

Access to and usage of clean water in peri-urban Vietnam: a case study of Gia Lam  
district, Hanoi

Miss Nguyen Thi Huyen Cham



จุฬาลงกรณ์มหาวิทยาลัย

CHULALONGKORN UNIVERSITY

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---

Accepted by the Faculty of Political Science, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

..... Dean of the Faculty of Political Science  
(Assistant Professor Ake Tangsupvattana, Ph.D.)

THESIS COMMITTEE

..... Chairman  
(Carl Middleton, Ph.D.)

..... Thesis Advisor  
(Assistant Professor Jakkrit Sangkhamanee, Ph.D.)

..... External Examiner  
(Man Purotaganon, Ph.D.)



จุฬาลงกรณ์มหาวิทยาลัย  
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ผู้ช่วยศาสตราจารย์ ดร. จักรกริช สังขมณี

เป็นที่ทราบกันอย่างกว้างขวางว่าน้ำมีส่วนสำคัญในการพัฒนาที่ยั่งยืน โดยเฉพาะอย่างยิ่งเพื่อลดความยากจน ดังนั้น เป้าหมายในการรับรองคุณภาพและปริมาณน้ำได้ถูกกำหนดในประเทศส่วนใหญ่ น้ำประปาได้รับการแนะนำอย่างมากให้ใช้ในชุมชน เพราะไม่เพียงมีการบำบัดน้ำอย่างเหมาะสมแต่ยังลดภัยจากการใช้บ่อน้ำบาดาลของเอกชนที่กระจายอยู่ทั่วไปอีกด้วย ในเขตชานเมืองของเวียดนามที่อำเภอเกียลามในกรุงฮานอยแม้ว่าหน่วยงานปกครองส่วนท้องถิ่นจะพยายามอย่างมากเพื่อติดตั้งระบบ น้ำประปาให้กับชุมชนในพื้นที่ อย่างไรก็ตามผลลัพธ์นั้นยังไม่เป็นที่น่าพอใจ

วัตถุประสงค์ของการวิจัยนี้คือเพื่อสำรวจสถานการณ์ของการใช้น้ำสะอาด วิเคราะห์ปัจจัยที่ส่งผลกระทบต่อการใช้ในอำเภอเกียลาม รวมทั้งประเมินธรรมาภิบาลการจัดการน้ำโดยการลงภาคสนาม ทำให้สามารถพบแนวทางแก้ไขบางประการในการปรับปรุงการใช้น้ำสะอาดให้กับคนในพื้นที่ในอนาคต จากงานวิจัยพบว่าการใช้น้ำสะอาดอยู่ในระดับที่สูงมากและมีความไม่เท่าเทียมกันในการใช้น้ำสะอาด องค์ประกอบสำคัญที่ส่งผลกระทบต่อการใช้ น้ำสะอาดในชุมชนที่มีระบบน้ำประปา คือ รายได้ ขนาดของประชากร และระดับการศึกษาของครอบครัว ส่วนในชุมชนที่ไม่มีระบบน้ำประปานั้นอุปสรรคทางด้านภูมิศาสตร์เป็นปัจจัยหลักที่ทำให้ยากที่จะตั้งโรงงานผลิตน้ำ จ า ก ห ลั ก เ ก ณ ฑ์ ข อ ง ธ ร ร ม า ภิ บ า ล ก า ร จั ด ก า ร น้ า การประเมินแสดงเห็นว่าธรรมาภิบาลการจัดการน้ำภาคครัวเรือนในอำเภอเกียลามยังไม่ประสบความสำเร็จเนื่องจากยังไม่สามารถสัมผัส ทธิผลด้านความโปร่งใส การสื่อสาร และความรับผิดชอบ

จ า ก ที่ ลี ง ต่ า ง ๆ ที่ พ บ การศึกษาทำให้ทราบว่า การปรับปรุงการใช้น้ำสะอาดในอำเภอที่กล่าวมานั้นจำเป็นต้องพิจารณาถึงวิธีการพัฒนาระบบการจัดการน้ำควบคู่กับการคำนึงถึงปัจจัยต่างๆ ที่ส่งผลกระทบต่อการใช้ น้ำสะอาดทั้งในชุมชนที่มีและไม่มีระบบน้ำประปา งานวิจัยนี้ได้เน้นถึงความจำเป็นของโลกข้อบังคับที่ชัดเจนผ่านทางเอกสารที่เฉพาะเจาะจง แนวทางปฏิบัติในทุกๆระดับ โดยเฉพาะอย่างยิ่งหน่วยงานการปกครองในพื้นที่ เพื่อปฏิบัติตามหลักความโปร่งใส ดังนั้นจึงจะสามารถเพิ่มการสื่อสารระหว่างผู้มีส่วนได้ส่วนเสียเพื่อเพิ่มประสิทธิภาพและยกระดับความรับผิดชอบต่อสังคมที่ของ แต่ละระดับในเรื่องนี้

งานวิจัยนี้จบด้วยคำแนะนำในการแก้ปัญหาดังกล่าวจากกระทรวง กรม อำเภอเกียลาม ตลอดจนผู้ผลิตและจัดหาน้ำที่มีความเชี่ยวชาญ โดยเรียกร้องความร่วมมือจากหน่วยงานที่เกี่ยวข้องทั้งทางตรงและทางอ้อม โดยเฉพาะอย่างยิ่งข้อกำหนดและแนวทางปฏิบัติแก่อำเภอเกียลามเพื่อขับเคลื่อนการจัดการน้ำให้ดียิ่งขึ้น

เอก: การพัฒนาระหว่างประเทศ

คำสำคัญ: การเข้าถึง, การใช้, น้ำสะอาด, เขตชานเมือง, เวียดนาม, ฮานอย, อำเภอเกียลาม

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เป็นที่ทราบกันอย่างกว้างขวางว่าน้ำมีส่วนสำคัญในการพัฒนาที่ยั่งยืน โดยเฉพาะอย่างยิ่งเพื่อลดความยากจน ดังนั้น เป้าหมายในการรับรองคุณภาพและปริมาณน้ำได้ถูกกำหนดในประเทศส่วนใหญ่ น้ำประปาได้รับการแนะนำอย่างมากให้ใช้ในชุมชน เพราะไม่เพียงมีการบำบัดน้ำอย่างเหมาะสมแต่ยังลดภัยจากการใช้บ่อน้ำบาดาลของเอกชนที่กระจายอยู่ทั่วไปอีกด้วย ในเขตชานเมืองของเวียดนามที่อำเภอเกียลามในกรุงฮานอยแม้ว่าหน่วยงานปกครองส่วนท้องถิ่นจะพยายามอย่างมากเพื่อติดตั้งระบบ น้ำประปาให้กับชุมชนในพื้นที่ อย่างไรก็ตามผลลัพธ์นั้นยังไม่เป็นที่น่าพอใจ

# # 5781225224 : MAJOR INTERNATIONAL DEVELOPMENT STUDIES

KEYWORDS: ACCESS / USAGE / CLEAN WATER / PERI- URBAN / VIETNAM

NGUYEN THI HUYEN CHAM: Access to and usage of clean water in peri-urban Vietnam: a case study of Gia Lam district, Hanoi. ADVISOR: ASST. PROF.JAKKRIT SANGKHAMANEE, Ph.D., 69 pp.

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KEY WORDS: ACCESS, USAGE, CLEAN WATER, PERI- URBAN, VIETNAM, HANOI, GIA LAM DISTRICT.

THI HUYEN CHAM NGUYEN: ACCESS TO AND USAGE OF CLEAN WATER IN PERI- URBAN VIETNAM: A CASE STUDY IN GIA LAM DISTRICT, HANOI. ASSISTANT PROFESSOR JAKKRIT SANGKHAMANEE, PH.D

It is broadly recognized that water plays an important role in sustainable development, especially for poverty reduction. The challenge is how to ensure water quality and quantity is adequate. Piped water is highly recommended to be used in communities because it is treated properly and can reduce exploitation of groundwater from scattered private wells. In peri- urban Vietnam, the local government of Gia Lam district in Hanoi has made a great deal of effort to set up a piped supply to communes but still usage is low.

The purpose of this research is to investigate the situation of clean water usage, analyze the factors which affect to water usage in Gia Lam district and evaluate how water governance in the field works. With this, it hopes to find some solutions to improve clean water usage for the locals in the future. Findings from the research show that the level of clean water usage is not high and there is inequality in usage. The key elements which affect to clean water usage in communes which are covered by piped supply are income, the demography of households and education of household headman. Those communes without access to a piped supply are mainly geographically difficult for water mills to reach. Evaluation shows that in Gia Lam district domestic water governance does not work because it does not achieve the transparency, communication and accountability.

From what has been discovered, the study discloses that to improve clean water usage in the district it is necessary to consider how to improve water governance. Also solutions are needed for the challenges affecting clean water usage for communes with and without a piped supply. The research highlights the necessity of clear mandate mechanisms through specific documents, guidelines to all levels, and responsibilities of the district government to be transparent to increase the communicative activities among stakeholders, efficiency and enhance accountability.

The paper closes with the some recommendations for specialized ministries, departments, Gia Lam district government to water suppliers to facilitate the implementation of some solutions above. It calls for coordination between relevant agencies vertically and horizontally, with guidelines to Gia Lam district government to deploy water management more effectively.

Field of Study: International Development Studies  
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Student's Signature .....

Advisor's Signature .....

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## ABBREVIATIONS

MARD	Ministry of Agriculture and Rural Development
MONRE	Ministry of Natural Resources and Environment
MOC	Ministry of Construction
NTP	National Target Program



# Chapter 1: Introduction

## 1.1 Statement of Research Problem

Water plays an important role in sustainable development, particularly in poverty reduction. Given the importance of water to poverty alleviation, human and ecosystem health and the management of water resources is of central importance (Charles, 2007).

Gia Lam is a peri-urban district of Hanoi, the capital of Vietnam. It is located in the East of Hanoi center. It is considered a dynamic location, with rapid urbanization and is a central transportation hub to other industrial cities in the North such as Hai Duong, Hai Phong, Quang Ninh, Hung Yen province.

With its convenient position and simple geography, there are many advantages to development in Gia Lam district in a variety of economic sectors. As the result of development, the groundwater is now polluted due to the residue of fertilizer in agriculture as well as untreated wastewater from industry and households. Moreover, the percentage of samples with arsenic concentration in water greater than the standard limit is higher than other peri-urban and urban districts in Hanoi (Dan & Dzung, 2002). This can be explained by the process of geology formation in the Red Delta River. High arsenic concentration is mostly found in shallow-drilled wells with different levels and it is considered as one of major causes to a number of diseases like skin, liver, nerve, cardiovascular and respiratory tract infections. Arsenic is especially considered one of the most significant environmental causes of cancer worldwide (Elizabeth, 2009).

For a variety of reasons, it is highly recommended that water from a piped is used in within the community. Firstly, piped water is treated properly to meet the requirements of the Ministry of Health, and is therefore safe to drink. Secondly, water is harvested centrally through a piped system which can restrict the threat of drill scattering from private wells into the groundwater.

Acknowledging the importance of piped water, the local government in Gia Lam district has been planning to implement piped supply systems to the

communes. However, the results are not optimistic. According to the report from Gia Lam Economics Department, in 2014 just 52% of households in 15 planned communes had access to piped water, with this access being still not full. Among 22 units in the district, 15 communes were served piped water and the rest were still using drill wells. All the households in communes covered by piped supply joined the system by following all the procedures and paying the initial fixed cost. However, after joining the level of piped water being used was not high as expected. Some households returned to using the drill wells, others used both piped and drill and some used the piped water fully and economically. The remaining 7 communes are yet to access the piped supply due to geographical difficulties which the piped system is not set up for. Therefore, although they hope to access piped system, they have to wait for the plan from the local government.

From all these reasons above, I think that it is necessary to investigate the real situation of water usage in this site, explore the causes which hinder the piped water usage of the locals and analyze them, and seek better solutions for water governance to solve the issue in the district. That causes me decide to do the research “*Access to and usage of clean water in peri-urban Vietnam: a case study of Gia Lam district, Hanoi*”.

## 1.2. Research Questions:

### Main question:

How can the provision of clean water for locals in Gia Lam district, Hanoi, Vietnam be improved?

### Specific questions

- What is the current situation of water usage for locals in the research place?
- What are the factors which affect water usage in Gia Lam district?
- How does water governance work in

Gia Lam district?

- How can water governance improve water usage for the locals in the future?



