Inequality in Urban Infrastructure Accessibility to Slum Settlements: A Case Study of Bangkok Metropolitan

Chaweewan Denpaiboon[1]

Pattamon Selanon[1]

Krittaphas Denpaiboon[2]

[1] Faculty of Architecture and Planning, Thammasat University, Thailand
[2] Innovative Center for Community Sustainability, Thammasat University, Thailand

Corresponding Author:
Chaweewan Denpaiboon
Faculty of Architecture and Planning,
Thammasat University Rangsit Campus,
Pathum Thani 12121, Thailand
E-mail: denpaiboon@gmail.com

Abstract

Typically, accessibility of people with low-income to public urban infrastructure is unfairly managed, and this tendency seems to be gradually higher in the future. Objectives of this study are: (a) to study relationship between pattern of the slum community and accessibility to urban infrastructure; (b) to design system of accessing public services for low income people based on housing problem; and (c) to provide recommendations for social justice policies to the relevant government agencies. The selected three study areas include of Bangkapi district, Bangkok, Klong Luang, Pathumthani and Bang Phli, Samut Prakarn. Methods of the study cover literature review and the research's interview as well as a fieldwork observation. The questionnaire was used along with the statistical package Social Science (SPSS) to describe the phenomenon of residents' attitudes and receiving services. In addition, Bangkok's geographic information is used in the Urban Analysis Model, ArcGIS 10.4 and the ArcGIS Software with the Network Analyst Extension in order to evaluate the relationship between variables and accessibility to the urban infrastructure. The study also combines considerations of the city's access to services, using the Human Development Index (HDI), which is a measuring tool of the United Nations Development Programme (UNDP) in ability to access to city services. The results demonstrate that the urban poor have access to city services and housing, but there is a lack of stability and justification in typical slum areas. In addition, there are also problems of the location of the slum communities in Bangkok and city services as followings:

1. Most slum communities are far from the public transportation routes.

2. In term of basic educational institution, people from slum communities within a 1,000-meter radius seems to be able to reach the service. However, most of the slums are located in a radius of more than 1,000 meters, where the number of access is limited.

3. In aspects of market and career sources, most slums are located in a radius of more than 1,000 meters.

4. For department store and shopping malls in Bangkok, slum communities can catch within a 1,000-meter radius.

Finally, the study shows measurement of access to basic infrastructure services with an analysis of the Human Development Index (HDI). Findings of the study reveal that accessibility to urban infrastructure and housing is in low level when compared with users' satisfaction analysis, which is also low.

Keywords: Inequality, Urban Infrastructure Accessibility, Slum Settlements

Introduction

In today's society worldwide, there is a concern over how "housing ownership" would bring an effect to residency status. There are increasing numbers of campaigns regarding the housing market. Having a residence could mean the rights for residency status. Whilst many group of people, such as, people living in slum or people with temporary house registration, lost their residency status, as a result of not having a house registration. Subsequently, these group of people also lost opportunities in basic living necessity such as applying schools for their children and requesting for water supply (Archer and Boonyabancha, 2011).

Many countries plan their policies using housing as a tool to reduce disparities and social inequalities. To increasing housing ownership of target groups, especially those with low income, government policies encourage or sometimes interfere the housing market mechanism, which is the beginning of poverty reduction in the community. The policies are such as supporting career, providing the basic facilities. Good housing could bring a great effect to people of the country (Sampson and Sharkey, 2008) This strategy needs a social promotion process, which consists of getting a good education, finding secured career, having a stable income, etc. If this social promotion process does not sustain, a poverty cycle could return in the end (Figure 1). The government considers that the stability of the housing is a part of social welfare, which should be supported. However, the mechanisms of the market must be taken into account. At the present, there is a policy to increase the occupancy rate of low-income housing; for example, non-profit and cooperative rental state-owned housing, or low-budget private projects. Some invasive slum areas are improvement process. Inequality and injustice in the housing are apparent in the form of illegal or low standard housing for labors or poor people, which do not obtain the rightful citizenship status, and live in small crowded and unsafe areas without basic living infrastructure from government. This study aims to gain understanding of conceptual analysis to improve the quality of life of the poor living in slums or outcast housing from the private sector, which access to urban infrastructure with inequality manner.

