

A Guide for Successful Urban Shelter Design

The importance of infrastructure and cooperation



Nicole Fabienne Inauen

Student in architecture

nicole.inauen@tauchbasis.ch

When dealing with developing countries that are due to see massive spikes in population growth and construction, the question of proper expansion is an important one. Not only is the formational period of a building's lifespan the moment where the architect can make the biggest impact on design and function, it also serves as an opportunity to get input from a relevant community. Much of the time, all input is not considered. Planning in countries such as the Philippines is principally driven by cost, while efficiency and sustainability fall by the wayside. In many cases, citizen and architect input could prevent many of the issues that plague Manila's lower-class slums. Transportational issues in particular are not treated with the proper level of concern, leading to dysfunctional communities that actually encourage impoverishment.

1 Urban sprawl

“Urban sprawl” describes the vast, limitless, and uncontrolled extent of urban development into areas adjoining the edge of a city.

The seemingly unstoppable phenomenon of urbanization has a huge influence on living conditions, especially in the Philippines. Between 2000 and 2030, cities

in developing countries will double in population, from two to four billion people, and triple in constructed area. All these cities will continue growing and expanding in a high extent. As well will the flow of people moving from the countryside to the city, so that urbanization will increase to a point of equilibrium where three quarters of the world's population lives in urban areas and there are few suburban and rural communities remaining (Shlomo Angel 2008:146f).

However, much of the time a decline in urban density goes hand in hand with the extension of a city. Over the past two centuries, economic growth, increasing household incomes, and improvements in living standards have made average urban densities decrease, specifically in industrialized countries. This combination of declining density and progressive urban sprawl is often blamed for a range of societal ills. People support “compact cities” which reduce car dependency, regenerate city centers and conserve open spaces at the periphery of the city (Shlomo Angel 2008:147). However, high densities also bring a variety of problems, inter alia “infrastructure overload, overcrowding, congestion, air pollution, severe health hazards, lack of public and green space and environmental degradation” (Burgess, 2000:15).

The biggest challenge is to find the right balance between the two, i.e. a sprawled city that's compact enough to remain centralized and functional. The term optimal density describes a state at which a city “can sustain effective systems of public transport or allow for sufficient porous surfaces to avoid flooding” (Shlomo Angel 2008:148). To maintain these standards, careful advance planning is essential. Tracking population and predicting its growth has become an established science, allowing foresight regarding potential expansion. Proper timing is crucial. When urbanization is still in progress such forecasting is valuable. One must prevent land designated for common use, such as arterial roads, from being occupied, otherwise demolition and displacement will have to occur.

Another problem is the decline of open space within cities. In the period from 1990 to 2000, cities lost about 5.7 % of it (Shlomo Angel 2008:152). Open space in the Philippines is never fully sheltered from informal or formal development by “land use maps” or “official protected status” thanks to rampant and widespread government construction corruption (Shlomo Angel 2008:152). The best way to preserve open space is by transforming it into useful public or private property and then actively protecting it. This property needs to be “well-defined, properly circumscribed, [and] marked with the attributes of open spaces,” sometimes going so far as to “[fence them] off, and even [guard them] day and night if necessary” (Shlomo Angel 2008:153). This refers to sensitive natural habitats, nature parks, and playgrounds, to name a few examples.

All in all, the tightrope walk to find the right form for a city is extraordinary difficult. What is definite is that urban expansion is a consequential phenomenon that needs to be included in city planning activities from the onset.

2 The importance of coordination at all levels

If we take a closer look at the role of architects in the design of urban shelters, we can make an overall statement saying that “generally they are not involved enough in the design process” (Johnny Åstrand). Often, the main determining factor of a project is money. This leads to the cheapest solution – and not the best in terms of human indoor and outside environments – being used. At least, the one that seems to be the cheapest one. However, regarding the long term use of a building, this is not always true. Not only must construction costs be considered, but also and even more importantly all the maintenance, infrastructure, and social service costs. In many cases, this is neglected. To prevent this from happening, architects should definitely be more present in the process. Due to their interdisciplinary education

– design and creativity combined with an understanding of economic, cultural, technical, and political aspects – architects could become the connecting link in a system of cooperation that is so strongly needed in this field.¹

Speaking of cooperation, this does not only cover relations between different planning professionals like traffic planners, engineers, environmental planners, urban designers and architects, but good cooperation also demands that politicians, economists, etc., work closely with the planners. A successful project requires a constant exchange of different knowledge and experience.