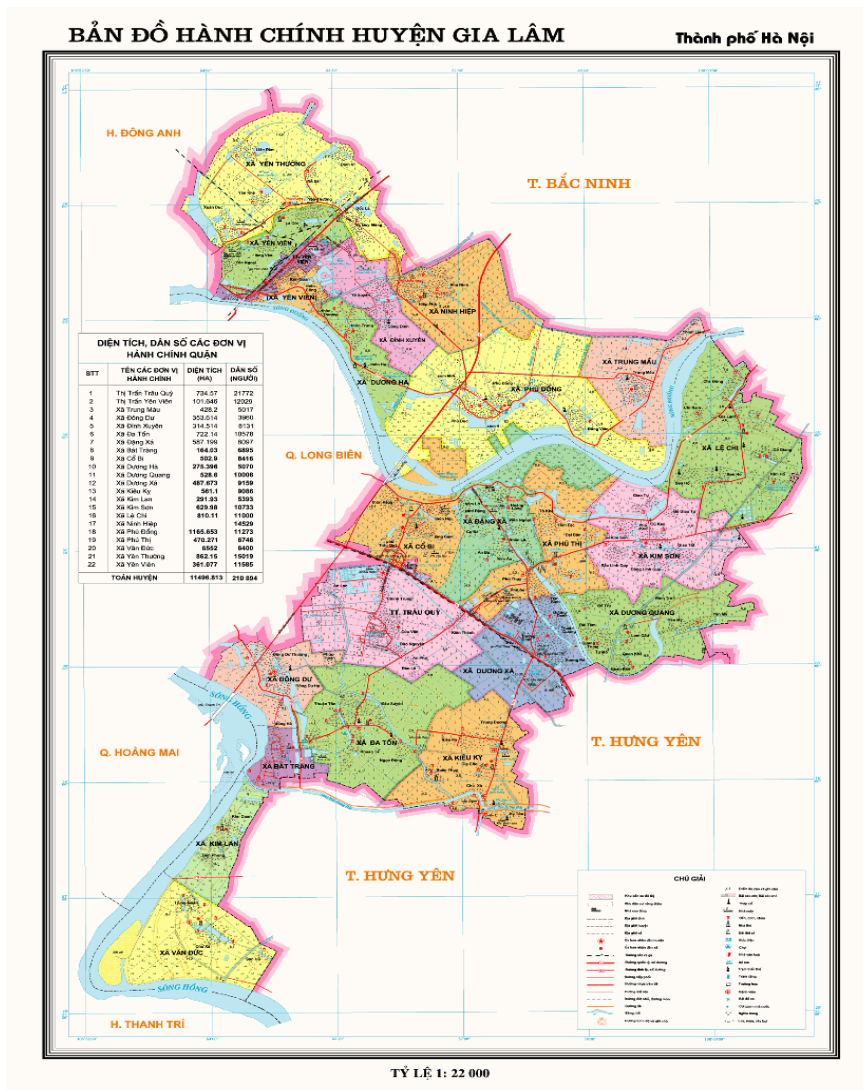
### **1.3 . Objectives of research**

- Investigate the use of clean water for consumption in Gia Lam district, Hanoi, Vietnam.
- Analyze the factors which affect water usage in Gia Lam district.
- Evaluate water governance in Gia Lam district.
- Seek solutions to improve water usage in Gia Lam district in the future



## 1.4. Research Methods and Research Scope

### 1.4.1 Research sites



Source: Gia Lam People's Committee

#### The natural features of Gia Lam districts

Gia Lam is one of the peri-urban districts in Hanoi. It is located in the North East of Hanoi center. There are many main transport routes across Gia Lam district, connecting the district to other industrial provinces in the North of Vietnam like Hai Phong, Quang Ninh, Hung Yen and Hai Duong. It is therefore seen as a convenient area for developing economy and exchanging commerce due to the ability of attracting investors.

The weather in Gia Lam district is typical tropical weather for the Red River Delta. There are 2 seasons each year: hot and wet season from April to October and dry season from November to March. Between the 2 main seasons, there are transition periods creating a diverse climate, almost like 4 seasons a year: spring, summer, autumn and winter. As a tropical monsoon area, the average temperature throughout the year is 23.5<sup>0</sup>C. In the summer the average temperature is 27.4<sup>0</sup>C. The average precipitation a year is around 1,400 – 1,600 mm, from May to September, particularly in July and August. The average number of sunlight hours per year is 1,500 hours, minimum 1,150 hours and maximum 1970 hours. Plain geography and rich land in the body of Red River Delta along with the pleasant climate allows for diverse tropical and subtropical agriculture.

In short, with the natural characteristics as shown above, Gia Lam district has many advantages to develop industry, commerce and agriculture. Utilizing these can help the government to foster a growing economy in the near future.

### ***The socioeconomic features of Gia Lam district***

The total population in Gia Lam district at the end of the year 2013 was 253,800. The average growth is around 2%/ year. In 2011, the number of households was 61,806 and had increased 2.07% by 2013. The population growth and migration are partly the consequence of industrialization and urbanization creating pressure on the local authorities to ensure locals can access basic services sufficiently. Nowadays, young laborers in the peri-urban tend to move out of the area to look for non-agricultural jobs. Shifting labor structures are suited to the trends of urbanization and modernization. However, it also creates challenges because the majority of laborers are old with limited skills who may find it difficult to adapt to new technologies.



Table 1: Population and Labors in Gia Lam district, between 2011 and 2013

Indicators	Unit	2011		2012		2013	
		Quantity	Ratio (%)	Quantity	Ratio (%)	Quantity	Ratio (%)
<b>The whole district</b>	<b>People</b>	<b>243,957</b>	<b>100</b>	<b>248,991</b>	<b>100</b>	<b>253,800</b>	<b>100</b>
Agriculture	People	183,923	75.39	176,780	71.00	172,849	66.10
Non-agriculture	People	60,034	24.61	72,211	29.00	80,951	31.90
<b>The total households</b>	<b>HH</b>	<b>61,806</b>	<b>100</b>	<b>63,751</b>	<b>100</b>	<b>64,386</b>	<b>100</b>
Agriculture	HH	45,983	74.40	45,238	70.96	43,975	68.30
Non-agriculture	HH	15,823	25.60	18,513	29.04	20,411	31.70
<b>The total labors</b>	<b>Labors</b>	<b>166,876</b>	<b>100</b>	<b>174,040</b>	<b>100</b>	<b>185,439</b>	<b>100</b>
In aged	Labors	133,500	80.00	139,232	80.00	149,561	80.65
Out aged	Labors	33,376	20.00	34,808	20.00	35,878	19.35
<b>Distribution</b>	<b>Labors</b>						
Agriculture	Labors	83,238	49.90	78,660	45.20	75,273	40.59
Industry	Labors	46,725	28.00	49,131	28.23	52,946	28.55
Commerce	Labors	36,913	22.10	46,249	26.57	57,220	30.86

Source: The Department of Statistics in Gia Lam district

Due to the rapid economic and population growth, polluted groundwater is inevitable in the peri-urban area. The residue from fertilizer and wastewater from industrial companies and households consumption are untreated. After being discharged directly, they seep into the ground and pollute the groundwater. The proportion of arsenic in water in Gia Lam district was found to be higher than the accepted figure from the Ministry of Health and higher than figures from other districts in Hanoi. Therefore, the need for piped water is urgent.

According to the report of socioeconomic development in Gia Lam district in 2014, there are 2 types of piped water supply in the district. The first comes from the Hanoi Water No 2 One Member Company Limited and the second from rural water supply stations supported by the World Bank. While 51.28% habitants are served by the piped supply, 48% are supplied by the Hanoi Water No 2 One Member Company Limited. However, the rural water supply stations do not work well because the project is not systematic, and they cannot fully operate and serve the designed capacity. Now those rural water supply stations are being more effectively managed and transformed with expectations that they will work better in the future.

At present, the infrastructure system in Gia Lam district meets the basic requirements for economic development. However, it can be an obstacle for development because of the rapid urbanization trend which means it must be improved and have more investment. Throughout the 20 communes in the district, there is 91,105 km of constructed road, around 48% of which was concrete. Although irrigational systems were already constructed and are facilitating significantly for agriculture, they will still need to be improved in the future to fulfill the requirements of agricultural goods and advancement in agricultural systems. Among the 47 pump stations, only 8 are working well which the rest having degraded. The canal systems for agricultural production covers 35,493 km, but only around 26% is concreted. The 20 health centers in Gia Lam district qualify only 16 of the stations. Education achievement showed that there are 5 kindergartens which achieve national standard per the overall 21 units. Electric systems are receiving more investment, improving their existing status

enabling them to meet demands. Currently 100% of the locals have joined the national electricity grid and 100% of them are using regularly and safely.



Table 2: Gross Outputs of economic sectors in Gia Lam district 2011 - 2013

Indicators	2011		2012		2013		Comparison (%)		
	Value (Million VND)	Ratio (%)	Value (Million VND)	Ratio (%)	Value (Million VND)	Ratio (%)	2012/2011	2013/2012	Average
<b>I. GO</b>	<b>1,867.785</b>	<b>100</b>	<b>2,087.629</b>	<b>100</b>	<b>2,280.139</b>	<b>100</b>	<b>111.77</b>	<b>109.22</b>	<b>110.49</b>
<b>1. Agriculture, forestry, aquaculture</b>	<b>265.801</b>	<b>14.23</b>	<b>270.107</b>	<b>12.94</b>	<b>263.421</b>	<b>11.55</b>	<b>101.62</b>	<b>97.53</b>	<b>99.55</b>
1.1 Agriculture	256.349	96.44	260.115	96.30	253.141	96.10	101.47	97.32	99.37
1.2 Forestry	88	0.03	71	0.03	80	0.03	80.68	112.68	95.36
1.3 Aquaculture	9.364	3.52	9.921	3.67	10.200	3.87	105.95	102.81	104.37
<b>2. Industry and construction</b>	<b>1,063.322</b>	<b>56.93</b>	<b>1,188.634</b>	<b>56.94</b>	<b>1,296.012</b>	<b>56.84</b>	<b>111.78</b>	<b>109.03</b>	<b>110.40</b>
2.1 Industry	802.502	75.47	885.561	74.50	950.206	73.32	110.35	107.3	108.81
2.2 Construction	260.820	24.53	303.073	25.50	345.806	26.68	116.2	114.1	115.15
<b>3. Commerce and services</b>	<b>538.662</b>	<b>28.84</b>	<b>628.888</b>	<b>30.12</b>	<b>720.706</b>	<b>31.61</b>	<b>116.75</b>	<b>114.6</b>	<b>115.67</b>
II. Average indicators									
1. GO/person/year	8		8		9				
2. GO/Labor/year	11		12		12				
3. GO/household/year	30		33		35				

Source: The Department of Statistics in Gia Lam district

During the past years, economic growth was achieved due to development of economic sectors and positive shifts in economic structure. Despite an increase in the value of contributions from the agriculture, forestry and fishery sectors, the proportion of increase compared to increase from industry and services was low. This shows a sharp trend of industrialization taking place in the district, with industry - construction and commerce – services playing an increasingly important role to the economy in the district. The contribution of industry accounted for more than 56% of total gross outputs through the years. This can be explained by the existence of small and medium sized industrial zones occupying in the district.

The establishment and the development of industrial zones has been a great achievement for the district government but also created challenges. Industrial zones have been fostering the transformation of economic structure and labor structure by creating jobs and contributing to gross outputs. However, the challenge of labor migration creates difficulties with social issues. Also environmental issues occur due to low-technology and untreated wastewater from small factories.

### **1.4.2 Sampling**

To study this issue in the district, I discussed with district leaders to choose the most appropriate sample of communes and households. To understand the reasons why households already with piped supply are reluctant to use it, I aimed my sampling at communes already covered by the piped system. Of the total 22 communes in the district, 15 communes were already covered by the piped system and of these I chose Dang Xa commune. This commune can be seen to have typical economic development compared to other communes. In this commune, I chose 100 samples to complete the questionnaires. 100 households were selected based on the selected criteria of income in order to ensure the samples were representative of the whole commune. There are 10 villages in Dang Xa commune. Because most villages are almost identical, I chose 10 households in each village. Households were selected by consulting with the

village headman, who selected 10 households which were distributed according to the ratio of income for the whole commune to get a representative sample.



The reasonable number of selected households can be explained by the formula below:

$$n = N / (1 + Ne^2) = 96, 5338$$

This formula can be applied to the whole which is defined already. With the total number of households in this commune,  $N = 2785$  households, chose standard error,  $e = 10\%$ . The result is shown above. I rounded it to 100 samples.

### **1.4.3 Method of data collection**

There are two types of data used for research. Secondary data is mainly used for understanding the general information about the phenomenon, while primary data gives deeper information of representative samples which enables explanations for the phenomenon to be offered.

Secondary data was mainly collected in the offices of People's Committee of Gia Lam district. Data was about the general features, including natural and socioeconomic characters of the district, general information of water accessibility and the status of supply stations in the whole district. Some related decrees, decisions about the management of piped water supply was collected in the office or on the Internet.

Primary data used for this research comes from surveys, in-depth interviews with households and with local government staff. Designed questionnaires were used for interviewing 100 selected households. The questionnaires contained questions on general information about households as well as more specific information relating to water accessibility. Through the process of collecting the 100 samples, in-depth interviews were conducted with 10 households. The basis of selecting the households was based on either popular or unique ideas or those who were able to describe deeply, analyze or explain the phenomenon. I also held non-structured interviews with local government about the water governance in the district. The specific information I wanted to get is about mandate mechanisms, their coordination and their difficulties in reality and the reasons why water governance still doesn't work very well. Most in-depth interviews are recorded carefully by listening, taking notes, recording throughout the talks and restoring questionnaires.

