

Category B: Information from Regular Monitoring

Introduction

Rationales of the Indicators

In several countries, systems of monitoring and controlling the quality of the environment exist so that the health of the public and the environment are not jeopardized. As the surrounding environment affects people, public access to information regarding the quality of the environment is vital to the everyday lives of people. This is because if any hazardous contaminations in the environment occur, people would be aware of it and be able to protect themselves at least at primary levels. As air and water are two essential elements to life, we have developed this set of indicators to assess the efforts of organizations responsible for monitoring air and drinking water quality and how well the public can access or is aware of this information.

General Situation

According to the Summary of Thailand's State of Pollution 2004 prepared by the Pollution Control Department, problems are more alarming than it ever has been before. Results from forty-nine air quality monitoring stations all over the country in 2004 (January-November) showed that the main problem the country faced was with particulates smaller than ten microns and then followed by ozone gases. Other pollutants such as sulfur oxide, nitrogen oxide, and carbon dioxide are still at acceptable levels.

Air quality in Bangkok faces increases in the amount of small particulates around roads due to a rise in numbers of vehicles. As for air quality in rural areas, small particulates are also the major problem especially in Napralan sub-district, Chalermprakiat district, Saraburi province. It was found that this location had the most severe problems with small particulates because the area houses rock quarry and cement industries. Chiang Mai also faces small particulate problems which is caused by a variety of sources such as a rising number of vehicle fleets, forest fires and the construction of buildings. Ozone gases occasionally exceed acceptable levels in certain location such as Ayutthaya Province, Pluakdaeng District in Rayong Province, Sriracha District in Chonburi Province and Muang District in Rachaburi Province.

As for urban drinking water, the findings from a survey on the sources of drinking water in Bangkok conducted by the Faculty of Public Health of Mahidol University in 1996 showed that 86.2% people consume tap water and 36.2% consume bottle water. 92.6% of those who consume tap water boil the water first before drinking (Tap Water, Publication of the Metropolitan Waterworks Authority Year 14, Issue 1, January-February 1998). Rural areas, on the other hand, face a shortage of clean water for consumption especially during the dry season. From a survey on the sources of drinking water conducted by the Bureau of Policy and Planning of Public Health (2001), it was found that the source of drinking water in households located in the municipality was 25% from taps, 2.6% from artesian wells, 3.6% from shallow wells, 27.5% from rain, and 31.9% from sealed bottles. As for households situated outside of the municipality, 12% consume water from taps, 3.7%

from artesian wells, 8% from shallow wells, 51.3% from rain, and 8.8% from sealed bottles. From an inspection done in 1997-2001 on the quality of drinking water of households from taps, artesian wells, shallow wells, and rain, it was deduced that most of the time, the quality did not meet drinking water standards of physical states, chemical compositions and bacteria levels recommended by both the World Health Organization in 1984 and the Department of Health in these percentages 65.5%, 56.1%, 58.9%. and 62.1% respectively (Food and Water Sanitation Division, 2004 A). Thus, people living in rural areas face a risk of contracting digestive and intestinal ailments such as diarrhea, twisting of the intestines, typhoid, various parasitic infestations, and exposure to various chemicals such as dental fluorosis (discoloration or mottling of the teeth) due to overdoses of fluoride or arsenic intoxications.

Nevertheless, the Department of Health together with other organizations involved with waterworks initiated the Drinkable Tap Water Project in 1996 and the project has been carried on until today. In Bangkok, the Metropolitan Waterworks Authority implemented this project in every domain which leads to the improvement of water quality to meet the standards of drinkable water. In the other provinces, the Department of Health, the provincial waterworks authorities and the District Administration Organizations also implemented the Drinkable Tap Water Project. However, specific project names were given to each location such as Drinkable Village Tap Water Project or Drinkable City Tap Water Project. In contrary to Bangkok, these projects did not cover all areas and thus by 2003⁹ there were only 586 villages out of the 50,459 villages which had acceptable waterwork systems during the Drinkable Village Tap Water campaign from 1996-2003. This is only 1.16% of the total number of villages which had certification to be a Drinkable Tap Water Village. Apart from that, it was found that existing waterwork systems in many locations had structural problems, maintenance and management problems, and lacked adequate water quality inspection and monitoring systems. These weaknesses are deemed to be the main source causing bacteria contaminations and unacceptable standards in tap water (Food and Water Sanitation Division, 2004 B).