Figure 1. Cycle Poverty
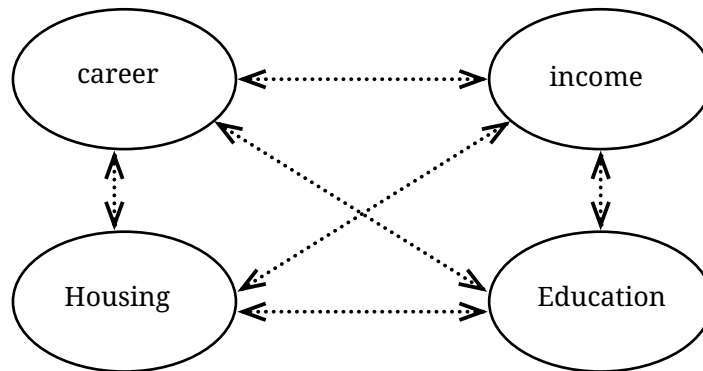
Objectives of the Study

1. To study structure of accessibility to public urban infrastructure of the low income people, based on the problem of housing in Slum areas.

2. To provide guidelines for the involved government sectors in order to create social justice policies.

Literature Review

Harris and Todaro (1970) explained the birth of slum phenomenon with migration or labor migration theories that there is an expectation that wage labor in the city is higher than rural labor causing labors to fluctuate the cities at all the time. Meanwhile, new economic theory described the phenomenon of NELM (1991). From the two reviews, it can be summarized that migration can be considered as a positive factor as rural people come to work in the city. When they make an income, the money is sent back home resulting in a cash flow from urban to rural, which is good for economic development of rural communities. These two migration theories are the most common phenomena for all world societies. They have to work to feed themselves and their families. Learning by doing, they require a proper housing in the city. Amartya Sen (1992) Poverty is the failure of basic capabilities to reach certain minimally acceptable levels. The functioning relevant to this can vary from such elementary physical ones as being well-nourished, being adequately clothed

and sheltered, avoiding preventable morbidity etc. to more complex social achievements such as taking part in the life of the community being able to appear in public without shame and so on. The studies of housing inequity are strongly suitable for study with human right (Sen, 2005). Both concepts are not perfectly the same, however, they can be blended together according to public reasoning process. Today, the concept of endorsement of housing right in both senses of quantitative and qualitative is widely accepted as a basic human right. However, concrete definition of those right is currently lack of clarity which resulted in the inaccurate sufficient housing need level. The large and diversify of questions which researcher have to face when they want to set the housing sufficiency criterion. To create the accurate measure, physical body of housing as well as issues and aspects have to be put in an aggregate index (Navarro and Ayala, 2008, Chiappero, 1996). However, in some cases, researchers, e.g., Wuff and Reynolds (2010) and De Silva and Elmelech (2009) has eliminate the intricacies of making aggregate index by using other tangibly factors, i.e., housing price, occupied status as a benchmark to study on housing inequity. In other cases, research factors might not be directly tangibly, which many academic studies use the level of satisfaction as a benchmark? The measurement of poverty in the sense of housing, actually, similar to the measurement of normal poverty. So the measurement of poverty of housing can be observe from the efficient level of public utility or the inadequacy of physical attribute which are the basic functioning of house.

Method

The Conceptual Frameworks

According to *Concise*, the nature poor means "lacking adequate money or means to live comfortably" The term poverty is defined as the state of being poor and as "want of the necessities of life". The sense of lacking those things that are necessary. Therefore, it can be inferred that poverty is clearly multidimensional in nature. It encompasses not only material deprivation in terms of income or consumption levels arising from illiteracy, malnutrition, bad health, poor access to water and sanitation, but also vulnerability to economic shocks and lack of political freedom. Material deprivations are clearly linked in many cases to these other types of deprivation; however, these are not all-encompassing. In other words deprivations in terms of some minimally adequate income or consumption do not always move together with other deprivation. As a result there are different conceptualizations and approaches of poverty.

Research Methods

This study utilizes a variety of analytical tools in order to clarify understanding in social and economic aspects of household as well as their satisfactions in housing. The study gathers 144 sets of questionnaires deriving from 3 slum communities comprising of Bangkapi district, Bangkok, Klong Luang, Pathumthani, and Bang Phli, Samut Prakan. The followings are methods of data analysis.