In addition to horizontal cooperation, vertical cooperation should be improved, too, especially within the government. More consistent interaction between national, regional, and local levels could prevent and address all kinds of problems in urban shelter development. Governments can foster detailed local plans reacting to area-specific circumstances that fit perfectly into an overall plan based on a wider context including infrastructure, for example transportation, electricity, etc., and environmental issues. Overall, there has been “a trend to more strategic levels of planning, including supra-national planning as globalisation and trans-national activity increase in importance” (Jenkins et al. 2007:304).

Another issue is the separation of public and private that can be seen in many places. Rather than opposing each other, the “private and public sectors should work together, forming public-private partnerships as a favoured model for providing urban services” (Jenkins et al. 2007:178). Private investments into public housing should be encouraged. Making residence ownership profitable would achieve this (Jenkins et al. 2007:166).

Last but not least, planners should not neglect the common people’s interests. Generally speaking, “housing users know their needs better than governmental officials” (Jenkins et al. 2007:161). Through the use of community forums, future

¹ This is based on my experience during a field trip in Metro Manila in February 2012.

inhabitants can provide valuable insight into the construction process, making the architect relevant again. He has to mediate between the common people and the planning professionals since he knows both sides. Another possibility is architect-supervised self-help housing. This is become increasingly prevalent in urban shelter construction in developing countries. Self-help housing is based on the ideals of “trust in mutual help,” the “openness to new ideas and to rational modes of thinking with a widespread sense of optimism,” and the strong work ethic of the residents (Jenkins et al. 2007:160). It also contributes to “better architectural solutions as its focuses on individualised household use values and not abstract market exchange values” (Jenkins et al. 2007:161). However, just letting people do whatever they want would result in total chaos. People are absolutely willing to help each other, to learn, and work their hardest, but if they do not have the know-how required to make it all work they cannot succeed. To give a theoretical example, pretend there is a woman who is very motivated in creating a nice home for her family. However, she simply does not know that the separation wall she added totally cuts off all the ventilation in her house. An architect can introduce efficient building techniques and materials to bring a systematic approach to the construction process while also considering what future inhabitants want and need. To sum up, only when the architect and all the other stakeholders engage interactively and negotiate for common interests can good urban shelter projects evolve.

3 Factors that should be Shaping Urban Shelter Design

The Philippines’s capital city of Metro Manila is rapidly expanding and rife with examples of poor low-income shelter design. Planning principles are mostly founded on minimum cost at maximum output volume. Designers also often neglect the environment. The resulting dwellings are predominantly one-story row-houses with insufficiently ventilated lofts. They cover enormous land areas, failing to take advantage of opportunities for vertical growth. In addition, these

developments lack variety, as there are no middle or high income inhabitants, and are purely residential. Commercial parts or offices are not integrated.² That is why this paragraph will look at different factors that should be shaping urban shelter design in order to create well-working neighbourhoods. Of course there exists an enormous multiplicity of such criteria, some of them being more important than others. In order to be able to focus on one of these aspects – the influence of transportation systems – more deeply, a selection of the rest will only be treated briefly in this essay.

- Infrastructure in general: Public officials and even architects working for the government often support one-story dwellings, arguing for cost reduction, but they forget that this has a considerable influence on infrastructure. Streets are longer, it is more difficult to provide for widespread sanitation, etc.
- Maintenance: Often, all work is considered finish once a building is completed. Lack of maintenance can cause serious problems and use up an enormous amount of money, especially in countries with extreme climate conditions.
- Indoor climate: What is the point of a nice concrete bungalow if you cannot stay inside without overheating? With global warming climatic considerations are becoming progressively more important. In tropical countries in particular, good ventilation is crucial. Without structural-based temperature control, inhabitants are forced to spend scarce rent money on air conditioning and fans.
- Possibility for expansion: Family sizes change over time. Therefore, flexibility in the organisation of the unit as well as the possibility of expansion (ex. vertically) are useful and sometimes essential. For example, even though at the moment of construction a building might not exceed five stories, thus making it legal to build without an elevator, it makes sense to build a shaft that could be

² This is based on my experience during a field trip in Metro Manila in February 2012.

occupied by an elevator without making significant changes should the property owner desire to upgrade or expand.

- **Greenery:** Plants and water features have a big influence on outdoor climate, as well as aesthetics and human well-being (anti-stress factor).
- **Waste management:** Especially in slums, waste occupies open spaces which could be used as recreational areas. A well-functioning waste collection system could mean a significant increase in life quality. It is important to teach residents how to dispose of their garbage correctly. For that, the easiest and most efficient option is educating children who are willing and able to learn and can then transmit their knowledge to their parents.
- **Neighbourhood events:** The design should include the possibility for organising neighbourhood events. Through these, the inhabitants get to know each other and build trust. This creates a sense of security that renders traditional gated communities unnecessary.
- **Public facilities:** Schools, churches, and super markets should be within walking distance to provide for those who lack the means to pay for other transportation.
- **Rain water drainage:** In many cases, rain water drainage is insufficient to the extent that with the slightest rainfall, neighbourhoods (or slums) get flooded. In addition, this potentially potable water becomes dirty and unusable. In a neighbourhood that lacks running water, this is a huge waste. Rain water from the roofs and the streets could be collected, naturally drained, and stored in tanks that provide the buildings with fresh water, but such a design would need to be implemented structurally.
- **Mixed use:** Architects need to avoid creating pure residential low-income areas. By including middle and high income buildings in the design, the social balance improves and creates a mutually beneficial environment. Furthermore, adding commercial activities creates additional income possibilities.