Case Selection

For the evaluation on the access to information on the findings of air and drinking water quality, the researchers chose to assess the main organization responsible for monitoring air quality in industrial zones and the surrounding areas. Currently, the industrial sector is expanding very rapidly and there are a total of thirty industrial estates scattered over thirteen provinces in Thailand (<http://www.ieat.go.th/>). Factory workers and the community living around these zones are vulnerable to first hand risks from air pollution than those living in other areas.

This case study on the access to information on air quality focuses on the assessments of air quality around the industrial zones of Map Ta Phut, Rayong, and the surrounding areas. The researchers chose Map Ta Phut Industrial Estate because it is Thailand's main industrial zone and has a total of fifty-seven factories in which more than half are in the petrochemical industry and the rest are in the steel, chemical products and fertilizer industry. Apart from these factories, there is also an

⁹ Information about drinkable tap water was obtained through interviews with officers from the Food and Water Sanitation Division, 22 February 2005. The information on the number of villages in rural areas that have a waterworks system was obtained from Thailand's Rural Villages: Basic Information from the Village Level 2003. (Community Development Department, 2004)

oil refinery and an industrial waste management and disposal company named Genco. According to the Ministry of Industry¹⁰, these factories are classified under the group which emits high levels of pollutants. In addition to the Map Ta Phut Industrial Estate, there are two other industrial estates adjacent to it as well (Padaeng Industrial Estate and Eastern Industrial Estate).

From assessing three¹¹ different research analysis on the health impacts caused by air pollution on the people who live in communities around the Map Ta Phut Industrial Estate, the researchers found that all three had very similar findings. In all of the analysis, there were three similar symptoms of sicknesses that all the communities had which are respiratory disorders (coughs, dry throats, and sore throat), eye disorders (sores, pain, and irritations), and nervous system disorders (headaches and dizziness). These three symptoms were also consistent with statistics collected on out patient complaints from hospitals in Rayong. These symptoms have been increasing in number in Rayong more than any other province in the central region of Thailand since 1994 (Green Globe Foundation, 2003).

This assessment on the monitoring of the air quality focuses on the performance of the Industrial Estate Authority of Thailand and the Pollution Control Department. These two bodies have established air quality monitoring stations around industrial estates.¹²

As for the case study on the access to information on the findings of drinking water quality, this study selected to assess the monitoring of drinking water quality in rural areas.¹³ Specifically, the province of Buri Ram was chosen because it is a province where many villages still lack access to clean water for consumption. From data collected by the Bureau of Water Management of the Department of Water Resources on the number of villages that do not have a waterworks system in the 75 provinces all over the country, it was found that Buri Ram had the third highest number of villages (808 villages) which do not have waterworks systems after Surin

¹⁰ The types of factories which emit large amounts of unavoidable pollutants must have regulatory bodies and environmental degradation mitigation systems according to Section 4 in the Industrial Declaration: Classification of the Type and Size of Factories, Methodology of Controlling Pollutant Emissions and Any Other Substances Which Affect the Environment, Specifications of the Qualities Required for the Regulator and their Duties, and Requirements for Obtaining the License for Regulators and Caretakers of Environmental Degradation Systems, 2002.

¹¹ The three research issues are: 1) The Impact on Health of the Community Around the Map Ta Phut Industrial Estate, Rayong in 1997 by Anchalee Siripittayakhunkij, et al. 2) The Impact of the Health of the Community Around the Map Ta Phut Industrial from Air Pollution in 1999 by Viboon Suputthithada, et al. and 3) Precautions with Health Impacts of People in Communities Near Map Ta Phut Industrial Estate 2000 by Pitpusa Saichon, et. al (cited from Green World Foundation, 2003)