1. The study utilizes Urban Network Analysis Model method in order to investigate physical accessibility of the settlement, which are related to the public utilities and facilities. The Analysis utilizes mathematical techniques along with Geographic Information Systems and ArcGIS software with Network Analyst Extension to find the location of a slum area with city services in Bangkok.

2. Statistic Package Social Science (SPSS) to explain behavioral phenomena of residents and their uses. And the relationship between variables of accessibility.
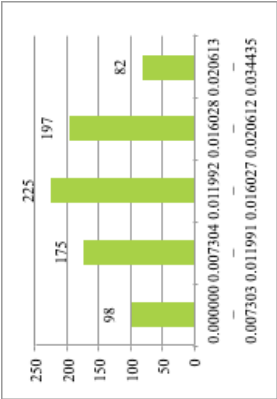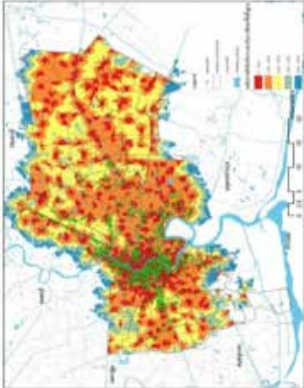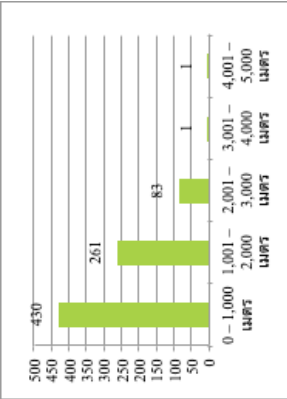
3. Human Development Index (HDI) to the analysis of accessibility in four basic living essentials including, factor of socioeconomic characteristics of households, housing factor, accessibility to city and urban infrastructure, accessibility to social welfare and financial security.
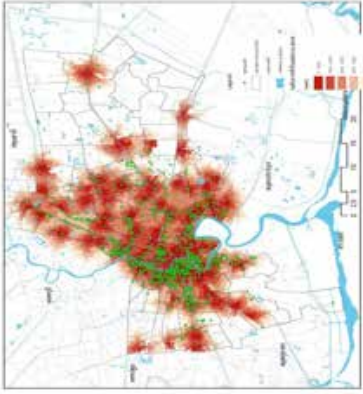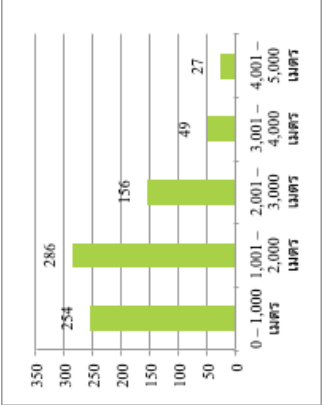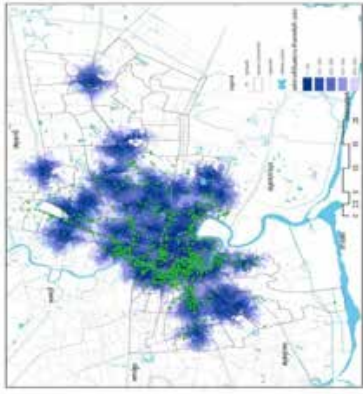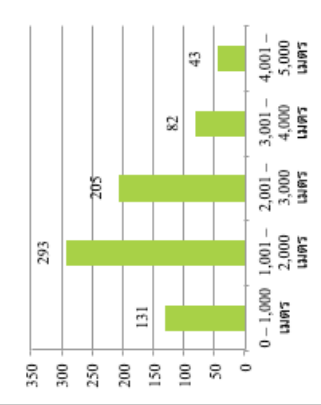
The Study's Results and Discussion

A Study of the Relationship Between Location of Slum and Accessibility to Urban Infrastructure

The analysis is based on database of the Geographic Information System (GIS) program in 2014 to describe and analyze the location of the slums shortest community and accessibility to urban infrastructure. The Urban Network Analysis tool is also applied in find settlement pattern of the slum community in Bangkok as well as accessibility to government services such as transportation, basic living services, education, major job sources and shopping centers.