- Transport: The World Bank explains the role of transport in creating social exclusion amongst impoverished urban-dwellers as follows:

The 'income poor' make less trips, and more of their trips are undertaken on foot. For most purposes they are restricted to whatever services can be accessed within walking distance, making them 'accessibility poor'. The journey to work may be relatively long. Even if it is not, it will use slow modes and may be very time consuming, so they are also 'time-poor'. For the poor, trip making is often discouraged by their vulnerability as pedestrians both to traffic accidents and to personal violence, making them 'safety poor'. Finally there is evidence that long walking distances and times also creates a tiredness and boredom which reduces their productivity by adding an 'energy-poverty' dimension to their deprivation (World Bank 2002, Hans Örn 2002:7).

This shows how crucial transportation for the urban poor is. It presents – after food and housing – one of the strongest needs among people. So strong, that households in developing countries spend 15-30 % of their income – compared to 3 % in Great Britain - on transportation. (Hans Örn 2002:6) Especially for low income families, this has a high impact.

However, what exactly is transportation and what makes one system better than another one? Whereas traffic describes the problems caused by private motor vehicles, transportation treats the question of how to move between home, work, schools, and other activities in an affordable, safe way using as little time as possible. (Hans Örn 2002:4).

Since the urban poor cannot afford a private car, other ways of transport become significantly more important. Forgetting this fact is one of the main mistakes in slum dwellers relocation projects. Developers build social housing in the outskirts of a city where land is cheap, but employment opportunities are distant. Many residents then sell their houses in order to move back into informal settlements that have the advantage of being close to their work and public

facilities. Therefore, it is essential that the design considers transportation in its first step. A good system can expand the options for work, education, health, etc., for the new settlers significantly so that they do not return to their old slum dwellings.

One aspect is public transport. It can only be affordable for the poor if the profitability of public transport operations is high. One of the key aspects influencing this is efficiency. However, only systems that consider design from the very beginning make this possible. Once construction has already taken place, a change such as the creation of wide avenues that can carry bus rapid transit is almost unrealizable. A well-functioning transport system also has other advantages. Important transport knots, such as central bus stations, become commercially interesting, which raises land and building value. This can even attract international companies that form a source of employment and income, which also contributes to the well-being of the lower classes (Hans Örn 2002:5).

However, it is not all about public transport. Other means of movement like cycling or walking should in no case be neglected. Through the use of a bicycle a person can increase his accessible area by about 25 times (Hans Örn 2002:6). The introduction of bicycle use in a larger scale can even create low-end jobs like bike repair or pumping shops (Hans Örn 2002:17). Such mini-enterprises form an important income segment for the urban poor. In the design this would for example mean including bike lanes in the project or perhaps even bike rental stations. Separation of bicycles from motorized traffic can easily be achieved through low-cost measures (Hans Örn 2002:17). In the same way, the supply of pedestrian ways is especially important in low-income areas, since walking is still the main means of transport for most of the urban poor. Sidewalks need to be wide enough to offer good and secure walking conditions. The design should also consider protection against climatic conditions such as heavy rainfall or strong sun radiation to make walking as comfortable as possible.

4 Design of Environmentally Friendly and Sustainable Shelter and Neighbourhoods

“A livelihood is sustainable if it can cope with and recover from stress and shock, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation” (Chambers and Conway 1992:6).

Environmental problems can be caused by well-off people through car emissions and solid waste production, but also through a lack of land and services for the lower class that form a larger part of the population. These deficiencies, for example in sanitation or sewage systems, can cause pollution of underground water supplies. Further, the occupation of unsuitable land, like natural drainage zones or ecologically fragile areas, can have an enormous impact on functioning vital ecosystems (Jenkins et al. 2007:146). Another grave point is the uncontrolled dumping of solid waste. This is particularly problematic in slum areas. Garbage collection trucks have difficulty navigating their inefficient narrow paths. Often the issue is inhabitant ignorance as to how to properly recycle and dispose of waste.