¹² Data gathered on the air quality from four monitoring centers of the Pollution Control Department and four more of the Industrial Estate Authority of Thailand in 2003 suggested that small particulates (PM10) and ozone gases were beyond acceptable standards at certain times. Other kinds of pollutants are still at acceptable levels (Source: Report on the Status and Problem Management of Air and Noise Pollution 2003, Pollution Control Department, 2003; Documents reporting the results of the air quality inspection, Industrial Estate Authority of Map Ta Phut, 2003)

¹³ Definition of "Rural Areas" in this assessment refers to the same definition as defined by the Ministry of Interior which is the areas which is beyond the municipality (Interviewed officer of the Community Development Department, 26 January 2005). In addition, a municipality or city area will have a population of at least 7,000 people and a population density of at least 1,500 people per square kilometer. Rural areas will possess a population of less than 7,000 people and a population density of less than 1,500 people per square kilometer. And the majority of the population's occupation would be in agriculture.

(936 villages) and Srisaket (1,209 villages). The researchers further chose Amphur Nangrong because the area faces problems with chronic droughts, a lack in water resources for consumption (cited from the news center of the Thai Red Cross Disaster Operations Center, 18 November 2004), and having numerous villages that do not have a waterworks system.

Since the analysis of just one location might not be comprehensive enough to reflect the general situation of the monitoring of the quality of drinking water in rural areas, the researchers therefore interviewed officers from central organizations which are the Bureau of Water Management of the Department of Water Resources which plays a role in waterworks for rural areas and the Food and Water Sanitation Division of the Department of Health which has a section which focuses on improving drinking water quality and researching on drinking water issues. Another interviewed was the Bureau of Environmental Health of the Department of Health, which is designated to develop mechanisms to transfer knowledge and technology on environmental health, which supports the strengthening of collaborations with stakeholders at all levels in managing the environment for communal health. Currently, the Healthy Public Places Group is working on the **Drinking Clean Water, One Nation's Effort Campaign** with people living in rural areas. The campaign promotes being cautious of the quality of drinking water in terms of having acceptable levels of bacteria, being safe, and being suitable for drinking. The campaign has a goal that in 2005, 30% of households/1 village/1 province will be cautious about the quality of drinking water in terms of having acceptable levels of bacteria (Bureau of Environmental Health, Department of Health, 2005).

Case Study: Air Quality in Map Ta Phut Industrial Estate and Surrounding Areas

Tables of Indicators

Indicators	
II.B.1 Mandate to disseminate information on air quality*	
Values	Explanation and Justification
(0) Not applicable/not assessed	Reviews of legislations did not found that there are specific requirement to share information on Air Quality to the general public, rather the people have rights to access broad information on the environment. This can be seen in the Section 6 (1) of Enhancement and Conservation of Natural Resources and Environmental Quality Act. B.E. 2535, stating that person shall have rights and duty in access information from the official with regard to <u>Enhancement and Conservation of Natural Resources and Environment.</u>
(i) There is no mandate that monitoring information about air quality be disseminated to the public	Furthermore, Section 58 of Constitution of the Kingdom of Thailand B.E. 2540 and Section 7 and 9 of Official Information Act B.E. 2540 have also determined public rights to access information of the government, which also include rights to access information on the environment.
(ii) <u>There is a mandate that monitoring information about air quality be disseminated to the public, with vague or broad exceptions or restrictions (please specify)</u>	Section 43 of the Royal Decree on Criteria and Procedures in Good Governance B.E. 2546 states that any governmental administration shall made available to public, except some issues which can be covered only in a necessary case.
(iii) There is a clear mandate (including periodicity and content of dissemination) that monitoring information about air quality be disseminated to the public, and mandate has clearly defined exceptions and restrictions	However, though there is no legislation to publicize Information on Air Quality, the Pollution Control Department has determined one of its strategies to survey and assess environmental situation in order to establish Pollution Forecast and Warning System. The department also allocates consecutive budget every year to disseminate Information on Air Quality from 51 Air Quality Monitoring Stations located throughout the country via several medias such as TV program, Radio, Newspapers, and Website of the Pollution Control Department (www.pcd.go.th), Air Quality and Noise Management Bureau (www.aqnis.pcd.go.th) and via monitors installed in 4 highly congested traffic areas of Bangkok. It also propose additional installation of such monitors in large cities e.g. Chiang Mai, Samut Prakan, etc.