#### 1.4.4 Method of data analysis

After data collection, data was processed by combining qualitative and quantitative methods. Quantitative was mainly used for the 100 questionnaires using Data Analysis Regression Software and some statistics about socioeconomic features of Gia Lam district. Qualitative was applied mainly for in-depth interviews. Quantitative methods were used through descriptive statistics, comparative statistics and OLS regression. Descriptive statistics were used to describe the overall picture of the situation in the field and the features as well as opinions of selected respondents by showing the figures, the mean, and the percentage of indicators, the data for which was processed using Excel. Comparative statistics was used to compare the situation in the district annually to see the changes before explaining the reasons. Finally, OLS regression was applied to run the model to show the elements which affect to water accessibility in the district.

Qualitative methods were used for the data from in-depth interviews to describe the situation more deeply and explore the reasons. The data recorded was analyzed carefully, based on the norms of water access and water governance to show the arguments or conflicts in reality. Deeper talks with local government disclosed the difficulties in water governance at the district level and helped to discover more about the practical solutions to improve water governance at the local level.

#### 1.5. Significance of research

The research will assess more specific situation of water access and water governance in Gia Lam District, Hanoi, Vietnam. Statistics will be collected and analyzed more systematically to facilitate further studies in the future. Some drawbacks and obstacles of water governance and difficulties in households themselves in water access will be shown more clearly to seek solutions to the challenges. The elements which effect water accessibility will also be shown clearly to help government and local government. The outcome is to help local government play a better role in the future and encourage the community to engage deeper in water governance to get sustainable, clean water access. One further outcome is to improve the proportion of people accessing clean water, and



as a result improve public health and the quality of life for people as well as innovation for the local governance.



## 1.6. Ethical issues

For the primary data, participating households and local government in Gia Lam district, were contacted in advance and informed clearly of my goal. Later, I asked for permission from the local government to get a recommendation letter for the selected commune and headman of villages to enter the selected households. I introduced myself and my goal briefly to interviewees, telling them I was doing a research about clean water usage in Gia Lam district as my thesis for Chulalongkorn University in Thailand, in order to investigate their obstacles to water usage. I also revealed that I would like to receive their support by supplying information and answering questionnaires. I did not forget to affirm that their identifications would be kept secret and used for academic study only.



## Chapter 2: Literature Review and Conceptual Framework

### 2.1 Literature Review

#### 2.1.1 Rural water supply

Firstly, I start with the issue of rural water supply in some countries over the world, mentioning the implementation of rural water supplies and its challenges and introducing ways to deal with problems. Secondly, the situation of water usage in Vietnam will be shown so the readers can visualize the whole picture for this issue in Vietnam. Finally, I discuss the issue of water governance in Vietnam, first with water governance in various kinds of water and then with a focus on drinking water governance.

##### a. The implementation of water governance

Tanzania is chosen as an example to review the implementation of water governance in a rural area because it is recognized to experience a long process in development of this issue (A.Jimenze & A.Perez-Foguet, 2010). The process evolved over many milestones, mainly due to the funding structure and the division of responsibility for each stakeholder. The first model shows that the State covered 75% funds and the rest was charged by local government. Through water tariffs and taxes, local government charged operation and maintenance costs. However, this model of rural water supply was changed in 1965 to a new funding structure which charged 100% funds to the State, though local government was still responsible for maintaining supplies. Another change came a few years later when it was seen that local government did not perform well in their responsibilities, redirecting this task to central government. In this model there was no charge in water, it was free to everyone. This resulted in threats to the sustainability of rural water supplies in this period. This can be explained by some reasons. First, free water means there is no sustainable funding for maintenance. Consumers who were not charged seemed to use water in a larger volume and uneconomically compared to other modes, causing a burden on supply. Reviewing this suggests it is suitable for the users to maintain the operation of rural water supplies, instead of the government. After so many changes in rural water

management in Tanzania, in 1991 one final change was seen when the national government played the main role in most activities, from investor to practitioner and manager. After deploying this model, many drawbacks were revealed because of the lack of participation from other stakeholders in the process. After so many changes in the model and fixing of existing drawbacks, rural water governance reached the water policy seen today which has proved itself to be suitable because of its existence until now. Water is acknowledged as a human right, the central government just performs as coordinator and facilitator to manage and facilitate the process. In other words, the role of national authority is intermediary and the district government takes the key responsibilities in implementing and maintaining. Because it is linked closely to the community, therefore the local government who is regarded as a body of the State and work directly with the community, is the most suitable to deploy the model in the domain. In other words, the district government plays an intermediary role in dealing with both local and central governments. This model is based on the demand-response approach which locals are highly encouraged to engage in. The supplying process reveals the real demand and governments are involved in the construction and operation. Certainly, they are strongly required to charge maintenance costs to ensure the sustainability of the construction. However, the ways to contribute costs can be flexible, either in cash or through workdays and depend on the preference and particular conditions of each household. This model is reasonable because it not only can maintain the sustainability of the supply system through contribution costs and the positive participation of the community but it also can increase the efficiency because the beneficiaries are participants.

It can be understood that which regards to rural water supply, district level seems to be the most suitable to play the key role. To facilitate it, the mandate mechanism must be transparent, reasonable, and include specific and obvious regulations about rights and responsibilities to this issue. The success of this process decides the success of rural water supply in the territory.

#### b. The challenges of rural water supply

“Challenges for water governance in rural water supply” already showed some basic challenges of rural water governance in Tanzania, which are also common in other areas. Challenges include low quality of delivered service, low

sustainability, lack of pro-poor targeting and inadequate information systems (A.Jimenze & A.Perez-Foguet, 2010). Discovering, understanding, and analyzing these challenges can inspire ways to overcome them within particular situations.

The first difficulty of rural water supply was unqualified water delivery service in rural areas. The quality of water does not meet the standards because of polluted groundwater points. It was explained mainly by weak service management, including ill management of catchment and uncontrolled connections to the network. Local residents have less capacity to cope with the complex issues. This situation in Tanzania is just one phenomenon. In other places, the low quality of rural water supply can be due to inadequate infrastructure or natural disaster which directly affects the water quality.

Secondly, low sustainability is a concern. In Tanzania, the functionality by category showed that only 45.3% of hand pumps, 48.6% of gravity-fed systems and 44.4% of motorized systems were functional at the time of the survey. Some water points were found to be quite sustainable in some areas while others failed totally. Sustainability is challenged by restricted funds of the community, the difficulty in building harmonized relationships between water user entities and village representatives, the low efficiency in the management of services, and the withdrawn role that local government plays in almost all stages of the process. The key role is handed to community but supportive activities to build an effective and sustainable model are still insufficient. Therefore, the role of the State is to enhance the capacity of the community to undertake this construction actively and to consult and support them as coordinator.

The third challenge was the lack of pro-poor targeting. It could be explained that because of overestimating the development of new infrastructures and efficiency rather than capacity building and post-project aid and equity. However, the greatest challenges for targeting the poor are found at district level. After investigating needs and demands, district councils distribute projects. This tends to help richer villages that are better connected and more influential. Therefore, inequalities are born.

Moreover, headman of villages are not qualified enough to apply procedures and join in the decision- making processes.

The fourth challenge was inadequate information systems. The information is not satisfactory in terms of quantity and quality. This causes a failure in targeting the poor. The case of Tanzania reflects common challenges. Though data was collected and summarized by local authorities and eventually published by the Ministry, fact checking by districts shows some inaccuracy.

After considering one typical case of challenges in rural water supply in Tanzania, it can be deduced that the main challenges in rural water supply are the low sustainability, the threat of inequality, the unclear mechanisms in mandating and coordination among related stakeholders throughout different levels, and weakness of organizational structure. They can appear together at the same time and challenge the success of rural water supply. In order to remedy the problem, all challenges need to be considered carefully and with flexibility to particular conditions.

#### c. Effects of rural water infrastructure

The changes in availability of rural water infrastructure affect time use at household level and individual level, especially in the case of women in Pakistan who hold the main task of water collection (Ilahi & Grimard, 2000). At the household level, lack of water infrastructure means women take more time to collect and wait for water, resulting in a lack of time to do other work which can generate income for their family. At individual level, in this case women themselves have less time for leisure. Improvements in water- supply infrastructure would reduce the total time women spend doing all related activities and time previously spent collected water can be used for income generating activities. Investments in such infrastructure would not only reduce the workload for women, but it would also change the women's contribution to the household, from performing every day routines to doing monetary work.

Increasing water access could bring a great deal of benefits, especially to vulnerable groups like women and children (Ivens, 2008). Females are likely to get sharp benefits due to improved quality and quantity of water which facilitate them to achieve higher dignity and gender equality and

the position of women compared to men. Besides, direct benefits for children can be shown by they could perform better at school due to fewer illnesses, less absenteeism, and better sanitation, particularly during menstruation. Self-esteem and self-confidence are also shown to increase.

d. The relationship between community participation and the results of rural water supply

There is increasing knowledge about community participation in rural water supply. Firstly, it is argued that people's participation can contribute to the achievement of five main objectives of water supply projects: effectiveness, efficiency, empowerment, equity and coverage (Narayan, 1995). However, some concerns include that participation places unfair burdens on the shoulders of rural people (Oakley, 1991). People are forced to participate whether they are willing or not, and participation could fail if local people have low capacity to influence the direction of the project. To achieve the expected outcomes from participation, mainly the sustainability of the project, people need to be involved in higher levels of decision making, not just in manual work (Schouten & Moriarty, 2004).

There are different levels of community participation in water supply (Prokopy, 2005). The lowest participation is contribution of money, labor, or materials to a targeted project. This is also seen as nonparticipation where participants are not given a choice and may have no idea about what and where their input is being used for. This way is popular in many places. Communities just contribute material dimensions for the project as users to pay for the service. It is reasonable and inevitable, but it is not enough for rural water supply which serves water as a social good, not as a merchandise good. In the middle level, participants engage in deeper decision making about largely predetermined questions. Households attend meetings in which they reveal their opinions and are involved in making decisions such as the location of key facilities and the timing of water supply, and monitoring construction. At the top of the hierarchy, participants are in charge in deploying their own initiatives, develop strong leadership roles, and are in full control of their project. The fact that members of the committee are likely to hold more power than others can be accepted because they are restricted by other elements of project like deadlines, budgets and the planned schedule.

It can be deduced that community participation plays an important role in the sustainability of rural water supplies. Households are encouraged to engage deeply and actively in almost process of the project. However, in the peri-urban districts which are nowadays changing rapidly with urbanization, many rural socioeconomic features decrease and urban socioeconomic features increase. Community participation should be encouraged flexibly, depending on the type of rural water supply and specific conditions of residents.

e. How to deal with the problem of rural water supply

Communities in Costa Rica have come up with rules to overcome some of the many challenges of rural water supply (Madrigal, Alpi'zar, & Schluter, 2011). The most important way is through dynamic interaction of a set of working rules enforced by local communities, and reasonably defined local accountability. Also the capacity of local leaders to generate appropriate incentives to engage the community in sustainable solutions for collective-action problems.

Local accountability mechanisms reflect effective governance structures. For the local community itself, internal factors are seen as the most suitable way to monitor those who are directly responsible for the rural water supply in the community, rather than by external factors, such as the central government. Costa Rica in this example showed that building a sense of ownership through being involved in the design of institutions, construction of infrastructure and maintenance is a good way. However, if the leadership is too strong and too dependent on external funding, it can create motivational problems, whereby the community members stay passive and are not willing to commit time or money for needed maintenance and investments.

With regards to this issue, while the district government is seen as the most suitable to implement rural water supply, community members should be encouraged to monitor it, in parallel with joining as beneficiaries with the assistance of reasonable mandate mechanisms to facilitate it.

Phnom Penh is a good example of rural water supply dealing with the poor infrastructure and being helpful to poor people (Tortajada & Biswas, 2011). Between the 1970s and 1980s, investment in water infrastructure was very low, meaning infrastructure was just maintained and worked at minimum capacity. The



shortage of clean water already put a burden on the community. Facing this problem, the government requested help from Japan for technical assistance to aid the recovery of the existing water supply. One decade later, the Cambodian government defined water as an economic and social good, and is charged for suppliers. This resulted in other positive outcomes which allow suppliers to run as a business and ensure users are served a high quality and affordable water supply. To ensure the poor consumers could reach the supply, the government made great efforts. After defining particular groups of poor, they elected representatives who negotiated with the suppliers to find a price they could afford.

Both lessons from Costa Rica and Cambodia are worth considering. However, the experiences from Cambodia are likely to be more practical and realistic for less developed countries. Utilizing the support from developed countries through positive relationship and cooperation is the fastest way to improve the infrastructure conditions in terms of quantity and quality. The beneficiaries of rural water supply are rural residents who are normally not wealthy and have limited income and expenditure. Therefore, it is vital to consider this group as a social dimension, together with economic viewpoints which aim at the sustainability and efficiency for the supply side.

## **2. 1.2 The situation of water usage in Vietnam**

Currently in Vietnam people use water for consumption from 5 main sources: water companies, water supply stations, treated drill wells managed by the Department of Agriculture and Rural Development, private boreholes or drill wells, and from rain water and rivers mainly used by poor people living near the river (Huong, 2013). Urban citizens are extracting 70% clean water for consumption, and the rest is used for other activities. The system of water supply in rural area can be separated into two main types: the first is charged by community and the second by water supplies which are responsibility of province.