The determining question therefore is: How can architects make residents sensitive to environmental issues and promote sustainable neighbourhoods? There exist different approaches to this subject. One of them is the environmentalist point of view, which states, “Development and nature must be linked, and sustainable development can be achieved through regenerative settlements, renewable resources and recycling” (Jenkins et al. 2007:185). Another one would be the economist view, according to which “decision making should combine environment and economics, achieving sustainable development through the market system” (Jenkins et al. 2007:185). A relatively good attempt at combining these two visions is the case of Curitiba.

Named the City of the Year by the World Bank in 1994, Curitiba is the capital of the Paraná state in southeastern Brazil. Although it is one of the fastest-growing Brazilian cities with a population that has exploded in the last 60 years, it has not

followed the conventional Brazilian demand for car-dominated design. During the 1960s and 70s, under visionary and dynamic mayor Jaime Lerner, Curitiba began an urban development based on public transport. Today, around two thirds of the population regularly uses public transport (Hans Örn 2002:20). In order to make such a system popular for all social classes, it has to be cheap to use, fast, and comfortable. Cost is the major factor for lower-class citizens, but rich people will only switch over from private car use if the public transport presents a productive and efficient alternative.

So, what is Curitiba's secret? How can it reach all these goals?

The system is based on buses on exclusive busways with signal priority. In addition, to minimize the stop duration at each station, ticketing takes place before boarding in so-called "tube-stations" (Hans Örn 2002:20). All this ensures high travel speed while offering comfort and convenience comparable to a rail transit system but at a fraction of the cost. However, for the poor of the poor this might still be too much. That is why Curitiba integrated garbage disposal into the transport system. Basically, they exchange sorted rubbish against bus tickets or food. At seven in the morning, slum inhabitants sit waiting for the official waste collector trucks with huge bags full of garbage. Eight to ten kilograms of normal waste are worth a bus or an opera ticket. Five kilograms of recyclable garbage earn one kilo of farm products and two liters of kitchen oil bring another kilo of food (Thayane Vitola Rohn 2007:8f). In August, garbage can be exchanged for school supplies children and at Christmas, for sweets and cake (Jens Glüsing 1998:122). This system works especially well in slum areas where it is extremely difficult for trucks to navigate the narrow roads. Afterwards the city sells the collected rubbish to private recycling factories and the resulting money is used for social projects. Residents' societies, for example, get 10 % of the money from the garbage to be invested into public services and other general improvements (Thayane Vitola Rohn 2007:9).

In this way, you can kill two birds with one stone. The high usage rate for public transport has contributed to give the city one of the lowest rates of air

pollution in Brazil, while the exchange of rubbish against food is one of Curitiba's most successful anti-poverty measures. Through the help of all the inhabitants, the neighbourhoods are cleaner than ever. The high life quality has attracted foreign investors and enterprises that have begun to contribute to the city's wealth. All in all, this example shows what a great effect the combination of environmental issues, infrastructure planning and design can have.

Designing proper housing in a developing country, whether a single home or dwellings for a larger population group, demands an in-depth understanding of the potential needs of the inhabitants as well as heavy consideration as to how the building(s) fit into the current and future scheme of the area. Unfortunately, many people in charge of such construction tend to focus more heavily on money than form, function, and sustainability. This type of thinking has a particularly strong negative effect on resident transportation. A good system, such as that of Curitiba, can expand the options of its citizens and make it easier for them to succeed. Curitiba also manages to tackle many of its environmental issues with its highly integrated system. The city is proof that thinking outside-the-box with a specific group of people's needs in mind can have a very positive impact.

References

Angel, Shlomo

2008 *An arterial grid of dirt roads*. Princeton: The Woodrow Wilson School of Public and International Affairs. ISSN 0264-2751

Chambers, Robert and Conway, Gordon

1992 *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. Brighton: International Symposium on Sustainable Design. ISBN 0903715589

Glüsing, Jens

1998 *Curitiba – Brasiliens ökologische Hauptstadt*. Spiegel Special 12/1998.

Örn, Hans

2002 *Urban Traffic and Transport*. Lund: HDM Building issues. ISSN 1100-9446

Jenkins, Paul, Harry Smith and Ya Ping Wang

2007 *Planning and Housing in the Rapidly Urbanising World*. Abingdon: Routledge. ISBN10 0-415-35796-9

Rohn, Thayane Vitola

2007 *Improvements to Curitiba's waste disposal system: A comparative study between Curitiba and Germany solutions*. Curitiba: International Symposium on Sustainable Design. ISBN 978-85-60186-02-0

1992 'Sustainable Rural Livelihoods: Practical Concepts for the 21st Century', *Discussion Paper 296*. Brighton, UK: Institute of Development Studies.

.