II.B.2 Number and diversity of monitored parameters of air quality*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) Air quality is not monitored In the selected case</p> <p>(ii) Meteorological variables or suspension particles (PPMA) that affect air quality are monitored in the selected case</p> <p>(iii) Meteorological variables and suspension particles (PPMA) are monitored in the selected case</p> <p>(iv) <u>A comprehensive set of parameters - including meteorological variables, suspension particles (PPMA), and selected gases - is monitored in the selected case</u></p>	<p>Air Quality Monitoring Stations of Pollution Control Department located near the Map Ta Phut Industrial Estate and Surroundings Areas are 3 stations including 1) Map Ta Phut Health Office(29T) 2) Map Ta Phut New Land (30T) and 3) Rayong Field Crop Research Center (31T). Furthermore, it has constructed an additional Station in Rayong at Plauk Daeng District, with 40-50 Km. far from the Industrial Estate Authority of Thailand (IEAT) with monitoring parameters covering meteorological parameters and other pollution substances such as following gases: Carbon Monoxide (CO), Oxide of Nitrogen (NOx), Sulphur Dioxide (SO₂) Hydro Carbon (HC) and large particulates of 100 micron and below (TSP) and small particulates of 10 micron and below (PM10).</p> <p>Moreover, Industrial Estate Authority of Thailand has established 4 Air Quality Monitoring Stations in surrounding areas of the Estate: 1) Map Ta Phut New Land Communities 2) Ta Kaun Temple 3) Nong Faeb Temple, and 4) Mamchalut Temple. These stations monitor meteorological parameters and other toxin but type of parameters are less than that of Pollution Control Department</p> <p>Sources: -Interview with Director of Air Quality and Noise Management Bureau, 1 February 2005 -Interview with engineers in Map Ta Phut Industrial Estate and Surrounding Areas, 25 January 2005</p>

II.B.3 Information about air quality available on the Internet *	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No information on air quality could be obtained on government agency website or other websites</p> <p>(ii) <u>Information on air quality could be obtained after in-depth search or after multiple links on government agency website or other websites</u></p> <p>(iii) Information on air quality could be obtained immediately in search or on the home page of government agency website or other websites</p>	<p>Information on Air Quality from each station including those located in Map Ta Phut area is shown in the website of Air Quality and Noise Management Bureau (www.aqnis.pcd.go.th) in the website of Pollution Control Department (www.pcd.go.th) under "Other interesting Websites" under "Information and Services". The Information on Air Quality displayed is of daily and 5 days before, shown in graphs exhibiting trends of parameters and it can be searched for archives as well. However, if detailed information is needed for research and development proposes, interested person shall contact Planning and Evaluation Division, Air Quality and Noise Management Bureau.</p> <p>Information on Assessment of Air Quality in Map Ta Phut area prepared by Industrial Estate Authority of Thailand is not already published in the website, but it is under the future plan to do so.</p>
II.B.4 Free public access to air quality reports*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No reports are available for free public inspection at any of the selected institutions</p> <p>(ii) Reports are available and can be read free of charge at one of the five selected institutions (specify number of reports and name of institution)</p> <p>(iii) Reports are available and can be read free of charge at two or three of the five selected institutions (specify number of reports and number of institutions)</p> <p>(iv) <u>Reports are available and can be read free of charge at four or five of the selected institutions (specify number of reports and number of institutions)</u></p>	<p>General public can access to Information on Air Quality of Pollution Control Department without any cost, both by requesting directly at the department or search in the website of Pollution Control Department. The Department publishes information on Monitoring of Air Quality in classified by each station to people requesting such information in person, and publish annual Report on Situation and Management of Air and Noise Pollution. By request, this report can be received at the Pollution Control Department or download from the website of the Department.</p> <p>Pollution Control Department distributes its annual Report to governmental agencies, private organization, national library, libraries of universities and research institutes and library within the Department. Interested persons can borrow such report according to procedures specified by each library.</p> <p>With regard to information on Monitoring of Air Quality in Map Ta Phut Industrial Estate and Surroundings Areas by Monitoring Stations of Industrial Estate Authority of Thailand which</p>