Until the late 1990s, the rate of rural residents accessing clean water was low at just 30% with a growth speed of just 1% per year through 1987 – 1988 (MDG National Report 2010). The National Target Program of Rural Water Supply and Sanitation started in 1999 and passed two stages 1999 – 2005 and 2006 – 2010 to

improve the situation. In the third stage 2011 – 2015, the Program set the goal 95% of rural residents accessing clean water.

Although a great deal of effort was being made, the percentage of rural households in remote areas accessing clean water was low. In 2010, there were 41 million rural residents not yet accessing water which met the requirements of Ministry of Health. Just 8% of rural residents had piped supplies, 82% had improved sources and the rest 10% still harvested consumption water from unimproved sources. This was a result of geographical and financial difficulties and limited perception of locals about the importance of clean water. Because of confined awareness, many people did not prioritize clean water. The majority continued accessing water from streams, rivers and lakes for consumption. In some areas, after finishing water supply stations, it is witnessed that either people did not access at all or did occasionally but combined with other unimproved sources. As a consequence, the finances were not enough to operate and maintain which threatened the sustainability of projects.

The cases previously discussed show the difficulties in accessing water sources in remote areas, especially mountainous and offshore communes. They are clearly shown as geographical, financial conditions and local perceptions. In Kien Hai district, Kien Giang province, the main water source is rain water. In the dry season, many streams and groundwater run dry. To get water, locals must walk around 10 km to or buy at the high price of 120 to 150.000 VND per  $1m^3$ . Therefore, taking time to collect water and high prices became problems.

The issue of accessing insufficient quantity and low quality water did not occur only in the rural area but also in big urban territories. In 2010, fewer than 60% urban residents joined the piped supply even though the targeted number was 88%. The quantity and quality of water supplies was decreasing and sustainability was weak. Monitoring was not conducted in the right way, especially to the small scale water supplies. The management of effective centralized water supply usage was weak because of deficient budget for operation, maintenance and repairs. Consequently some constructions were out of use within a few years after finishing construction due to the low quality and incompatible designs. Some stations cannot work at all.

Reasons for these unexpected results can be explained because of the following. Firstly, the living standard is not high enough to contribute funds towards water supply projects, creating issues for construction, management and maintenance which remain dependent on State investment. Secondly, most rural water supplies are located in remote communes and experience difficulties in communication and management skills. Thirdly, untrained staffs and unsystematic construction resulted in inefficient projects. Fourthly, the funds for the projects are not abundant, so were unable to apply new and qualified technology to meet the requirements. As a result, the quality of water could not be secured.

Inequality in water usage is also a concern. Although the situation of water usage in rural areas has already been improved significantly, there is still existing big gap among living standard groups, regions. 70% of richest residents have access to clean water but the figure for the poorest was just 40%. Among 7 regions of ecological economy, there are 4 crowded regions with 60% supplied water while the ratio for 3 regions remaining is below 50%. In mountainous and coastal areas people have less than 20 liters per person per day which is less than the standard outlined by WHO. Poor rural residents suffer unhealthy conditions because of insufficient clean water. The increasing scarcity and competition in water is a huge threat to poverty reduction. Therefore, to reduce the gap it is necessary to invest in water related projects.

### **2.1.3 Water governance in Vietnam**

The picture of water governance in Vietnam will be introduced broadly in this paper. First the process of institutional change in accordance with the changes in context of Vietnam will be addressed followed by functions of various ministries related to water management and finally to piped water governance in Vietnam.

#### ***The process of institutional changes in water governance in Vietnam***

The institutional reforms in the water sector are the consequence of administration reforms in Vietnam after Doi Moi. The reforms mark a huge change in the mindset of water resource managers. The Law on Water Resources of 1998 concentrates on administrative scope to water problems, especially problems

in the agriculture sector. In contrast, the National Water Resources Strategies emphasizes on enhancing effective and efficient water governance in the context of following market mechanism. By 2020 the strategy expects the establishment of a water service market with the engagement of multiple economic sectors; and an official playground of trading water licenses. However, the water resources management sector adjusts the activities by the legislations and regulations.

It can be said that there has been a great transformation from the socialist ideology of water resources management in Vietnam, which mainly focused on supplying of water services and distribution of water resources, to market-oriented mode of governance which focuses on regulation of the provision of water services and water resources allocation by various economic sectors.

Besides, in 2006, Vietnam enacted its first national water policy paper – the National Water Resources Strategy towards the year 2020, showed the agreement of Vietnam to follow the international calls for recognizing water as an economic good. This can be seen to signal a transformation in the ideology of Vietnamese water governance competence towards market mechanisms to address local water problems supportively. Because of the fast economic development, and increasing industrialization and modernization, Vietnam's water resources are under increasing pressure of over-exploitation and degradation.

To cope with the existing water problems, Vietnam started to reform its water sector in the late 1990s. Market-oriented mechanisms in water governance have been increasingly recognized as ways and means to achieve effective state management of water resources. Vietnam is asked to move quickly to get good management practices in place because the water is not sufficient. One of the institutional measures is to mobilize market forces in water management with the Government of Vietnam being supportive in terms of legislation for water markets to perform and behave well.

Another change is from water demands. This is the consequence of rapid economic development, especially intensification and expansion in the agriculture, fishery and aquaculture sectors. Urbanization, industrialization and tourism development taking place at the same time as population growth resulted in more

water usage and increased pressure on water demand. The availability of water and water allocation is dependent on various parameters, such as locality, infrastructure development, funding and institutional framework. At the domestic level, access to water varies according to income and the locality of residence. Moreover, the deterioration of water quality has become an important issue in national and local water management. Most of water usage also leads to water pollution from uncontrolled discharge of wastewater, the utilization of pesticides and other substances applied in agriculture, fishery and aquaculture production and water transport sector like navigation, construction and maintenance of ports and so on.

In Vietnam today, a public and private economic sector co-exist. Regarding water related businesses, there are central and provincial level state owned companies, private factories, service suppliers and cooperatives, which are following profit-oriented. Doi Moi (Renovation) and the formal introduction of the market economy in the mid-1980s marked a historical break. Property rights were organized and water was, for the first time, perceived as an economic good, therefore water pricing were introduced.

### ***Water governance according to related ministries***

National government assumes most responsibilities with regards to water resource management in Vietnam. Vietnamese state apparatus is hierarchically structured and state management responsibilities are divided into ministerial and ministerial- level portfolios.

At the macro level, water in Vietnam is managed by two ministries: the Ministry of Agriculture and Rural Development (MARD) and Ministry of Natural Resources and Environment (MONRE). However, MARD was born first and the creation of MONRE is under debate. Multiple scholars argue that the generation of MONRE was useless because under MARD water resources management function was unified within one ministry. When existing in two separate ministries, decisions sometimes conflict with each other and need to be reconciled by the Prime Minister. According to the new documents, MONRE's functionality considerably increased, but not all functions were taken from MARD. Among the new responsibilities of MONRE, environmental protection (including climate change) can

be considered key and the building and management of a water resources observation networks represents a new challenge.

While MONRE's main functions are environmental protection and water resource management, MARD's central concern is still stressed on structural issues, such as flood control and mitigation, and water supply, mainly for production purposes and rural water supply. MARD basically remains engineering-oriented and agricultural production and hydraulic operation. However, the key conflicts between MARD and MONRE basically comes from decision-making power and the way to access and control over resources. The latter includes the allocation of funds for the ministry itself, but first and foremost funds for implementing projects and construction work.

Other ministries take on various responsibilities related to water management. The Ministry of Construction takes the responsibility of water supply activities within the urban area and industrial zones across the whole country. Together, they have to issue the criteria and economic and technical norms of urban water supply, parallel with guiding and monitoring it. The Ministry of Agriculture and Rural Development is put in charge of state management in terms of rural water supplies by researching the mechanisms and policies on rural water supplies, promulgate the criteria on economic and technical norms and examine whether the activities work well or not. Moreover, the Ministry of Health requires State management in terms of clean water standards for consumption, and examining and administrating the implementation. The Ministry of Planning and Investment attracts domestic and external funding for water supply constructions. Other ministries need to coordinate with MOC and MARD to deploy State management in water supplies. In addition, the Ministry of Information and the Ministry of Education are assigned to coordinate each other to disseminate relevant information to community.

Specifically with regards to water governance, MONRE is in charge of state management of water resources, general land use planning, international coordination of water resources management in the Mekong River Basin,

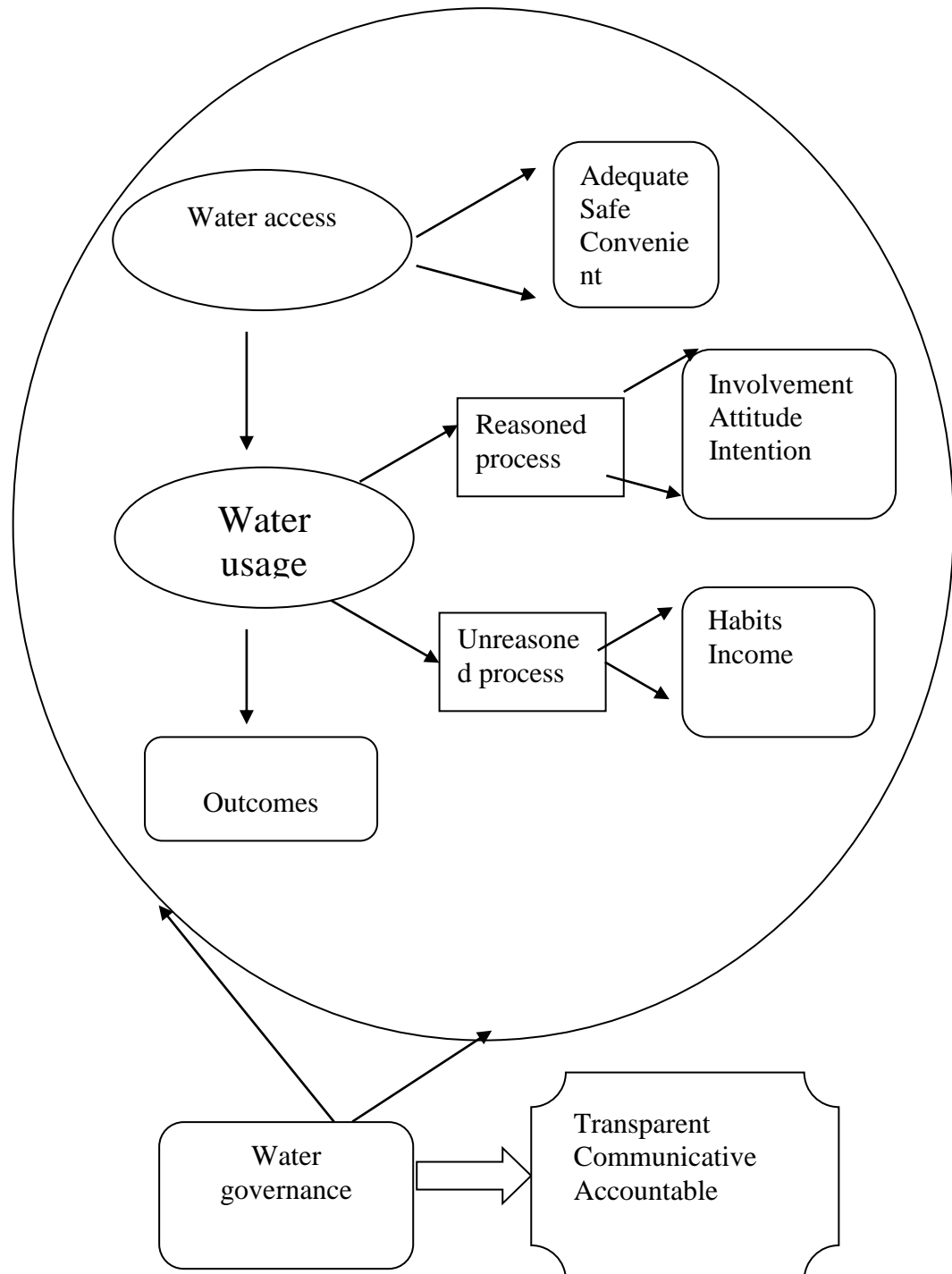
management of hydro meteorological, surface water, groundwater, water quality data collection, and water quality standards.

The Ministry of Industry and Trade takes the responsibilities of hydropower, in collaboration with the MARD (Decree No. 189/2007/ ND- CP), while the Ministry of Health is concerned about water standards and regulations in drinking and domestic water (Decree No. 188/2007/ ND – CP). The Ministry of Construction deals with urban water supply and drainage, resolving urban wastewaters, the Ministry of Finance deals with distribution of state budgets, and the Ministry of Planning and Investment undertakes the allocation of planning and investment, and coordination of international relations. MARD deals with irrigation, drainage, rural water supply, flood and disaster prevention, cultivation land management, fishery, and hydropower in coordination with the Ministry of Industry and Trade.

Therefore, it can be clearly deduced that with regards to drinking water management, two ministries are taking responsibility. The Ministry of Agriculture is in charge of this issue in rural area while the Ministry of Construction is responsible within the urban area. The Ministry of Health is concerned by the standards for domestic water. The mandate mechanism is taken by specialized agencies of Provincial People's Committee. This means Department of Agriculture and Rural Development will assume the management of water supply in rural areas which belong to the authorized domain. Finally the Department of Construction will deal with this issue in the urban territory.

