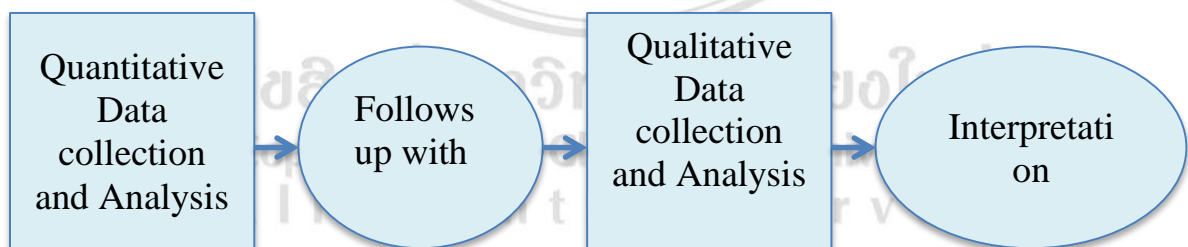


CHAPTER 3

Research Methodology

3.1 Explanatory Sequential Mixed Method

A graphic sequential mixed design is used, in which quantitative data is collected and analysed, followed by a qualitative study to further understand the underlying reasons for the quantitative findings and to reveal in-depth insights about the local context. Quantitative data are useful in representing the whole population and measuring the size of the issue, but can not explain as well the why and how of the data. Qualitative data are therefore collected to overcome this limitation of quantitative data and increase the overall usefulness of the findings. The data was collected in two ways: a household survey for quantitative study (with individual household focus). This was followed by Key Informal Interviews, Focus Group Discussions and a case study for qualitative (with community level focus).



Source: Designing and Conducting Mixed Method Research (2nd ed.). Creswell, J.W., & Plano Clark, V.L. (2011)

3.1.1 Quantitative Study

For the household survey, three types of households were clustered based on land ownership: own house/land, tenants/hostel, and squatters. Different household types (squatters, renters or owners) might have different WASH facilities and risks of

water and sanitation related diseases. In the case of hostels, only one respondent was recruited to complete the survey, assuming the same WASH condition in a hostel building.

Contingent valuation determines the amount of **willingness to pay** and also the **ability to pay**, with the prior assumption that the study area is an impoverished shantytown. The questionnaire asked three separate questions for **piped water system, water disinfection and waste management** in municipal areas. For each issue, respondents were asked about their willingness and ability to pay. The **open-ended** question approach was used for WTP elicitation techniques. The open-ended approach is to straightforwardly ask the maximum amount each respondent is willing to pay. A hypothetical scenario is: “How much would you be prepared to pay if water supply and waste collection are improved up to the current downtown condition” To lessen any imaginary bias, **photographs** of piped water system and waste management of downtown Yangon are presented. Another scenario for water disinfection is, “How much is your household willing and able to pay monthly if piped water is disinfected in the reservoir before distribution, and if the water quality is drinkable?”

Among three types of payment system for WTP, namely addition on current water/electricity bills, volunteer donation and increased price in current services (Whittington 2010), the third, increased current price (tax here), matches with a possible payment of public service. At the moment, the government collects a quarterly tax on waste and water. The monthly tax will be a convenience to analyse against monthly income of socioeconomic factors. A follow-up question -- “why do you want to pay that WTP” -- is added to understand the motives behind the WTP better, and for differentiating between a valid and a protest answer.

The next is a KAP survey of WASH, to realise the current situation and provide complementary results from contingent valuation. The WASH parameters are taken as in many similarities with those in WHO guideline as it could be to ensure the data uniformity, except some that don't fit in the proposed study area. It asks the source of drinking water and water for general use (water for cooking and other purposes, as of pilot study), hygiene and sanitation practice, knowledge on diarrhoea disease, perception on current water source and incidence of diarrhoea.

The final section of the survey is an assessment of mobile phone and internet usage among family members.

3.1.2 Qualitative Study

This part mainly focuses on the community level factors such as incidence of water and sanitary related disease, the government's waste service, community initiated work on WASH related work and also rechecking the WASH condition, and mobile phone use of the *overall quarter*, which may check and balance the first survey findings.

Semi-structured interviews (FGD and KII) and case study methods were conducted for the follow-up qualitative research. Collective action on waste management and waterways clearance (as water is individual interest) is asked. Positive and Negative signed case studies, self-initiated or intervened by public sector or organisations, are noted. The questionnaire is considered from different social aspects as much as possible.