	report on hourly basis, the interested persons is subjected to service fee, calculated by parameter/hour at 0.60 baht/hour. There is no collection and public report of this information.
II.B.5 Quality of information accessible to the public about air quality *	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) Information about air quality was not accessible to the public</p> <p>(ii) Incomplete or contradictory information about air quality was given to public, or information has not been integrated</p> <p>(iii) <u>Integrated information about all parameters for air quality monitored is accessible to the public</u></p>	<p>General public can access Information on Air Quality of every parameters used, both from Pollution Control Department and Industrial Estate Authority of Thailand</p>
II.B.6 Timeliness of air quality information*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No air quality data are available</p> <p>(ii) The most recent data on air quality are generally more than 1 year old (specify how old)</p> <p>(iii) The most recent data on air quality are generally 6 months to 1 year old (specify how old)</p> <p>(iv) <u>The most recent data on air quality are generally less than 6 months old (specify how old)</u></p>	<p>The collection and analysis system in Air Quality Monitoring in Map Ta Phut area of Pollution Control Department and Industrial Estate Authority of Thailand are computerized and automated system. Data is collected every minute into database, and then sent to the control center for an assessment. These systems are Real-time Monitoring.</p>

II.B.7 Regularity of air monitoring	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) Air quality data have not been gathered regularly over the last 3 years in the selected case</p> <p>(ii) Air quality data have been gathered annually or semi-annually for at least 3 years in the selected case</p> <p>(iii) <u>Air quality data have been gathered quarterly, monthly, or more often for at least 3 years in the selected case</u></p>	<p>Pollution Control Department has consecutively conducted an assessment of Air Quality in Map Ta Phut area (Real-time Monitoring) for more than 8 years. The Industrial Estate Authority of Thailand started an Assessment of Air Quality in Map Ta Phut area in 1998, but rather completed database is that of year 2003 onward.</p>
II.B.8 Existence of database of air quality monitoring data	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No operating database of air quality monitoring information is in place or in development</p> <p>(ii) A database of air quality monitoring information is planned or in development but not yet operational</p> <p>(iii) <u>An operating database of air quality monitoring information is in place</u></p>	<p>Both Pollution Control Department and Industrial Estate Authority of Thailand are presently preparing database on Information on Air Quality in Map Ta Phut area.</p>

Case Study: Drinking Water Quality in Nang Rong District, Buri Ram Province

Tables of Indicators

Indicators	
II.B.1 Mandate to disseminate information on drinking water quality*	
Values	Explanation and Justification
(0) Not applicable/not assessed	Reviews of legislations did not found that there are specific requirement to share information on Drinking Water Quality to the general public, rather the people have rights to access broad information on the environment. This can be seen in the Section 6 (1) of Enhancement and Conservation of Natural Resources and Environmental Quality Act. B.E. 2535
(i) <u>There is no mandate that information about drinking water quality be disseminated to the public</u>	Furthermore, general public can execute its rights under Section 58 of Constitution of the Kingdom of Thailand B.E. 2540 and Section 7 and 9 of Official Information Act B.E. 2540.
(ii) There is a mandate that information about drinking water quality be disseminated to the public, with vague or broad exceptions or restrictions (please specify)	However, the study did not find any agency continuously and regularly allocate budget in publicize information on Drinking Water Quality; therefore, (i) is selected.
(iii) There is a clear mandate (including periodicity and content of dissemination) that information about drinking water quality be disseminated to the public, with clearly defined exceptions or restrictions	
II.B.2 Number and diversity of monitored parameters of drinking water quality*	
Values	Explanation and Justification
(0) Not applicable/not assessed	Interview with Nang Rong Health Officer found that in the past 5 years, there was no monitoring of Drinking Water Quality of Nang Rong's population since Provincial Health Office did not have plan or project on this issue.
(i) <u>Water quality is not monitored in the selected case</u>	
(ii) Physical and bacterial parameters or selected chemicals are monitored in the selected case	The government reform in 2002 restructured organizations, responsibilities, and personals of both central and provincial administrations. This created uncertainty that which agency shall be responsible for the missions in monitoring water quality in rural areas. Before the reform, the agency in charge of monitoring water quality in rural areas (rain water, shallow wells, artisan wells, and tap
(iii) Physical and bacterial parameters and selected chemicals are monitored in the selected case	