## 2.2. Conceptual Framework

CONCEPTUAL FRAMEWORK





The research is focusing on water usage in Gia Lam district. Therefore, it will start with the concept of water access which recognizes water as a human right in the development report, and then come to the concept of water usage and finally come to the concept of water governance which covers the whole process of implementation of transferring water access from paper to water usage which reflects the real life. The study will analyze water access ability which allow us to evaluate the result of water governance that whether water governance works well or not in order to achieve the goal of water access as a normative norm. Finally, the thesis will analyze the outcomes of water access ability in Gia Lam district.

In “Charting the Progress of Populations”, United Nations Population Division, access to safe water is valued by the number of population with access to and adequate amount of safe drinking water placed within a convenient distance from the user’s dwelling. Access is interpreted as actual use by the population. The critical elements of water indicators are: adequate, safe and convenient distance. However, while the indicator “safe” is popularly assessed, the two others are of less concern.

In Resolution 64/292, it is acknowledged that the right to safe and clean drinking water and sanitation as a human right that is essential for the proper enjoyment of life and human rights.

Access to safe water is valued in international goals. Therefore, all countries need to work towards increasing the quality of life and health by ensuring a safe and sanitary living environment for all population groups. In order to do this they must ensure access to clean water and provide access to safe drinking water in sufficient quantities and promote access for all people to safe drinking water and other basic services, facilities and amenities, especially for vulnerable and disadvantaged groups.

Access to safe water for all people is a key to a successful development strategy. Even today, a new International Decade (2005 – 2015) for Action “Water for Life” was declared by the United Nations, access to drinking water is clearly stated in the MDGs (target 10 of goal 7), this is one of the most important goals given that its completion will facilitate the achieving most of the other objectives.

Water usage is affected by reasoned processes such as personal involvement, attitude, intentions, and unreasoned processes such as habits and reflexes and situational factors like income (Gregory & Leo, 2003).

Water is perceived in a number of conflicting ways as a commodity, as a common good, as a basic right and as a sacred resource or god (Mary, 2006). Those who regard water as a common good will never agree that water is a commodity for sale. Contemporary Western views hold water as a commodity, an object to merchandise and not a free natural good. The awareness is that, if water is considered a commodity, water market and prices would be created to achieve resource conservation and sustainability, and equity would be ensured thereby resolving conflicts through market mechanism. Traditionally, water is perceived as a common property meaning the water resources in a particular region belong to that community or local people who occupy there. Water rights are formal rights originated with the government, out of a given social context where water scarcity and violation of water rights became common. In the legalistic societies of today formal law has more importance to prevent violation of water rights. The availability of water is limited and uncertain. Drastic climate changes and strongly increasing population has aggravated the already existing conditions of water scarcity in the country. Therefore, it is urgent to talk about the “Right to Water”, and it is responsibilities for the states to address this problem consistently and operatively.

Resolution II on Community Water Supply declared that all people have the right to have access to water in quantities and of a quality equal to their basic needs. However a shift in the concept of water from a basic need to a commodity can be seen in the following conferences. As Principle 4 of the Dublin Statement Proclaims, the International Conference on Water and Environment claimed that water has an economic value and therefore it should be recognized as an economic good. One statement acknowledges water as a basic right in having access to clean water and sanitation at an affordable price. It agreed water should be accessible at an affordable price, instead of free of charge. These conferences recognize the past failures in realizing the economic value of water, which in their opinion ultimately lead to the wasteful practices.

On a large scale, water should be treated as a social and cultural good, not primarily as an economic good. The factors that apply are: availability means the water supply for each person must be sufficient and continuous for personal and domestic uses; quality means the water required is safe; accessibility – water, water facilities and services have to be accessible to everyone without any discrimination.

Therefore, it is vital to consider water supply within the dimensions of human rights as a social issue as well as the economic side which can ensure the sustainability and efficiency of charge. However, how to define reasonable price but achieve economic value sometimes is difficult.

At present, there is no universally agreed upon definition of water governance, because different people and institutions use the concept in different ways. This research will look at a few basic definitions of water governance before going into more detail.

Water governance is the field of political, social, economic and administrative systems that are in place to develop and manage water resources and the delivery of water services at different levels of society (Rogers & Hall, 2003). In other words, water governance is the set of systems that control decision-making with regard to water resource development and management.

Water governance covers the manner in which allocation and regulatory politics are practiced in the management of water and other natural resources and broadly covers the formal and informal institutions by which authority is exercised.

The definitions do not mention the goal of water governance. I agree with the definition of UNDP, who consider that water governance is comprised of political, economic and social processes and institutions that governments, private sector and civil society use to decide how best to use, allocate, develop and manage water resources. It includes mechanisms, processes, and groups, articulate their priorities, exercise their legal rights, meet their obligations and mediate their differences.

Although reform of water institutions and policies are taking place in many countries, progress in nearly all cases has been slow and restricted and sometimes it is difficult to foresee. In most of the countries of the developing world, water institutions do not operate properly, and most of them display fragmented

institutional arrangements and overlapping and/or conflicting decision-making structures. This point is closely relevant to the research place because Vietnam is now in the process of administration reforms, and institutional reforms to transit from a centrally-planned economy to a market economy. Old mechanisms still exist and work inefficiently, particularly within the water governance sector in Vietnam and in the Gia Lam district in particular.

More effective water governance is needed because of several reasons. Firstly, increasing pressure on water ecosystems is understood as a result of drastic economic development. This is absolutely true for most places in the world, because water is seen as a natural resource as an important input for all production activities. Secondly, scarcity of water along with pollution creates a challenge for meeting the demand of good quality water and sufficient quantity water. Thirdly, water governance and water service delivery is often corrupt with low capacity of governance because of lack of accountability and transparency. Finally, decentralization and other aspects of integrated water resource management are considered to be key elements of sector reform programs that, to be effective, require improvements in water governance systems (Yahua, 2009).

Some ideas were proposed to improve water governance. Institutionalize a method of promoting continuing innovation by official legislation, the discovery of new and better technical means, in order to adapt to a future that concerns increasing uncertainty and risk. However, water governance needs to fit the local situations, therefore flexibility is the key. Therefore technology also should fit each level of water governance and fit to the certain situation. There is no single model of effective water governance; in fact to be effective governance systems must fit the social, economic and cultural particularities of each country.

There are some basic principles that are considered to be essential for effective water governance. Approaches must be open and transparent, inclusive and communicative, coherent and integrative, equitable and ethical. Performance and operation must be accountable, efficient, responsive and sustainable (Charles, 2007). The role of market mechanism and technology should be concerned (Tortajada & Biswas, 2011). Moreover, while establishing a sound legislation is expected to support water governance, it is expected that by directly involving users of water

in the governance of the resource, the knowledge on which the participation is based will be more meaningful (Tortajada & Biswas, 2011). The reason is that the locals may often be more familiar with the peculiarities of local economic, social, cultural and environment situations. This point is totally right, especially in the researched place, although water system already built, but the access of water is still low because of many reasons relating to the economic, social and cultural sides. Therefore, good water governance needs to consider these components to fit in the specific conditions of the locals.

The outcomes of water governance can be identified in several different dimensions. These include basic access (quantity, quality and timing of water usage) and livelihoods, how the poor can use water to facilitate and foster their status. Outcomes of water governance can be shown in terms of social relations and processes. Outcomes also innovate in the political dimension, as structures of power and influence are transformed through working out of these processes, thereby the poor people can achieve political voice. In this regard, water governance is understood as a key to broader dimensions of governance and political renovation.

## **Chapter 3: Water usage and the the factors which affect to water usage in Gia lam district**

In this chapter, I will show my basic findings from the research before analyzing them. Based strictly on research questions, the findings start by showing the situation of piped water usage among the locals, from the general to specific interviewed households to discover the real situation and later, it shows the elements which affect water usage from the result of data analysis regression. Then it examines water usage in different dimensions: the level, the equality and the sustainability of clean water usage.

### **3.1 The situation of piped water usage in Gia Lam district:**

The piped water supply in Gia Lam district serves 15 per 22 units by two main supplies. Firstly, from Hanoi Water Limited Company 2 and secondly rural water supply stations which are supported by the World Bank. However, the role of Hanoi Water No 2 One Member Company Limited is prevalent because 51.28% habitants are being served by the piped supply, and 48% of them were supplied by the Hanoi Water No 2 One Member Company Limited. Currently there are 5 rural water supply stations located in the 4 communes, including Bat Trang, Kim Lan, Ninh Hiep and Phu Dong. Because there are 2 stations in Bat Trang commune, they are called Bat Trang station and Giang Cao station. Until now, there were 3 functional water supply stations and Bat Trang, Giang Cao and Kim Lan serve clean water for the locals. Most stations started construction in 2003 or 2004, but because the project is not systematic, after finishing they cannot operate and serve as the designed capacity. Remarkably, stations in Bat Trang commune are working well after finishing construction until now. It could be explained that although Bat Trang is rural commune like others, it is pottery craft village so the locals have higher living standards and the collected funds for operating and maintaining is more plentiful. Now those rural water supply stations are being transformed the new management type enterprise or cooperative models with the expectations that they will work better in the future.

In the 7 communes, although the inhabitants expect to access piped supply, because of geographical difficulties most of them cannot because they are remote

and some of them are separated by dyke system so the piped system cannot reach them easily. Moreover, piped system requires systematic and planned construction. Therefore, the locals have to wait for the plan from local government.

Table 3: The situation of supplying piped water in Gia Lam district, 2014

Order	Commune or town	The total people	The number of people access piped	The rate of access
1	Trau Quy	15,924	15,924	100%
2	Yen Vien	13,866	8,392	60.52%
3	Bat Trang	8,241	8,015	97.26%
4	Da Ton	12,585	12,585	100%
5	Dong Du	5,162	3,949	76.50%
6	Kim Lan	5,861	482	8.22%
7	Van Duc	7,276	0	0.00%
8	Kieu Ky	10,677	10,408	97.48%
9	Co Bi	9,386	8,876	94.57%
10	Dang Xa	9,436	9,436	100%
11	Phu Thi	8,059	8,059	100%
12	Duong Xa	11,460	10,766	93.94%
13	Duong Quang	12,542	4,919	39.22%
14	Kim Son	12,093	0	0.00%
15	Le Chi	11,565	0	0.00%
16	Duong Ha	6,333	0	0.00%
17	Phu Dong	11,506	0	0.00%
18	Trung Mau	5,565	0	0.00%
19	Ninh Hiep	17,118	0	0.00%
20	Dinh Xuyen	10,294	9,127	88.66%
21	Yen Vien	13,964	6,031	43.19%
22	Yen Thuong	17,683	4,356	24.63%
Total district		236,596	121,325	51.28%

Source: Gia Lam District Report

Nowadays, the locals in Gia Lam district use water from 2 main sources: from the drill wells and from the piped system. The problem is, the habitants in 15 communes with piped system do not access piped water properly and the level of accessibility is not as expected. Although at the beginning they were eager to welcome piped system and followed all the procedures as well as paid the initial

payment to join the system, after a time using the piped water was not welcome for reasons I will analyze in the upcoming parts. A popular way is combining 2 sources to save the piped water bills. The investigation was taken in 1 popular commune of Gia Lam district (Dang Xa commune) with piped system, with 100 selected households as being explain in the previous chapter. Most of them are using piped water for the most important activities like drinking and cooking.

### 3.2 The factors which affect to water accessibility in Gia Lam district

Table 4: Some basic features of investigated households

Indicators		Units	Quantity
Sex	Male	People	50
	Female	People	50
Average of demography		People	4.59
Average of labor numbers		People	2.53
Average of the school years		Years	8.98
Average of income		1000 VND	2.236
Average of ages		Years old	57

*Source: Summarize investigated households*

The socioeconomic features of investigated households are shown on the table above. Among 100 head of households were asked, 50 of them are male and the rest are female. The rates of male and female are equal.

Among 100 selected households, the average number per household is 4.89 people. The average age of headman is 57 years old. The average income per person per month is more than 2 billion VND. Overall, the general education level among the locals in Gia Lam district is quiet even. The average years of schooling of household headman are nearly 9 years. Most of them were aware of the role of piped water as safer source. People with higher education are likely to understand more about the importance of clean water to health than others, therefore they always approve and support strongly the using piped water and persuade their neighbors and relatives to join. Among 22 interviewed people with more than 10



years of schooling (in vocational school or university) more than half were aware of the threat of higher concentration of arsenic in water in their area. One man said “I watched television read newspaper about the arsenic already. It is really dangerous. The groundwater here is not secured. Just systematically treated water as piped supply can be believed, I think”. Others had moderate awareness about the importance of piped water. They think simply that it is treated water by State, by company, so that is good. When they meet any challenges using it, they tend to stop using it.