Figure 2. Results of Accessibility Urban Infrastructure

Access Pattern	Map of Slum Community Location to Shortest Urban Facilities	Number of Communities	Results
Level of Transportation Accessibility			According to the analysis of Bangkok's geographic information database, there are only 98 slum communities, or 12.61 percent of total slum have shortest transportation. The others, which are 679 communities or 87.39 percent, access to transportation service at a long distance as presented
Levels of Accessibility to basic living services and Education			Most Bangkok's slum communities, 430 out of the total of 776 slum communities or 55.41 percent, can access basic educational institution at 1000-meter radius. However, 336 communities or 44.59 percent must travel more than 1,000 meters.

| Level of Accessibility to Career Sources (Market) | | | The study demonstrated that 254 slum communities or 32.90 percent can access to career source in market in Bangkok communities with no more than 1,000 meters radius. Whilst, 418 slum communities or 68.10 percent, must take more than 1,000 meters to reach the market. |
| Accessibility to career source (Department store) | | | According to the study, 131 communities or 17.37% are able to access to the career source of department store in less than 1,000 meters; while 623 communities or 82.63% have to travel more than 1,000 meters. |

Type of housing in slum. The growth of urban development or some-times called urban phenomenon brought a great impact on economic and social structure in Bangkok and its vicinity. The study demonstrated that people with low income or laborers could also feel the change as their living style is remodeled from land invasion to a private rental room or house. This type of housing in the city is expensive and inadequate, so their living is transferred to suburbs, which is more affordable and expansive. This transformation affects to job recruitment model - the labors or migrant workers, who used to search for the career source, are now waiting for a work appointment outside the city. The new job recruitment model is arranged to meet the needs of both employers and employees, which is the same as foreign labor services such as Osaka (Denpaiboon et.al., 2014). However, some labors are still living in labor-intensive areas or big bazaars, such as the Tai market (Talattai), the North of Bangkok in Pathumthani Province as well as the central of Bangkok, Klong Teoy Market.

Type of slum housing in city area. This style of housing is generally lo-cated in the work source area such as fresh-market, industrial factory, and gov-ernment agencies, which are popular among general labors or daily workers due to this type of housing not only allow them to manage rent, but also cost and time sharing between their co-workers. Most of housing is in form of townhouse and housing around city area such as Khlongtoey and Bangkapi fresh markets, Ladkra-bang housing community, Bangpli housing community, and Thonburi housing com-munity, etc.

Housing of labors around Khlong Toey area is in a form of housing with room rent in city area. Most Thai labors, who are from countryside of the country, would have their own business. Meanwhile foreigners, who are from Myanmar, Cambodia, Laos, etc. works as labors in Khlong Toey Freshmarket. They mostly work for daily carrying loads for 3-4 times, each of which get about 50-100 baht. Most labors, who are mostly male in between 15-30 years old, live together as 5 people for one room with sharing bathroom for a rent of around 3,500-3,800 baht. If room with private bathroom, rent would start from 3,000 baht without water and electricity supply. Water typically cost around 800 baht per a person; whilst cost of electricity would depend of use.