<p>(iv) A comprehensive set of parameters including physical, bacterial, chemical, viral, and other parameters are monitored in the selected case</p>	<p>water) were Environmental Quality Monitoring Group, Regional Health Promotion Center 1-12, Department of Health together with Provincial Health Office, Office of the Secretary, Department of Public Health jointly prepared annual plan for monitoring of drinking water in rural areas.</p> <p>As a result of the government reform in 2002, Regional Health Promotion Center under Department of Health Department of Public Health and Regional Environmental Office under Ministry of Sciences, Technology and Environment were merged to be "Regional Environmental Office" under the Department of Natural Resources and Environment. However, the duties of this new agency do not cover monitoring water for consumption. When personals were transferred to the new Ministry, the Department of Health therefore lack of staff that has knowledge in Environmental Health. Furthermore, executives and some of operational staff of the Health Center understand that such duty belongs to Regional Environmental Office; hence, they did not place emphasis on this issue. This, in turns, did not help promotion of operations of existing projects such as "Drinkable Village Tap Project" and also hindered new projects such as "Clean Drinking Water, One Nation's"</p> <p>Interview with relating agencies confirms that <u>at present, there is no any agency acting as a core agency monitoring drinking water quality in rural areas.</u> Existing Drinking Water Quality analysis is part of other projects such as Construction of Village's Waterworks Project (Water Management Bureau, Department of Water Resources, Drinkable Village Tap Project (Health Office, with collaboration of Provincial Health Office), Project on Study of Drinking Water Quality in Restaurants, Food stalls, and Household (Food and Water Sanitation Division in corporation with Health Center 1-12) and "Clean Drinking Water, One Nation's Effort Project (Health Environment, in corporation with Health Center 1-12 and Provincial Health Office), etc.</p>
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	<p>Sources:</p> <ul style="list-style-type: none"> -Interview with Officers in Regional Environmental Office 11, Nakorn Ratchasima, 26 January 2005. -Interview with Health Officer, Nang Rong District, 26 January 2005 -Interview with Head of Drinking Water Development, Food and Water Sanitation Division Department of Health, 2 February 2005. -Interview with Health Expert 7 wor, Public Sanitation Group, Environment Health Bureau, Department of Health, 27 July 2005
II.B.3 Information about drinking water quality available on the Internet*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No information on drinking water quality could be obtained on government agency website or other websites</u></p> <p>(ii) Information on drinking water quality could be obtained after in-depth search or multiple links on government agency website or other websites</p> <p>(iii) Information on drinking water quality could be obtained immediately in search or on the home page of government agency website or other websites</p>	<p>Due to assessment Results of indicators above, Drinking Water Quality Monitoring in Rural Areas has been suspended since the government reform on 1 October 2002. Existing analysis of Drinking Water Quality is only part of projects; hence, assessment areas differ by objectives and scope of each project. Water quality monitoring did not fully cover all geographical areas, and are not regularly conducted. For example, Construction of Village's Waterworks Project will monitor unboiled water quality from its origin as one of the construction processes, while Project on Study of Drinking Water Quality in Restaurants, Food stalls, and Household randomly selects group for study and Nang Rong District was not included in this sample group.</p> <p>Consequently, information on Monitoring of Drinking Water Quality in Rural areas is not systematically collected by any particular agency. Nevertheless, information on analysis of water quality under other existing projects is also not published via the internet.</p> <p>Sources:</p> <ul style="list-style-type: none"> -Interview with Head of Drinking Water Quality Development, Food and Water Sanitation Division Department of Health, 2 February 2005