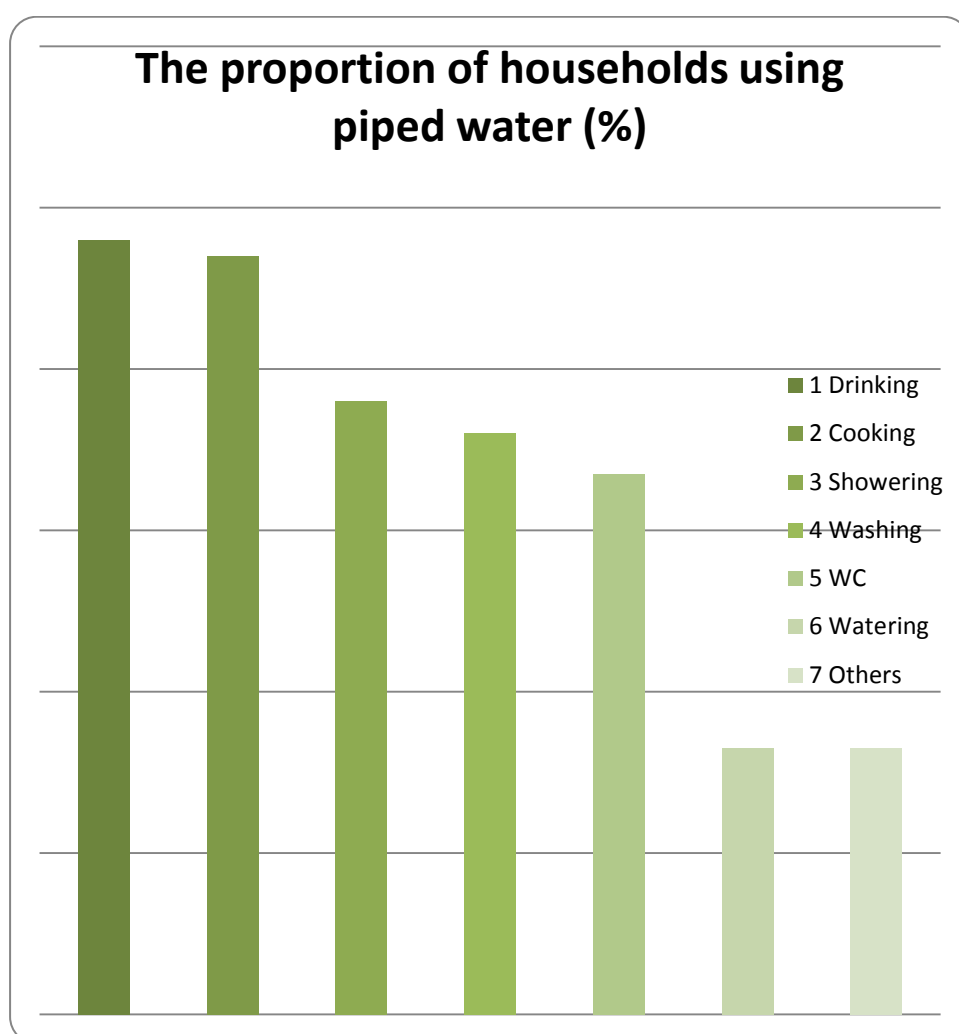
The level of piped water usage in selected households is displayed in the table below. The table discovered their access based on the decreasingly important activities. It is clearly seen that most of them prioritize piped water for the most important activities instead of using for all.



Table 5: The level of piped water usage according to activities

Order	Actions	The proportion of households using piped water (%)
1	Drinking	96
2	Cooking	94
3	Showering	76
4	Washing	72
5	WC	67
6	Watering	33
7	Others	33

Source: Summarize data collection, 2015



It is recognized that the percentage of households accessing piped water decreased for less important tasks. In other words, it is not 100% households using

piped water fully for all their daily actions. With the piped water, they need to pay, and the price is progressive which means when they are using more, their bills are running faster. With the important goals like drinking and cooking, the number of households using piped water is high, 96% and 94%, respectively. For less important actions like showering and washing fewer households access piped water, just 76% for showering and 72% for washing. The rest are using water from drill wells to combine 2 sources of water: drill wells is the former and piped water is new. “We combine to keep the water bills under controlled, the price of piped water is progressive, therefore we must use economically”, one housewife who combined 2 water sources shared.

Table 6: The table of piped water price

Unit: VND per m<sup>3</sup>

Order	The volume of used water	Price (Since 01/01/2014)
1	Less or equal 10 m <sup>3</sup>	5,020
2	From 10 m <sup>3</sup> to 20 m <sup>3</sup>	5,930
3	From 20 m <sup>3</sup> to 30 m <sup>3</sup>	7,313
4	Greater than 30 m <sup>3</sup>	13,377

Source: <http://hawacom.vn/?p=10031>

To show more clearly how the cost for piped water is higher than drill wells, the research interviewed one household headman to ask for explanation. One man compared the different costs between piped water and drill wells. He said that if his family used drill well totally, it is necessary to filter before consuming. However the total cost is still is much smaller than the piped water bill. To extract water from the drill well, they need electricity to pump and sand to filter. After filtering by sand, they feel water is acceptable visually. They need 80,000 VND for sand which can be used for 6 months, making the average cost for sand per month 13,000 VND. One month, they spend 18,000 VND for electricity. Therefore, the total cost for water per month equaled 31,000 VND. To access piped water, besides the initial cost, their monthly bill is around 105,000 VND.

Though the cost for piped water is much higher than drill wells, when they were asked about their satisfaction to the quality of piped water and the results are

revealed below. The opinions are coded by grading from 1 to 4, grade 1 means good quality, nothing is abnormal, grade 4 means bad quality, the worst.



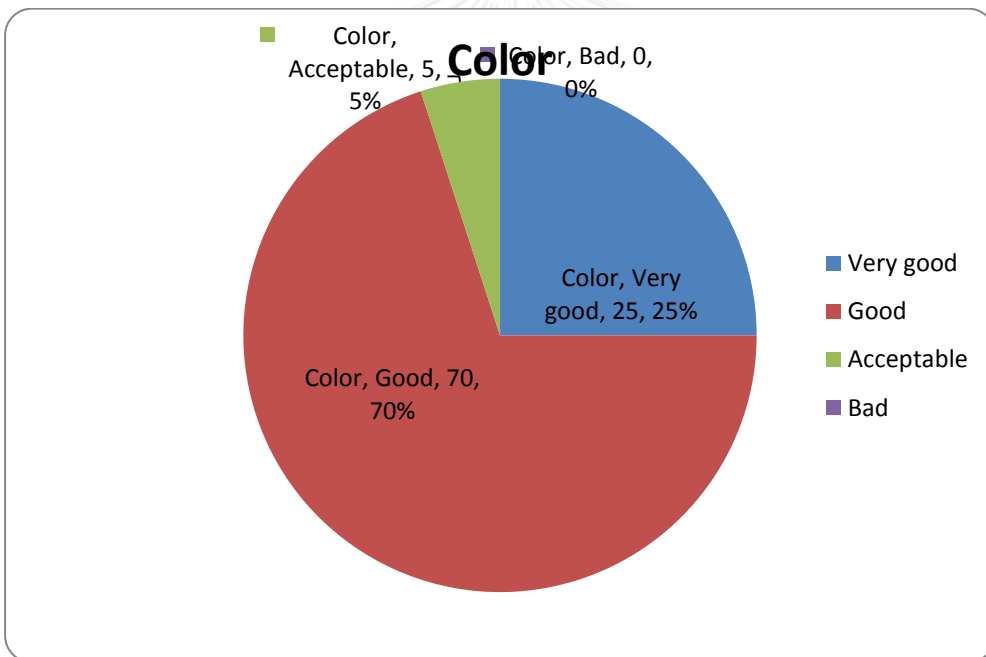
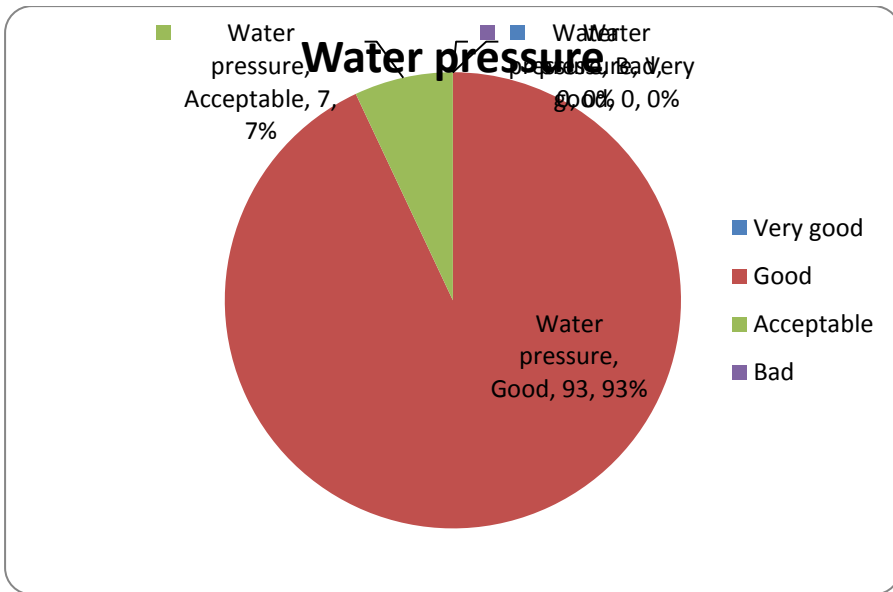
Table 7: Opinions about the quality of piped water

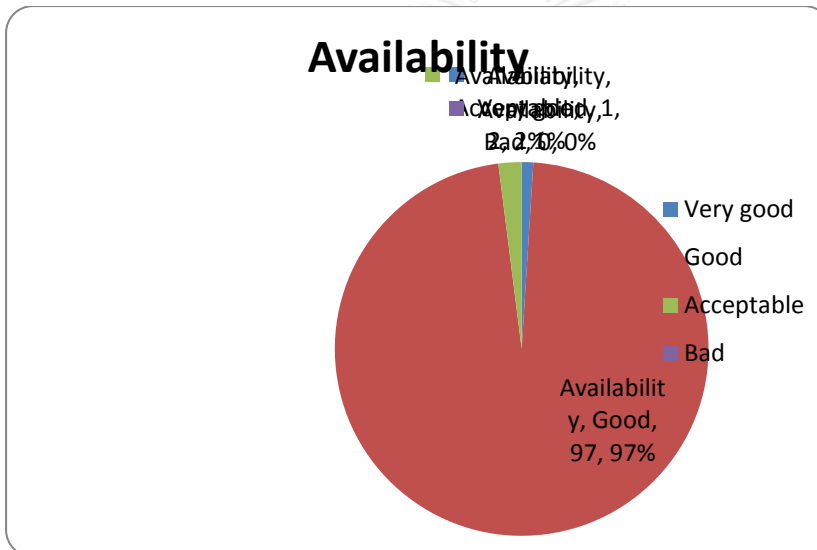
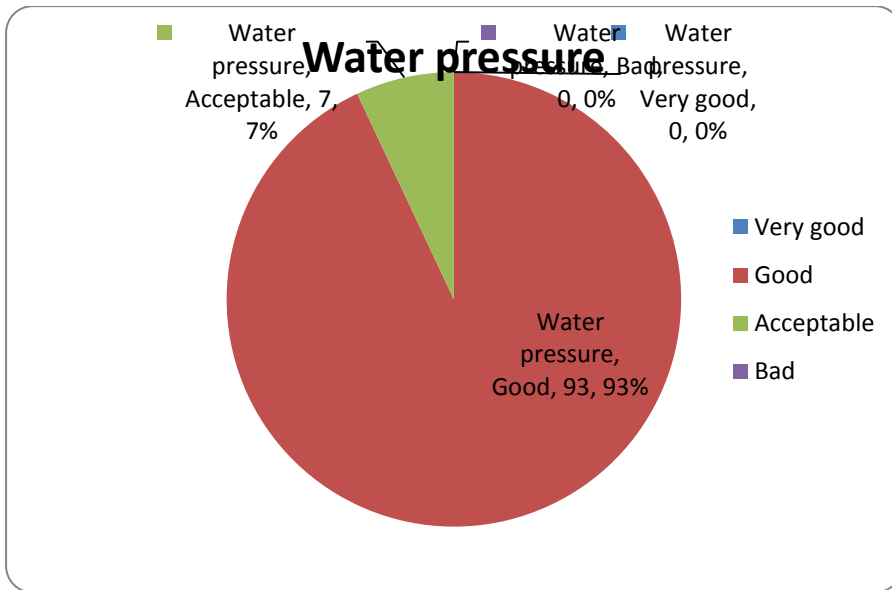
Unit: %

Grade	Characteristic of piped water			
	Smell	Color	Water pressure	Availability
Very good	13	25	0	1
Good	73	70	93	97
Acceptable	13	5	7	2
Bad	1	0	0	0

Source: Summarize data collection, 2015

Among 100 respondents, when being asked about the smell of piped water, just 13% said that they were satisfied, while most of them, 73%, revealed that they do not feel it is good and they feel the smell of flour which is in the stage of processing water in the factory. “We cannot drink directly. We have to filter again, otherwise, we cannot make tea deliciously”, one of respondents shared. 25% opinions supposed that the color of piped water is perfect.. However, 70% of users said it is just acceptable enough because sometimes they see very bad color, “I don’t know why, maybe the staffs just clean the big tank, but I hope they will find the way to restore it soon”, one housewife shared. Another lady also discovered the scum in the bottom of kettle after boil the water for drinking. About water pressure and availability, most users supposed it is not really good, but it is still can endure equates grade 2, 93% for the water pressure and 97% for the availability. They explained because sometimes it is weak, so the households should keep it in tank to reserve to use in high floors because sometimes it does not work in the early morning.