Figure 3. Housing with room rent owned by private sectors

Figure 4. Room rent in Khlongtoey slum area
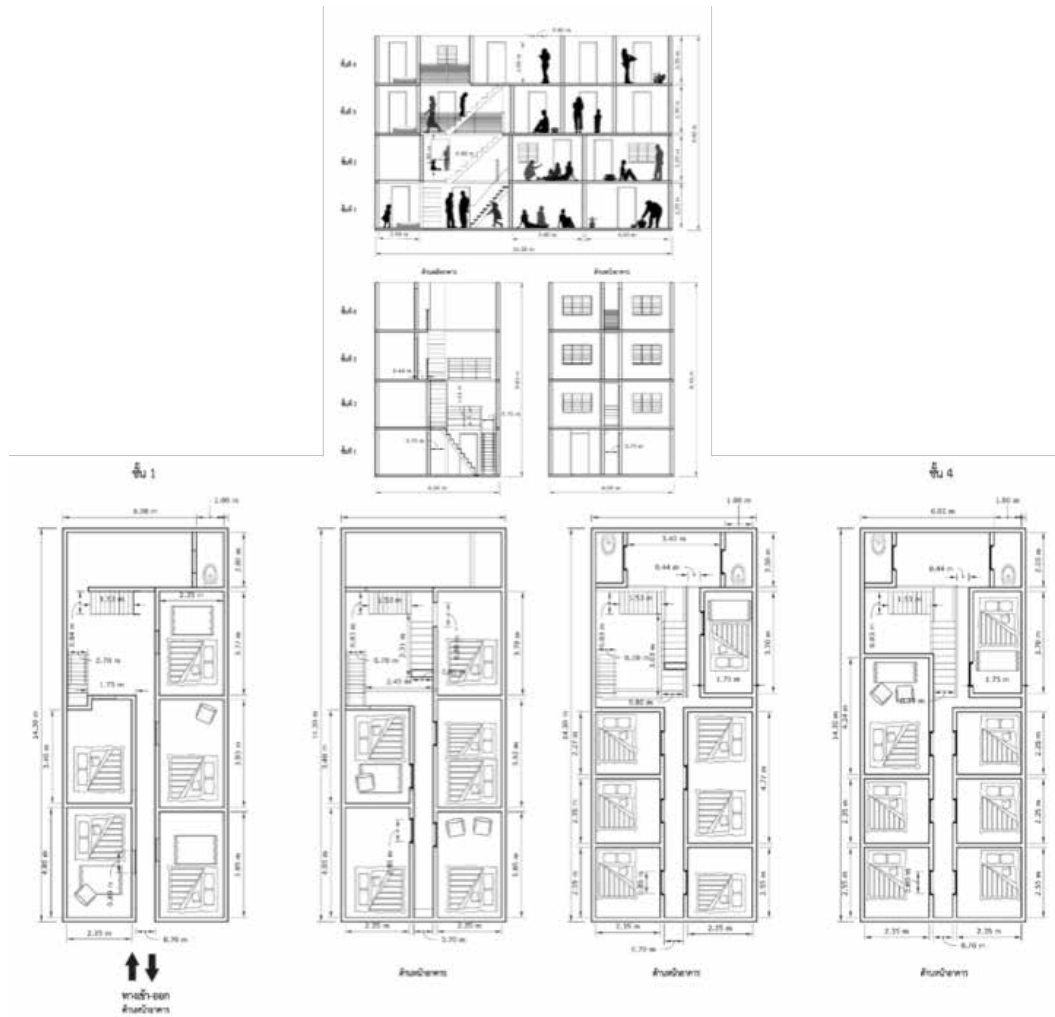
When asking for satisfactory of working in the capital city, low-income people inform that they are satisfied with low rate rent even though it is inconvenient for them, yet they are able to transfer money to their family in countryside every month.

Figure 5. Labors in the fresh-market Khlong Toey slum area

The study had several interviews, one of which is B, an owner of a small fresh fruit business in the fresh market. B comes from Pitsanulok province and has been living in the Khlongtoey fresh market for more than 4 years. He lives in a 9 square meter room in a rent of 2,000 baths. His daily income ranges from 300 to 500 baht. He lives alone while all of his family members are in Pitsanulok. He works in Bangkok so that he can transfer money to his hometown to feed his family. B noted that he moderately satisfies in income of working in the city even though he is not as happy as living in the countryside. Some of B's living unsatisfactory derives from insufficient water supply, bad lousy and smelly surrounding environment so that he is unable to have a good rest.

Figure 6. An owner of a small fresh fruit business in the fresh market

Type of slum housing in suburban area. Most people living in this type of housing are general labors or daily workers, who works on the construction site. Typically, every morning their employers would pick them up and return them after finishing work from nearby public areas or on the road. Some labors may go to workplace by themselves. These group of people normally are not concerned about eviction of their housing. They are able to work as a migrant worker until they are promoted as a skilled worker. Examples of this types of housing are areas around Piggyback road, Suroa road around Klong Neung, all of which are inhabited by both Thai and foreigners in a form of latent population. The income of the workers in the area of the piggyback road depend on working ability of each person. Skilled labors, who can read construction drawing or laying tiles tiling would be able to earn 800 baht per day. Wage of bricklayers is about 700 baht a day, and ordinary male laborers can have wage of 600 baht per day. Wage for foreign workers with work permits is about 300 - 400 baht per day. These labors typically gets around 15 to 20 working days a month. Therefore, they would lack of income for not working days.