II.B.4 Free public access to reports on drinking water quality*	
Values	Explanation and Justification
<p>(0) <u>Not applicable/not assessed</u></p> <p>(i) No reports are available for free public inspection at any of the selected institutions</p> <p>(ii) Reports are available and can be read free of charge at one of the five selected institutions (specify number of reports and name of institution)</p> <p>(iii) Reports are available and can be read free of charge at two or three of the five selected institutions (specify number of reports and number of institutions)</p> <p>(iv) Reports are available and can be read free of charge at four or five of the selected institutions (specify number of reports and number of institutions)</p>	<p>There is no monitoring on Drinking Water Quality in Nang Rong District for the past 5 years.</p> <p>However, if there was available information, generally public can access such information without any cost by directly request to responsible authorities.</p> <p>Interview with Head of Drinking Water Quality Development Group, Food and Water Sanitation Division, Department of Health, Food and Water Sanitation Division found that it has prepared study reports such as Report on quantitative outcomes of Drinkable Village Tap Project (2003) and Report on Drinking Water Quality in Restaurants, Food stalls, and Household (2005), which provide information on selected drinking water in terms of physical, bacterial, and chemical analysis. Any interest person can request these two reports without any cost.</p>
II.B.5 Quality of information accessible to the public about drinking water quality *	
Values	Explanation and Justification
<p>(0) <u>Not applicable/not assessed</u></p> <p>(i) Information about drinking water quality was not accessible to the public</p> <p>(ii) Incomplete or contradictory information about drinking water quality was given to public, or information has not been integrated</p> <p>(iii) Integrated information about all monitored parameters of drinking water quality is accessible to the public</p>	<p>There is no monitoring on Drinking Water Quality in Nang Rong District for the past 5 years.</p>

II.B.6 Timeliness of drinking water quality information*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No data on drinking water quality are available</u></p> <p>(ii) The most recent data on drinking water quality are generally more than 1 year old (specify how old)</p> <p>(iii) The most recent data on drinking water quality are generally 6 months to 1 year old (specify how old)</p> <p>(iv) The most recent data on drinking water quality are generally less than 6 months old (specify how old)</p>	<p>There is no monitoring on Drinking Water Quality in Nang Rong District for the past 5 years.</p>
II.B.7 Regularity of drinking water monitoring	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>Data on drinking water quality have not been gathered regularly over the last 3 years in the selected case</u></p> <p>(ii) Data on drinking water quality have been gathered annually or semi-annually for at least 3 years in the selected case</p> <p>(iii) Data on drinking water quality have been gathered quarterly, monthly, or more often for at least 3 years in the selected case</p>	<p>There is no monitoring on Drinking Water Quality in Nang Rong District for the past 5 years.</p>

II.B.8 Existence of a database of drinking water quality monitoring data	
Values	Assessment Results
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No operating database of monitoring information on drinking water quality is in place or in development</u></p> <p>(ii) A database of monitoring information on drinking water quality is planned or in development but not yet operational</p> <p>(iii) An operating database of monitoring information on drinking water quality is in place</p>	<p>There is no monitoring on Drinking Water Quality in Nang Rong District for the past 5 years and no agency with direct responsibility on monitoring of drinking water and general water quality in rural areas.</p>

Analysis

The analysis from indicators found that responsible agencies for Assessment of Air Quality in Map Ta Phut Industrial Estate and Surrounding Areas are enthusiastic in monitoring, analysis and report such information to public. In addition, the monitoring process is regularly conducted with various parameters and up-to-date database. However, in term of information sharing for residents in such area, it was found that both Pollution Control Department and Industrial Estate Authority of Thailand did not arrange daily report of Air Quality to such local community.

Regarding to report of the assessment results, the Pollution Control Department is evidently advanced, seen from an attempt to reach several types of Medias such as Television, Radio, and Newspaper to publish Information on Air Quality. However, most of such information is Air Quality in Bangkok and its provincial areas. Information on Air Quality in Map Ta Phut area is published in the website of Pollution Control Department and in form of printed media. Such information access is, however, still limited to residents of urban area with proper educational background. With regard to information of Industrial Estate Authority of Thailand, there was no attempt to report such information to general public. This can be seen from no report on Air Quality situation or dissemination of such data via the internet. Furthermore, interested person is subjected to fees in order to acquire this information.