Because it is not seen visually that piped water is secure, people cannot drink directly and they need to spend more on filtering. The easier way is to buy stainless steel tank to deposit the scum. This way there is just an initial cost. The other way is to buy RO Water Filter which costs 450,000 VND to be used within 12 months. The extra cost for filtering per month is 37,500 VND. It is added to the piped water bill and makes the total cost for piped water is much higher than drill wells.

When asked, all households replied that although they accessed piped supply nearly two years, they have never ever seen the water quality examination from either staff of water suppliers or local government. Sometimes, they also asked cashiers who collect the monthly bill but cashiers did not know how to respond and just explained that they were doing their own duties. That means there is no regular examination for water quality, the locals with regards as users or demand side, just accept the services they are being served.

This problem can be explained by the unclear mandate mechanism. The decree said that in regard of domestic water management, Ministry of Agriculture and Rural Development will deal with this issue in rural areas while Ministry of Construction will concern it in urban areas and industrial zones. The decree is specified to provincial levels, each ministry will mandate to professional department in People's Committee. However, in the subordinate agencies at district level, there are no guidable circulars and the roles of district local governments are so fuzzy that they cannot perform actively to engage in this issue. Besides, in the People's Committee at the district level, there are not many staffs working in the right major which they were trained. As a result any of the normal staff, not leaders, just deal with administrative procedures, regardless of their job title.

Processing 100 questionnaires through software Data Analysis Regression to estimate the factors which affect to water accessibility can withdraw the result as below. Studying the decisive elements can facilitate the process of solution.



Table 8: The results of estimation and factors which affect to water usage

	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>	<i>Reliability</i>
Intercept	-37.1989	<b>-1.88797341</b>	<b>0.06214715</b>	95%
INC	0.007047685	<b>10.64320856</b>	<b>9.0243E-18</b>	95%
MEM	5.654348942	<b>2.731535532</b>	<b>0.00754315</b>	95%
LAB	-4.02388173	<b>-1.45784822</b>	<b>0.1482511</b>	95%
GEN	-0.54336759	<b>-0.09919878</b>	<b>0.92119395</b>	95%
AGE	0.339680288	<b>1.275626321</b>	<b>0.20526472</b>	95%
EDU	2.431315936	<b>2.832541531</b>	<b>0.00566177</b>	95%
R Square	0.754136754			

*Source: Summarize collected data, 2015*

From the table, it can be recognized that there are sharply 3 variables that are valid, they are: INC, MEM and EDU.

$$WU = -37.1989 + 0,007Inc + 5.654 Mem + 2.431Edu^1$$

WU: Water Usage, measured by 1,000 VND

Inc: Income per month, measured by 1,000 VND

Mem: Members of household, measured by person (s)

Edu: Education, measured by the number of school years

$R^2 = 0.7541$  it means that variables in the model have explained 75.41% the changes of water usage and 24.59% the rest is due to external factors affect to water usage.

The result shows that, if other elements do not change, if income of households increases 1,000 VND, water bills will increase 7 VND, if the number of members in family increase 1 person, water bills will increase 5,654 VND, if the number of school years of locals increases 1 year, the water bills increase 2,431 VND.

Household's income is concerned as one of the most important factors to clean water usage in the researched place, because it affects directly to the ability to purchase water bills. If income increases, water usage will also increase and against.

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<sup>1</sup> The result from Data Analysis Regression

Now while the price of piped water is considered to be high, it is also progressive so income becomes lower comparatively. Therefore, to increase water usage, it is necessary to consider the factor of income, and income and the price of piped water need to fit each other. For low income households in the peri-urban, improved piped water accessibility depends on the factor of price. As many other vital goods, water was already subsidized. However, since Vietnam followed the marketeconomy, subsidy has been eliminated gradually.

When users were asked that what make them feel reluctant to use piped water, 74% opinions said that the total cost for piped water is too high, and 16% opinions revealed that the quality of drill wells is still good and they do not see any abnormal signs during the usage. The rest showed that they do not care piped water, do not believe the quality of piped water and other reasons. Therefore, it can be deduced that with existing price affects greatly to water usage.

The number of members in household is still important factors. Normally, greater members will cause greater consumption. Therefore, in the next time, to supply fully the locals, it is necessary to consider the volume of population and forecast the next figure to reserve or prepare carefully capacity of water mills.

The number of school years is also the decisive factors to water usage, because it decides to the awareness of the importance of piped water that if piped water is important to health or not. Although there was no advertising or motion from Hanoi Water Limited Company 2, most locals were aware of using piped water is good, and they agreed all the conditions set up at the beginning. However, their awareness is moderate. That is why when starting to use, if they see high cost, they tend to combine with drill wells or even just use only water from drill wells to save piped water bills. But if they are better-educated with higher years of schooling, they will understand more deeply the importance of piped water to health. One woman who was retired and had 14 years of schooling, she said “I know piped water is not cheap, but it is processed by the company, it is state company, I believe although if we see by normal eyes, we don’t see the difference between drill wells and piped, but I believe piped water is secured and I persuaded my family that we should use, that is our right!”. That means basically they still support for piped water. Therefore, to improve clean water usage, it is vital to increase the

awareness of the locals through enhancing the information given about the importance of piped water to ones to health.

When checking elements against each other, I do not see any mutual relations between income, demography and education each other in this model. The result will be shown in the appendix.

Habit is also the factor which affects slightly to water usage. Because it is difficult to engage this factor by quantitative method, I discovered it through in- depth interviews. Although many have access to the piped supply by following all paper procedures and paying initial costs for it, their habit of using drill wells still remains. One lady shared “We set up piped already, but still use drill wells. We have been using and do not see any abnormal signs, so just keep using. About piped, maybe we use in later time”. But this phenomenon is not so popular in Gia Lam district, because when they agree to access piped supply, most of them already thought about their decisions thoroughly.

### **3.3 General examination of water usage in Gia Lam district**

To examine and evaluate the overall of the situation in water usage in Gia Lam district, I am going to examine the level, the equality and the sustainability of clean water usage.

The real picture of the situation above showed that the level of piped water usage in Gia Lam district is not high. The Hanoi People’s Committee set the goals for rural districts that in 2015 60% of rural residents can access piped water. However, this number for Gia Lam district in the end of 2014 was just around 52%, meaning that 48% of the locals have not yet accessed piped water which is considered as safe in the risk of increasing polluted groundwater in peri-urban district of high speed urbanization cities like Hanoi. However, among 52% locals with piped supply already, the percentage of them access piped water fully is not high. They priority piped water for most important activities to save the water bills.

The sustainability of piped water usage is not high. This occurs to both 2 types of piped supply. The quantity and quality of water supplies are decreasing. The monitoring is not conducted in the right way, the quality of water is not secure and high cost causes users to not be consistent with it. The managing and exploiting centralized water supplies effectively and sustainably are weak because of

insufficient budget for operation, maintenance and repairs. It caused to the fact that some constructions are out of use within a few years after finishing constructing due to the low quality and incompatible designs. Some stations cannot work.

This can be explained because of a few reasons. Firstly, the living standard is not high enough to contribute the funds for contributing the water supply projects, meaning issues of construction, management and maintenance still depend on State investment. Secondly, most rural water supplies are located in the most remote communes with the difficulties in communications and management skills. Thirdly, due to the untrained staffs and unsystematic construction, it caused to the inefficient projects. Fourthly, the funds for the projects are limited, therefore they did not meet the requirement for applying new technology and as a result the quality of water is not secure.

Inequality in water usage has already been shown within one district. While 52% residents living in convenient geographical position are being served piped supply, the rest living in remote area or are separated by dykes have not been yet. The inequality still occurs to others who are not permanent residents. It starts from the procedures to join in the piped system whereby users must show the registered household books as an official document. Therefore, those who are not original owners, students, or tenants who are renting houses, need to buy piped water at the price for businesses which is much higher than the domestic price.

## **Chapter 4: Examine Water governance in Gia Lam district**

### **4.1 Water governance in Vietnam**

#### *Piped water governance in Vietnam*

Provincial People's Committee is assigned to take responsibility of executing water supplies in their authorized area through mandating mechanisms to provincial professional agencies. Specifically, Department of Construction is advisory agency for Provincial People's Committee to deal with the issue of State water management in urban areas and industrial zones. Likewise, Department of Agriculture and Rural Development is a consulting body to fulfill this issue in rural areas.

The People's Committee at different levels takes the responsibilities to organize and develop water supply services in their territory. They have to apply suitable methods to select or establish new water supply units, support, facilitate and examine to ensure the services meet the community's demand.

However, the mandate mechanism is likely to be clear until the provincial level but ambiguity can be seen in the mandate mechanism at the lower, district level. The content is about how senior levels cooperate and facilitate issues in the territory they manage, but it is not shown clearly which agencies will take responsibility. The flexibility in the mechanism and no obvious mandate mechanism can create difficulties in implementation.

Water supply activities are guided by the principles. Firstly, it is manufacturing business activity which is examined by State in order to ensure the legal rights and benefits of water suppliers and users. It is encouraged that water should be used reasonably and economically and calls for various economic sectors and the community to invest and manage water supplies together. The quality of clean water used for consumption must meet the requirements of Ministry of Health. The authorities, organizations and individuals must take the responsibilities to preserve water resources, therefore offenders will be punished strictly. Ministry of Construction will guide the process of engaging opinions and monitoring in construction.

***Principles and authority to decide and manage piped water price:***

The price of piped water must be calculated correctly according to production costs. The whole cost through the process from producing, distributing and consuming must be calculated in order for suppliers to maintain and develop based on the economic technical norms which are promulgated by authorized agencies. It is highly encouraged that suppliers decrease the cost and increase the quality and users use water reasonably and investors join in the water supply markets.

The price of water is not different according to various economic sectors and users. It must be calculated by the right authority and it must be under the frame which is promulgated by the government and meet the requirements of economic technical norms. In the case, water price which is approved by Provincial People's Committee is lower than the level which is calculated according to the guidance. The Provincial People's Committee must compensate from local funds to ensure the suppliers can offset the cost and maintain the service. In regard to clean water in urban areas and industrial zones, the total cost includes direct material cost.

The Department of Price Management within the Ministry of Finance coordinates with related agencies to design water price frame for consumption and submit to Minister for approval. Suppliers, after basing on the frame which is issued by Ministry of Finance and the guidance of price calculation, build the plans and submit to the Department of Finance for agreement.

To define water price, it must go through the formal process. Firstly, Ministry of Finance will regulate the frame of water price which is applied for domestic goal in the whole country. Provincial People's Committee adopts the own water price plans and promulgate them specifically according to particular territories. Later on, water suppliers decide water price themselves in order not to unfit with the decisions.

## **4.2 Evaluation of Water governance in Gia Lam district**

To examine water governance in Gia Lam district, I will follow 3 criterion, they are transparent, communicative and accountable. The goal is to examine and compare this issue in the fact and its requirement, thereby to show shortcomings of water governance in the field clearly.

The principle of transparency means that related- water policy decisions, documents and mechanism must be transparent and understandable to avoid confusion in the implementation stage. It requires transparency in the mandate mechanism and cooperation at each level.

However, as analyzed above, at the present, the mechanism of mandate and cooperation regarding domestic water governance are not clear, especially at the district level. While mandating specifically and clearly to the department level, Ministry of Agriculture and Rural Development to Department of Agriculture and Rural Development, Ministry of Construction to Department of Construction in each province, the regulations for district level is not specified and the responsibilities of board not clear. In other words, there is no transparency in the mandate mechanism at the district level in general, and Gia Lam district is one example. However this problem still occurs to the mechanism of cooperation. The work of inspections and monitoring of the quality of water is just on the framework of Preventive Health Care. The regulations on the field of Preventive Health Care have not yet specified. The roles of testing domestic water in water supplies are not yet clarified, causing difficulties and confusion when deploying and the shortage of specific guidance to the lower level causes difficulties in implementation. In general, no transparency in the mechanism of mandate and cooperation to the district level hinders the roles of water governance at the district. Instead, they just manage administratively rather than embark on the whole process of water governance.

Besides, the unclear documents are popular, especially in the very important decree. Decree 117/2007/ NĐ – CP regulated about producing, supplying and consuming clean water only mentions the object of completed water supply system. That means that small water supplies and uncompleted ones who were serving for 80% of rural populations were out of control. Consequently, rural water supply stations in 4 communes in Gia Lam district are out of scope of this decree.

There are no other official related documents, causing difficulties and confusion in managing this issue at the district.

Discussing this issue with local government and the staff who take charge of managing piped water, they said that they feel confused because of mechanisms and no official documents assigned to this task. They said that their task is managing administratively the actions which are taking place in their own domain. Water suppliers just submit the reports about the situation of supplying piped water for the communes, for example how many communes are connected with piped system, the volume of consumed piped water and the process of dealing with other communes without piped. Their reports do not come regularly and voluntarily, just appear when requested. Normally, it occurs at the end of the year, when local government staffs have to submit yearly reports to the relevant superior agencies, Department of Agriculture and Rural Development.