Most of housing in the area is owned by the private sector. Rent is range from around 2,000 to 4,000 per month (excluding water supply). If several people living together in one room, each would pay lower rate of rent. Some of labors lives in temporary shelter in invading area of Piggyback road.

Figure 7. Location of Kiebmoo Soi and Labor gathering area around Soi Kieb-Moo, Meanburi in the morning and came-back in evening

Type of slum house for rent land and temporary living area. This type of rent land and temporary living area is one of way solutions by rental land and built temporary house. People in this type typically live as a group. Most of them come from countryside and already have migrated to urban city to find a job in the city, they only want a temporary place to live, normally can shortly rent temporary land only 3-6 months. This type of land usually does not have any facilities and common living together. They might live in the land with a contract. And when the lands' owners want to reclaim their lands, they must bestow the land back to the owners such as a site construction, occupy land in city.

Result from Survey of Living Satisfaction in Three Study Areas

The study covers six aspects of the survey for accessibility to basic urban infrastructure composing of commercial, public health, education and finance in three study areas as followings:

Attitudes toward commercial services. According to the study of all three areas, the most commercial access is fresh market into two areas such as Navanakorn and Bangkapi areas, where they are working place for them.

Attitude toward public health services. The study found that most people use gold card[1] or social security for their medical treatment rights with 70.00 percent and 23.96 percent respectively. However, about 74.10 percent without do not have other medical treatment rights. For those who hold other types of non-health insurance, 10.40% have same level of holding life and accident insurance; while the remaining 10 percent are disaster insured.

Attitude toward education services. The study found that accessibility to educational services presents that most low income family members study primary to secondary school or basic education around neighborhood area with high rate of 67.92 percent. The rest of 32.08% studies further from neighborhood. Moreover, most low-income people are educated at a basic level. However, 48.84 percent receive higher education at secondary school. The highest level of education, most of the family members were 48.84% and only 2.33 percent study in Bachelor degree level.
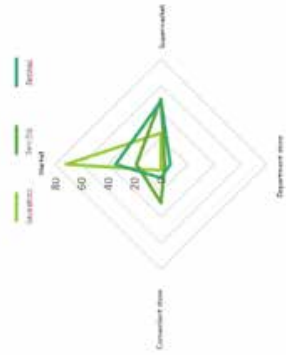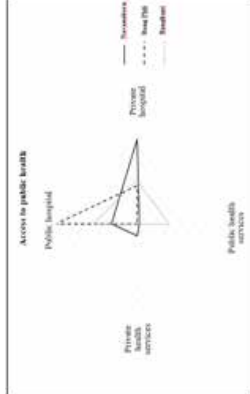
---

[1] Gold card "Honest document" is to provide universal health coverage benefits to cardholders, this will reduce the cost of medical treatment as well. Especially poor people to moderate. However Gold card has both advantages and disadvantages as well. Should understand more. To use the gold card effectively and get the most benefits

Attitude toward financial services. For those who borrow for housing, 61.11 percent of them received their loans from the formal financial institutions such as Government Housing Bank, Government Savings Bank or Krung Thai Bank, etc. For, the source of loans from informal system such as pawn shop was at 11.11 percent, which is in the same level of loan from relatives. Most people borrow money from the financial institutions mainly for housing at 58.97 percent. However, it should be noted that investment loan are mostly from informal financial institutions. Nawanakorn has the highest loan for housing and investment than other areas. The analysis of accessibility to financial services shows variety of pattern in loans and funds. In case of the load, most people prefer not to borrow, but when necessary loan source is from the formal financial institutions. On the other hand, if the holding funds, mostly sources of fund are from outer system. This shows differences in financial risk management of low income earners.

Attitude toward the environment of housing and community. Considering the issues that are relevant to the housing and community environment, there are five key areas of concern: housing satisfaction. Attitude towards community safety. Participation with neighbors Demand for housing in future projects and the demand for housing communities. The data and analysis are summarized as follows. The lowest satisfaction score was 3.03 at the moderate level, as well as the highest satisfaction was the sense of ownership in the community. Utilities expenses such as water bill, electricity bill, which are more expensive. Even if the cost of housing is cheap. And access to the financial system is quite difficult. The cost of utilities is high. The low income people in the Nava Nakorn and Bang Phli areas are also the least satisfied.

