allows cities to undertake large projects and apply for smaller grants for other initiatives.

Community Participation

As noted in the project descriptions, intense community involvement lies at the heart of these upgrading projects. Neighborhood input expressly resulted in the inclusion of staircases as a prominent part of the upgrading process. The major contrast between the three cases is in the method of organization and

\(^5\) The Colombian government has a policy of subsidizing the two bottom household income groups.
participation of community members. Each succeeding case shows a more formalized degree of community organization. Starting in La Paz, neighbors’ efforts emanated from deep cultural traditions of collective activity and payment. Project beneficiaries were “self-starters” and brought the municipal government ideas without solicitation from national planning agencies. Beyond planning, their participation included the donation of labor and materials.

Caracas participants underwent a more formalized process of working with project engineers to design infrastructure works as a part of their Neighborhood Improvement Plans. Community members also voluntarily donated labor-hours to the project. Finally, in Bogotá, neighborhood planning activities are headed by the social housing entity and planning departments. Free labor by neighbors has been eliminated from the community’s direct purview and replaced by local construction micro-enterprises that receive training, technical assistance, and the opportunity to earn a profit, in addition to neighborhood upgrade benefits.

Critique of Urban Staircase Projects

From interviews with project staff and the World Bank implementation completion reports, the benefits of access improvements via staircases and footpaths are enormous. Project works can improve the quality of life for local residents; however, the sustainability of financing and maintaining new facilities in the way of the case study examples is questionable. A critique of practices associated with the case study urban staircase projects follows.

Return on Investment
Perhaps the most evident advantage of the urban staircase projects is their return on investment. Less than $200 (1988 USD) per person in Bolivia reduced travel times by 45 minutes on average and resulted in an effective income increase of 15-33% for many people. Few transport systems of any sort could approach this return. In Caracas, the investment was even lower at ~$172 (1997 USD) per person for similar benefits. Finally, in the most recent project, only $48 (2003 USD) per person was needed for staircases and sidewalks that bring substantial travel time reductions and higher quality access.

Equity
Another more subtle benefit of the staircase and footpath projects is related to gender. The Guidelines for Incorporating Social Dimensions into Bank-Supported Projects emphasizes the relationship between transport solutions and gender. The poor in developing countries have long work trips, normally made by foot (Social Development Department, World Bank, 2006). By constructing staircases within slums, time savings provides opportunity for increased rest for women. Discussing the La Paz staircases, Plessis-Fraissard comments:

The poor people living in El Alto went down the mountain in the morning, walking a good hour or two. Then they worked 12 hours. Then ½ an hour to wait for the bus at least, then you go up with the bus. Then women still have to cook, which is slow at a high altitude and expensive. Try to cook an egg at that altitude: it will take you ½ an hour! Women had too few hours at night to rest. That’s why transportation was so important. (Wolfe, Fighting Corruption in La Paz, 1987-1996: A Tool Kit for Bank Task Managers, Forthcoming)

Localized Benefits
Community members worked hand-in-hand with project leaders to customize the access solutions that would best fit their needs. In fact, interviewees indicated that staircases might not have been considered

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6 In this discussion, return on investment only considers the “access” sub-project within the larger projects.
by the World Bank, if it were not for community input. The ability of community members to implement context-sensitive-design is no doubt unique among transport projects.

However, walking transport benefits are localized within the immediate urban upgrading area. Staircases and footpaths may improve travel within the slums, but the walking network needed to reach key destinations (jobs, markets, etc.) may be fragmented or non-existent. Moreover, slums with basic access problems but moderate or adequate sanitation and water supplies, are likely to be doubly overlooked: (1) via an urban upgrading program (they do not need the entire ‘package’ of upgrading components) and (2) in city-wide urban transport improvements (informal settlement access is rarely part of the formal transport network).

**Sustainability**
Initially, capital investment in the construction of staircases and footpaths in informal settlement areas brings needed aid to the community. However, the long-term social and operational sustainability of these one-time, project-specific infrastructure works is uncertain.

**Social**
As noted in several of the project documents, homes and commercial properties in communities that receive upgrades will invariably rise in value. Many of the estimates of project “benefits” are based on hedonic pricing models, and so, a leap in property values becomes one of the main measurable objectives related to success of an upgrading project (Sotomayor, 2003). When property values rise, this creates an incentive for owners to sell their homes or parcels and move, in many cases further propagating informal settlement patterns (Dowall, 2007). Therefore, without strong ownership and commitment to the project, there is little incentive for upgrade beneficiaries to stay.

**Operational**
Responsibility and funding for long-term operation and maintenance (O & M) of infrastructure investments is an issue that troubles both developed and developing countries alike. The case of mass transit funding in the United States exemplifies the unbalance in capital funding versus dollars for maintenance (Giuliano, 2006) and has led to excessive maintenance deferrals in city infrastructure (O'Hare, 2007). None of the urban upgrading cases examined has a clearly defined maintenance plan for the footpaths constructed during the upgrading process. Other infrastructure components, such as water and sanitation services, expect to be operated and maintained through the service providers. Access ways, which are a public good, would normally fall under the city’s jurisdiction to maintain, but cash-strapped municipalities have little ability to incorporate even more infrastructure into their jurisdiction.