Communicative water governance implies that water institutions must communicate among water stakeholders horizontally at the same level and vertically between levels. However, water governance in Gia Lam district shows that the communication with higher level is weak. It is also explained as consequence of ill transparency in mandate mechanisms. Communication between local government and water consumers as well as water suppliers is intangible. As a result, the effect of district government to suppliers is fuzzy to reconcile the conflicts between users and suppliers in order to improve the water quality. Communicating with agencies of health to monitor water quality is none. One staff in Gia Lam district shared “We do not see any documents related about monitoring water quality. It does not occur frequently, maybe it comes randomly from the Department of Agriculture and Rural Development, we do not know in advance”.

Accountability requires each water- related institution to explain and take responsibility for its actions. Penalties for violating the rules and arbitration-enforcing mechanisms must exist to ensure that satisfactory solutions to water issues can be reached. However, regarding water governance, accountability in Gia Lam district government is not clear. That is consequence of unspecified mandate mechanism, no specific responsibilities means no accountability.



Actually, in the paper, the content of mandate mechanism is said that district level cooperate with the specialized agencies in Provincial People's Committee to implement water management in the domain. However, who is responsible for it and which framework is it and so on is unclear. Therefore, regarding domestic water management, district government just manages suppliers administratively and summarizes and report to the relevant upper levels. The responsibility of accountability is blurred because of no base to check back. Especially, the mandate mechanism to water supplier companies is loose. In Gia Lam district, Hanoi Water No 2 One Member Company Limited who is playing the main role in supplying water for the local inhabitants is mandated by Department of Construction. However, the work of water quality inspection is put in charge by Department of Health. The shortage of coordination between these 2 departments through official guideline documents and no specific mandate mechanism to Gia Lam district resulted in low accountability for Gia Lam district government and water suppliers.

## **Chapter 5: Conclusion and Recommendations**

In the last chapter, I will conclude my findings and answer and analyze the research questions. That means I will depict the overall current picture of water accessibility, discuss the variables in effecting water accessibility and explore solutions to challenges. Finally I will give some recommendations to the government at different levels to improve the situation.

### **5.1 Conclusion**

Nowadays in Gia Lam district, locals extract water for domestic use through 2 main sources, from the drill wells and from the piped supply. According to the report from Gia Lam Economic Department, at the year 2014 around 52% people from 15 planned units (including towns and communes) were accessing piped water, and the remaining were still using 100% private drill wells for consumption daily.

Although accessing the piped supply is an expectation for most locals in the district, even those households with a piped supply choose not to use it and the level of piped water use is not high. Because of costly monthly water bills, most households prioritize piped water for the most important activities like drinking and cooking. It means they still maintain the drill wells to use in conjunction with piped water to keep the bills under control. In some special cases, they do not use piped water at all and instead they just pay the minimum fee as the contract requires.

The price of piped water is not only high but also progressive. However, the quality of water does not correspond with its price and its quality is not checked regularly. Through investigating 100 selected households, the research found the water quality was considered just good enough or acceptable, but because of how it looks they feel it is not safe for health and some of them need to filter it again before using, creating extra costs besides the bills. However, since the water is treated by a State company, they think it is still much better than the previous source, drill wells.

Although district government is the most suitable to deploy rural water supply, the roles in Gia Lam district are blurred because of unclear mandate mechanisms and a shortage of documented guidance. Mandate from ministry to provincial level is clear but at the lower level, like district government, there are no specific regulations to show rights, responsibilities and the scope of management.

According to normal division of mandate mechanisms, the Ministry and Department of Agriculture and Rural Development take charge of supplying piped water for rural areas while the Ministry and Department of Construction are in charge of this issue in urban areas and industrial zones. However in Gia Lam district, as a peri-urban district, the locals are served by two systems, from Hanoi Water Limited Company 2 managed by MOC and from rural water supply stations managed by MARD. Hanoi Water Limited Company 2 is playing a more important role in serving piped water for residents than the rural water supply. In terms of administration, Gia Lam district belongs to the rural area of Hanoi and is therefore under the direct administrative management of Department of Agriculture and Rural Development. It can be supposed that the work tasks of water management in the district are waiting, reminding suppliers to submit the reports and summarizing to submit to Department of Agriculture and Rural Development.

Unclear mandate mechanisms and a lack of coordination between related agencies cause difficulties. The Ministry of Health has to coordinate with other specialized agencies and suppliers to examine and qualify the water quality but there are no specific regulations in place to ensure proper implementation.

The study has displayed the factors which affect piped water accessibility in Gia Lam district. Communes without piped supply have geographical difficulties in reaching the piped system and therefore they need to wait for the plan from local government. Interviewing 100 households in Dang Xa which is a commune with a piped supply showed elements which determine water accessibility are education, the size of the household and income. Therefore, to deal with the issue of water accessibility in Gia Lam district, it is necessary to consider those elements fully and carefully.

To improve water usage for the locals in Gia Lam district, it is vital to improve water governance and make alterations according to the factors which affect

water usage. Water governance can work better with improvements in transparency, communication and accountability.

First, it is vital to clarify the mandate mechanisms for the district government. This is a prerequisite to ensure further activities can work well. In order to do that, it is urgent to define clearly the roles and responsibilities of related agencies regarding to domestic water management, from central government to the local level, especially to the district level. Specifically, issuing official documents is done by regulating the roles and responsibilities of the Ministry of Agriculture and Ministry of Construction and relevant lower level agencies. At district level, it is vital to promulgate guidance in documents for specific specialized boards to implement, as well as their related responsibilities.

Second, increased communication is needed between local district government and higher relevant agencies, and between local district government and water consumers as representatives for consumers. At present, the relation between water users and supplier seems one sided. The users only have option either accept the service or not regardless of whether the service is good or not. Therefore, the district government is needed to be as representative to reconcile conflicts. Another solution is to create a good relationship with water suppliers and other funding organizations to utilize their support for technology and funding, especially in remote communes.

Piped water price is acknowledged as high by consumers. However, they have to pay extra costs for filtering the water again to ensure it is safe to drink. Their income is not sufficient for expensive piped water bills. Subsidizing is not considered a good solution. The main reason is that Vietnam follows a market economy and all goods and services are charged for optimum sustainability and efficiency. A more feasible solution would be to negotiate with suppliers to increase the quality for consumers to save extra filtering costs. Not only would this enhance purchase capacity of consumers but also increase their belief in the quality of piped water so they will access more.

Third, enhancing the accountability of stakeholders regarding water management would clarify the responsibilities of local government, suppliers and consumers. Also strict sanctions should be in place in case of mistreatment.

Fourth, it is highly encouraged to apply the small and self-sufficient model of rural water supply in the remote communes which are waiting for the plan from district government.

Fifth, increasing the capacity of staffs who deal with water management will facilitate effective implementation. Specifically, a focus is needed on the main dimensions like the process of technical management, monitoring water quality and evaluation, operation and maintenance.

Sixth, encouraging various economic sectors, community and private sector to invest in the water supply by prioritized policy in terms of tax should be considered. This can reduce the burden on State funds and stimulate the development of regional economy.

Seventh, local staff must be educated in the relevant fields in order to adequately undertake their duties, since most of them are not professionals. The education of locals about clean water and sanitation must be prioritized. It is necessary for local government to check the schedule for communes without piped supply and consult the community to build the model like the rural water supply. It is small and convenient and serve the community itself by utilizing external funds combined with collecting internal funds from the locals. The 100 questionnaires showed the biggest concern of households was the cost of water if they used onto the piped system. Income was found to be one of the most important elements, and income and the piped bills do not correspond. Demography of households should also be considered when finding the right serving plan. Vietnam follows the market economy, and water is now considered an economic good which cannot be subsidized forever. However, the solutions mentioned should be considered to help users save costs and enhance the belief of consumers. Water suppliers need to improve the water quality and increase the monitoring of water quality.

Finally, increase the awareness of the community about the importance of clean water and sanitation to health through public communication. Education was found to directly affect decisions about clean water usage. Therefore, higher awareness could result in better informed decisions regarding clean water usage.

## 5. 2 Recommendations

I would like to recommend some ways to facilitate the solutions proposed above to improve the situation of water usage in Gia Lam district.

### 5.2.1 With respect to the ministry levels

Besides clarifying the mandate mechanism from ministry to relevant departments, it is necessary to coordinate mechanisms between 2 directly related ministries regarding domestic water supply. MARD is in charge of supplying water in rural areas and MOC is in charge of this issue in urban areas and industrial zones and communication between the two is needed to find solutions for the peri-urban, a mixture of urban and rural area.

Furthermore, the mandate mechanism between specialized ministries and water suppliers who serve water directly to consumers needs to clarify the responsibilities of each side and increase the mechanism of monitoring.

### 5.2.2 With respect to the department levels

At the department levels, it is urgent to mandate specifically at district level which plays the key role in domestic water management at the local level. Because the number of boards in district level does not fit totally with those in department level, the Department of Agriculture and Rural Development and Department of Construction need to mandate this task to particular agencies at the district. Since Gia Lam is one peri-urban district, it contains a mix of features from the urban and rural, and the present there are 2 systems of water supplying. The first one comes from Hanoi Water No 2 One Member Company Limited which is managed by Department of Construction. The second one is rural water supply stations which are managed by Department of Agriculture and Rural Development. The specific guideline for this case is very important to avoid difficulties or confusion when implementing water governance in Gia Lam district.

### 5.2.3 With respect to the Gia Lam district

Increasing the coordination according to the horizontal and vertical levels regarding water management will facilitate better water governance in the district. Also it is highly recommended to check the situation of communes with piped system

and to review the plans of communes without piped system regularly to ensure the situation is always up to date. It is necessary to improve community awareness about the importance of clean water and sanitation to health and encourage them to protect groundwater.

#### **5.2.4 With respect to the water suppliers**

Through the opinions from primary data, most of them recommend water suppliers, specifically Hanoi Water No 2 One Member Company to improve the water quality. This is reasonable because as a supplier to consumers, they have an obligation to offer a good service.

If subsidizing piped water prices is unfeasible because of unsustainability, improving the quality of water may be more feasible. If it is achieved, it can not only reduce the burden of consumers but also improve the consumer's belief in the service.

### **5.3 Research limitations and directions for future research**

Although the study has discovered some of the real situation of clean water usage in peri-urban Vietnam and some related issues, it was only conducted in one peri-urban district of Hanoi. I hope I can show better and deeper discernment about the issue of clean water usage in a district I am familiar with.

There were some challenges for the research. Firstly, the secondary data managed by the district government are not updated and sometimes not available because of unspecialized official government in the district office. Secondly, questioning government officials about issues with evaluation of water governance is sensitive and therefore may be difficult to get accurate answers. Thirdly, exploring coordination mechanisms between the Hanoi Water No 2 One Member Company Limited and the Ministry of Construction was challenging as they work as companies and are not interested in non-profit work and tend to avoid revealing internal reports to outsiders.

I expect that in the future scholars working on similar issues in the same domain can uncover some issues I did not manage to achieve. Also future research may choose to collect data for the 7 communes without a piped water supply.

Processing the data by quantitative and qualitative methods is highly recommended to show the picture in more detail.





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## APPENDIX

### QUESTIONNAIRES

To conduct the research “**Water accessibility in Gia Lam district, Hanoi, Vietnam**”

#### Part 1: Information of households

Name:

Address:

Phone number:

The number of members:

The number of labors:

Sex:

Male:

Female:

Numbers of schooling years:

Occupation:

Farmer		Code
Worker		1
Civil servant		2
Free business		3
Unemployment		4
Retirement		5
Others		6

Income per month:

Expenditure per month:

Chronic diseases:

#### Part 2: Information of water access

The sources of water you are using:

Code Goal	Boreholes (1)	Drill wells (2)	Rainy water (3)	Piped water (4)	Others (5)
Drinking					
Cooking					
Showering					
Washing					

WC					
Watering					
Others					

Do you need to filter water before using?

Yes	
No	

If yes, please explain why: .....

3. The cost of filtering: ....

4. How do you feel about the water as these criteria below?

Smell	
Color	
Pressure	
Availability	

Grading from 1 to 4, 1 means very good, 2 means good enough, 3 means acceptable, 4 means bad

5. Do you think that existing water source affect to health?

Yes	Notes:
No	

6. The reasons you do feel reluctant to access piped water supply?

Piped water bill is much higher	
The present water is good	
I do not care	
I do not believe the quality of piped water	
Others	

8. How much is your water bills per month?

.....

9. Which price of piped water per m<sup>3</sup> which you are willing to pay?

.....

10. How much is the initial cost to use piped water?

.....

11. Do you have any recommendations about this issue?

.....

.....

Thank you very much!



## VITA

Ms. Thi Huyen Cham Nguyen graduated in National Economics University in Vietnam in the major of Development Economic in 2009. After that, she has been working for Vietnam National University of Agriculture, Faculty of Economic and Rural Development as a lecturer. She is teaching the subject of Micro Economics and doing some researches to serve for teaching. She managed one project herself and cooperate with her colleagues in some projects before taking the program of Master of Art International Development Studies in Chulalongkorn University.

Being a master student in Chulalongkorn University is her profound proud. She expects to apply the knowledge which she got from the course in her future research, especially in the field of rural development in Vietnam and in the region.