Attitude towards community safety. The safety of the low income community reflected in the results of the questionnaire survey. In every study area, safety is a concern, especially for crime, theft and crime. The lowest satisfaction level with satisfactory score of 2.64. It shows that the income is quite a concern. In addition, there are additional information supporting this study in Bang Phli area has an average frequency of 16 times per year and Nava Nakorn area is 12 times per year. The study compared toward participating activities of the community, trust in leaders, activities involvement in neighbor community, the study found that low income people in all study areas have lowest satisfactory at 2.99 points with participating activities organizing by their community. However, rate of satisfaction in activities involvement in neighbor community is higher with 3.31 points.

Figure 8. Results of Accessibility for Urban Infrastructure

Indicators	Location	Results
Attitude toward access to commercial		According to the study of all three areas, the most commercial access is fresh market with a rate of 48.51 percent. Whereas, the least access to commercial is department store with 2.24 percent. Compared within the three study areas, the Navanakorn has the most access rate in fresh market with 71.64 percent. Meanwhile, the BangPhli and Bangkapi have high rate in access to supermarket commercial type (such as Tesco Lotus and Big C) with 50 percent and 48.28 accordingly.
Attitude toward access public health		The study revealed that most low-income people access to private hospitals to most with rate of 48.67 percent. On the other hand, private clinic is the least popular with 4.42 percent of access. In BangPhli area, government public health services are the most popular of accessibility with 70.00 percent.

Attitude Toward Access to Education	Results from studying accessibility to educational services presents that most low income family members study primary to secondary school or basic education around neighborhood area with high rate of 67.92 percent. The rest of 32.08% studies further from neighborhood. Considering this section, there is coherence between education in the neighborhood and traveling to study, in which its average distance is about 4.17 kilometers in 17 minutes. Accumulating, it can be estimated that people in basic education stage spend an average of 4 minutes for 1 kilometer distance. When compared within the three study areas, people in Bangkapi area spends about 22 minutes for their education, which is 7 minutes more than Nawanakorn and BangPhli area. It is noteworthy that the Nawanakorn area has an average distance of 2.20 kilometers, which is the minimum travel distance of the three areas, yet the travelling time is higher than the other areas.
Attitude toward Access to Financial	Most low income people in the study areas barely have both housing and investment loans. However, the study demonstrates people have investment loans and housing loans at 36.43 percent and 35.97 percent respectively. This means that most low income people have the two types of loans at a comparable rate.

Attitude toward Access to Housing	Overall, in every study area, there is a high likelihood of having a workplace near the highest residence. The satisfaction score was 3.67, which was moderate. Considering each area, we found that Nava Nakorn and Bang Kapi are satisfied with the highest number of workplaces located near their homes. Satisfaction score 3.75 equal to Bang Phli area as well. Only a low score of 3.48. As a result, the average total satisfaction has fallen as the source of work near the residence. The lowest satisfaction score was 3.03 at the moderate level, as well as the highest satisfaction was the sense of ownership in the community. Utilities expenses such as water bill, electricity bill, which are more expensive. Even if the cost of housing is cheap. And access to the financial system is quite difficult. The cost of utilities is high. The low income people in the Nava Nakorn and Bang Phli areas are also the least satisfied.
Attitude towards Access to Community Safety	As a result of the questionnaire, 97.18% especially Nawanakorn, which was reported high levels of crime theft and accidents at 100%, and for Bang Kapi area Bang Phli is as high as 96.88 and 96.00, which is very high as well. Considered in conjunction with the frequency of theft, crime and accident. On average, there are 16 times per month, or one month per month. Bang Phli area has an average frequency of 16 times per year and Nava Nakorn area is 12 times per year, but Bang Kapi does not find such information.