**Recommendations and Conclusions**
The ability to realize dramatic travel time and cost improvements through staircase construction in informal settlements in these Latin American cities is largely due to their topography. Many Latin American metropolitan areas share the trait of periphery informal settlements in mountains that ring the city. How are lessons from these projects applicable to other metropolises with different features?

**Measureable Targets and Outcomes**
The case study summaries reveal the inconsistency in methods used to set targets for and evaluate the access components in slums. All three indicate the length of paths constructed, but this measurement is relatively meaningless without contextual understanding. One case studied time to the nearest transit stop, which has a deeper meaning for mobility. A standard set of metrics should be chosen as target and outcome measurements to analyze projects and compare best practices over a series of projects.
Community Ownership and Cost-Recovery
Involving the community from the outset of an upgrading project through planning meetings and design workshops ensures that it will appropriately address community needs. Participation stands out as a key factor to the success of the three projects discussed. However, only one of these projects (La Paz) combined community participation with a higher level of ownership, by levying an “urban betterment” fee to the project beneficiaries. In addition to providing a cost recovery mechanism (infrastructure loan pay-back), this small fee probably intensified community commitment to the project. Furthermore, the user fee establishes a precedent for charging for infrastructure improvements, which could later be used to justify O&M funding. The combination of neighborhood planning with a user fee seems to have two beneficial outcomes: (1) monetary provision for the project (Imparato & Ruster, 2003) and (2) a deeper sense of ownership of the project, which may translate into less property sales and drain on the original community after completion.

The construction micro-enterprises formed in Bogotá may be viewed as another tactic to foster community ownership. This combination of technical training and bidding open only to neighborhood members contributes to extended capacity that will outlive the project. However, this process still fails to produce a method for cost-recovery.

Operation and Maintenance
Infrastructure requires funding for operation and maintenance. If a definitive source of funding and responsible party are not established in the initial project planning stage, then a cycle of infrastructure investment with decades of deferred maintenance begins. Transfers from volatile oil revenues or emergency grants from national agencies are not appropriate sources of O&M funding. Country and city agency planning for operation and maintenance should be mandatory for project implementation.

Agency Coordination
The case studies reveal that urban upgrading initiatives are primarily undertaken by municipalities, lending agencies, and local government agencies. While assessment of the project area with community participation is undertaken at the project beginning, there is little evidence of coordination between the implementing agency and public transport providers. An upgrade of a staircase may solve a problem related to the first leg of a journey, but coordination between transport agencies and the upgrading body is necessary to maximize access and travel time benefits.

According to Ortiz, a project may have a transport expert but lack specific studies for the access component (Ortiz, 2007). Coordination with other transport services that reach informal settlement access points should become a standard practice. This will this augment benefits to communities, while establishing a relationship between communities and transport providers that may improve service. Fundamentally, coordination requires a shift in thinking, from viewing the upgrading portion as separate and distinct from a transport component, to an integrated and collaborative network.

City-wide Implementation
One of the criticisms of the staircase projects is that they address walking accessibility in only one limited area of the city. Small loans for individual neighborhood projects from a multilateral lender are not profitable for the lending agency (Campbell, 2007), but these projects have a high return on investment. This begs the question, why are cities not investing or seeking loans for a city-wide pedestrian infrastructure improvement program? First, elected officials consider the opportunity cost of applying for loans. Pedestrian infrastructure is a fraction mass transit system costs. Thus, when a

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7 According to Campbell, a former transport expert at the World Bank, if the Bank loans less than $50-60 million (U.S. dollars), it will lose money.
country/city has a limited number of loan applications, pedestrian infrastructure is quickly displaced by more costly projects (Ortiz, 2007). Secondly, walking is efficient only for limited distances (for an hour commute, only about 5 kilometers can be covered). Investing in modes that offer a greater range of mobility is higher priority for increasing overall urban accessibility.

Despite these factors, city-wide pedestrian infrastructure projects are highly applicable to cities with an extremely high walking mode share. Many African cities face the same impediments to walking due to the lack of sidewalks, footbridges, and other pedestrian infrastructure. The Sub-Saharan African cities of Johannesburg, Addis Ababa, and Niamey have a walking mode share of greater than 50% (Pendakur, 2005). Nairobi also has a high walking trip share, and, like many of these cities, its focus is on providing modern mass transport to the city (Gonzales, 2007). The majority of the population walks because people cannot afford existing transport systems. Though efficient, modern transport systems will be largely unavailable to the public until a stable subsidy program is established that makes the system accessible to the poor. In the interim, implementing a low cost city-wide pedestrian network can reap enormous benefits to foot travelers (Plessis-Fraissard, Telephone Interview, 2007). For projects in cities with these travel patterns, creating a phasing plan to address immediate transport needs for pedestrians, while other systems are created, should become a required protocol.

Bibliography