3.2. Population and Sampling

The target population is all regular households (squatters, tenants or land owners, excluding factories) living in **4 wards** in Hlaingthaya Township. *Cluster and purposive sampling* will be done grouping the household types for household survey. To cover four wards of 22,736 conventional households (2014 census data), according to Yamane's formula (1967) of which the result is about 380 households at the margin error of 5%. Three hundred and ninety-three households are assumed to be sufficient for the quantitative survey.

$$n = \frac{N}{1+Ne^2} = \frac{22736}{1+(22736 \times 0.05^2)} = 393$$

Where n = sample household

N= Population of household

e = the errors of seven percent point

Table 3.1: Schedule of Data collection

Data and sampling method	Tools	Sample size
Quantitative data (Cluster, purposive Sampling)	HH KAP survey	402 ⁷ households surveyed
	Mobile usage	
	Willingness and ability to pay	
Qualitative data (Maximal Variation Sampling)	Key Informal Interviews-KII (Semi-structured questionnaire)	15 respondents (7 caretakers and residents, two ward administrators, three health care officials and three municipal staffs)
	Focus Group Discussion-FGD, (Semi-structured questionnaire)	3 FGD (at least ten respondents for each FGD=30) women caretakers

Source: Author's creation

The surveys are designed to cover the levels of households and community and the different aspects of the current facility, practice, attitude, knowledge and willingness to pay for improvement using KIs, FGD and Household Survey.

Careful steps are taken during the survey. These are described as follows. The preliminary findings from a pilot study in Hlaing Tharya show that quality of water from well fluctuates among streets and wards, and the latrine situation of squatters, with their toilet or common, access latrine, is also different, depending on the land status and space available. Owing to these findings, four wards, instead of the two wards proposed, are surveyed, to lessen the area selection bias. However, the shops and restaurants on the crowded road, exclusive housing villa and factory area were left out of the data collection. The common residential parts of the wards are recruited for the survey, to

⁷ 402 household samples were collected during survey, rather than 393.

make it straightforward and suitable for policy advocacy. The target population is the common residents, not big businesses and shops.

Asking questions on hand washing and ways of waste disposal makes it difficult to get “reasonable” answers. For example, the respondent’s dirty hands were seen during the interview, but she claimed she washed her hands at all critical times. The enumerator team used some smoothing introductions before such questions (for instance, “I usually don’t hand wash properly before eating, though I know this is good for health. I want to make sure you know this, whether or not this is applied.”)

Above all, the willingness to pay was the most difficult question to get answered. Most respondents mistakenly thought that the study was intended for a private company interested in investing in slums. Scenarios had to be explained two or three times, as low education levels limited quick understanding.

Three friends with experience in survey helped data collection and entry to finish it in time.

3.3 Method of Data Analysis

Improved or unimproved sanitation and sealed purified drinking water bottle or not, land ownership, poverty and so forth are considered as important factors in the analysis. For poverty, since its ranking identification is very technical, the land ownership and monthly income are considered as the main measurement of poverty in the study.

First, the WASH status is categorised into binary data set such as standard drinking water source or not, shared latrine or not, and *efficient* hygiene (hand wash at all three critical times) or not, appropriate waste disposal or not according to WHO-Unicef Joint Monitoring Program (JMP)’s standard. It is then analysed in the **binary Logistic model** (nonlinear regression) concerning the potential socioeconomic factors, including binary or categorical explanatory variables.

$$\ln\left(\frac{P(Y)}{1-P(Y)}\right) = \beta_0 + \beta_i X_i \dots\dots\dots(1)$$

$$P(Y) = \frac{e^{\beta_0 + X\beta_1}}{1 + e^{\beta_0 + X\beta_1}} \dots\dots\dots(2)$$

Where Y= dichotomous variables of sealed purified water bottle user or not, Xi= socioeconomic factor (X₁= monthly household income, X₂ = land ownership (HH type; rent, own, squatter), X₃ =average years of schooling, X₄ = age and education of caretakers and so on), and ϕ = cumulative logistics distribution.

Then, the linkage between Y and probability is as below.

$$Y = 1 \text{ if } p \geq 0.5 \quad \dots\dots\dots(3)$$

$$Y = 0 \text{ if } p < 0.5 \quad \dots\dots\dots(4)$$

After estimating the model as a whole, the marginal effect of each explanatory categorical variable, the effect of a change in each variable on the odd ratios of (Y= 1 /X=x), given all other factors are constants, are estimated.

Second, the mean and median of WTP is calculated and multiplied by household population to represent the possible benefits of improved service in Hlaing Thaya Township equation (1). The cost of the projects is not in hand for cost-benefit comparison, but this could be a good reference for project initiation in Hlaing Tharya in the future.

$$\text{Mean WTP} = \frac{1}{n} \sum_{i=1}^n y_i \dots\dots\dots (5)$$

Where n= sample size and y = WTP reported by each household.

The outliers of very high WTP are excluded, and it is analysed, using Tobit regression to suppress “0” WTP at the lower limit, against explanatory variables.

At third, mobile phone usage will be regressed, using Least Squared Regression Model at household, again to see its correlation to age, gender, occupation, education level, etc. At the household level, the dependent variable will be the portion of mobile phone use among family members (number of cell phone users denominated by family members, ranging from 0 to 1). It is regressed against the average year of schooling in the family, average monthly household income and household type, to explore what household left out of mobile phone use and information technology wave.