Conclusion

Initial findings identified a number of type of slum, households, and social groups who are particularly likely to suffer urban poverty: (a) those experiencing deprivation because of their stage in life cycle, (b) those approach accessibility to urban facilities, because of their location at central city, (c) those with long term or severe health problems and highly challenging disabilities and impairments, and (d) people living in remote rural areas who moved to urban areas, and regions where prolonged violent conflict and insecurity have occurred. It tackles the problems of urban poverty, such as the location of the poor in the city, the differences between poor areas, the effectiveness of specific programs in reaching the poorest and to design an effective best practices urban poverty reduction programs and policies. Understanding urban poverty distinct a set of issues from the general poverty and requires additional tools and techniques.

Most low-income people or slum dwellers have sufficient accesses to the public infrastructure and satisfy with the city's service. Overall fairness of the society in this stage should be fine; however, when their living form has change with the lack of access to public utilities such as water and electricity and the low level of safety and security of life, the fairness turns to be low.

Policy Implications

Access to land settlement. Land is the most important factor for the development and building valuable asset.

- Design interweave of business & living urban plan to avoid the increment of living land near the business area.

- Promote the development of life improvement for community member. Most of community members are poor in both cash & asset. Promoting the job opportunity for them is the solution.

- Government agency works together with community member to build strong community base as well as building self-sufficient community in long term.

- Use the successful community plan to be a development base as a prototype model to widen the chance of successful.

- Establish housing development foundation to promote saving habit for community member.

- Government agency support social enterprise to eliminate the gaps in knowledge provided by private sector/government to community.

- Support social safety net to develop a model of life standard improvement as well as environmental development.

Housing development plan. It must consider principal, agreement, and country's remodeling

- Manipulation of housing infrastructure must consider large community element, e.g., Leisure area, Orphanage, and school

- The approaching of ageing society must be concerned by the government agency in terms of housing infrastructure plan

The assessment of land to for housing. It is hard to be conducted due to:

- Lack of community contribution of making public policy—Community organization is not involved in policy making leads to the out-of-point decision.

- The cluster of land holding of particular social member—Widen the gaps between the rich and the poor, leads to the inaccessible of poor community member.

- Lack of financial institution of housing for the poor—The poor cannot access to the low-interest loan to purchase formal housing.

- Lack of solid urban development plan—Negatively effects the short-term & long-term housing development project

References

Boonyabancha, S. & Archer D., (2011). Seeing a disaster as an opportunity – harnessing the energy of disaster survivors for change. *Environment and Urbanization, 23(2),* 351-364

Chiapperoi-Martinetti, E. (1996), Standard of Living Evaluation Based on Sen's approach: Some Methodological Questions. *Politeia, 12*(43-44). 47-53.

De Silva, S., & Elmelech, Y. (2009), Housing Inequality in the United States: A decomposition analysis of racial and ethnic disparities in homeownership, economics working paper, Archive wp_565, Levy Economics Institute.

Elmelech, Y. (2009). Housing Inequality in the United States: Explaining the white-minority disparities in homeownership. Housing Studies, 27(1), 1-26.

Harris, J. & Todaro M. (1970). Migration, unemployment and development: A two-sector analysis. *The American Economic Review, 60(1),* 126-142.

Logan, J.R. & Molotch, H. L. (1987). Urban Fortunes: The Political Economy of Place. Berkeley & Los Angeles, CA: University of California Press

Navarro, C., & Ayala, L. (2005). Multidimensional housing deprivation indices with application to Spain. *Applied Economics, 40(*5), 597-611.

Stark, O. & Bloom, D. E. (1985). The new economics of labor migration. *The American Economic Review, 75*(2), 173-178.

Sampson, R. J. (2008). Moving to Inequality: Neighborhood Effect and Experiment Social Structure. *American Journal of Sociology, 114(1),* 189-231.

Peter, S. (2004). Towards a credible poverty framework: From income poverty to deprivation. Retrieved from https://www.sprc.unsw.edu.au/media/SPRCFile/DP131.pdf

Sen, A. (2005). Human Rights and Capabilities, Journal of Human Development, 6(2), 151-166.

Somsuk B. (2011). Inequality and Injustice in Housing. Conclusion Document. May 25, 2011 at room 111. Mahachulalongkorn Building.

Wuff, M., and Reynolds, M., (2010), Housing, Inequality and the Role of Population Mobility, AHURI Final Report No. 158, Australian Housing and Urban Research Institute Limited, Melbourne. Retrieved from: https://www.ahuri.edu.au/research/final-reports/158