In term of monitoring Drinking Water Quality in Rural Areas, it was found that missions regarding monitoring Drinking Water Quality in household, whether from natural sources such as rain water, shallow wells, artisan wells, or from the waterworks system were discontinued after the government reform in 2002. Previously such duty is belonged Regional Health Promotion Center 1-12 and then transformed to Regional Environmental Office 1-16 which is entitled to monitor and take care of environmental quality, but not include the authority Drinking Water of people in provincial level. On the other hands, Provincial Natural Resource and

Environment is responsible for monitoring water resource at provincial, control and regulate artisan wells activity and waterworks activity. Its duty, however, does not cover monitoring water quality for household usage which comes from other sources such as rain water and shallow wells, etc.

Though Department of Health still own Environmental Health Office at the central administration, the transfer of missions and personals from 12 Regional Health Promotion Centers resulted that remaining health centers conduct only health promotion activities. Therefore, personals of this center lack of knowledge in Environmental Health and perceive that activities on Environmental Health belong to other agencies. Consequently, there is no regular plan to monitor water quality in each area. Furthermore, insufficient budget and human resources hinder the operation of existing environmental health projects such as Drinkable Village Tap Project, and Clean Drinking Water, One Nation's Effort Project.

Problems found in this case study resulted from unclear in authority among several organizations after the government reform. Hence, there is no core agency in monitoring of drinking water in rural areas. Currently, central administration is trying to transfer missions to local administrations, but lack of a core agency in monitoring water quality in rural areas limits the budget allocation and transfer of knowledge to local administration. Even though Bureau of Health Environment, Department of Health has initiated "Clean Drinking Water, One Nation's Effort" Project, with the objective to foster public participation in monitoring water quality regarding bacterial aspect, the operation of such project (which need coordination from stakeholders and alliances) depends on readiness and alertness of various parties. In addition, limited budget results that, initially, the Health Office planned only one village per province to join the program (compared with 14,580 villages without waterworks system).

Recommendations

▪ For Thailand

- 1) Pollution Control Department and Industrial Estate Authority of Thailand which have role in assessment of Air Quality in industrial estate and surrounding areas shall inform local residents to aware of information on Air Quality in their areas. For example, they shall install monitors, displaying daily Air Quality, both in industrial estate and surrounding communities. In addition, they shall publish the Air Quality daily information via local press. Importantly, information displayed shall be easy to understand. At the same time, both organizations shall create knowledge to local people with regard to air pollution such as what is the air pollution, how to protect themselves from the pollution, and how to read the results of assessment of Air Quality. These are crucial information for the public, especially on the day when pollution level is higher than the standard level. The correct knowledge and understandings will create conscious and awareness on this subject.
- 2) Industrial Estate Authority of Thailand shall open public access to information on Air Quality without any cost, and publish Report on Air Quality to the public via website and other channels, in the same manner as currently carried out by in Pollution Control Department.
- 3) With regard to Information on Drinking Water Quality assessment in the Rural Areas, the executives and committee in Public System Reform of Ministries,

Departments and Division shall determine a core agency (both in central and local administration) to have direct responsible in monitoring Drinking Water Quality in Rural Areas (with majority comes from natural resources such as rain water and shallow wells).

- 4) Projects related to monitoring of drinking water quality shall be encouraged to be a major policy of the Department of Health and Department of Public Health. For examples, the Project "Clean Drinking Water, One Nation's Effort" which focuses on supporting and promotion of public participations from local administration (Tambon Administration Organization/Provincial Administration Organization), volunteers of villages, and local people in monitoring of water quality by the use of simple bacteria checking sets and chloride checking sets. Such operation shall be regarded as the core mission of the Provincial Health Office and the scope shall be expanded to cover more geographical areas.
- 5) Even though there is no system in Monitoring of Drinking Water Quality in Rural areas, all agencies both from central and local administration who are undertaking projects which collect sample water for analysis shall disseminate such information to the public, specifically to local residents. Furthermore, they should provide advices on improvement of water quality before consumption to local people in order to reduce infection of gastro-intestinal system diseases. These agencies include Water Management Bureau, Department of Water Resources; Food and Water Sanitation Division, Department of Health; Bureau of Health Environment, Department of Health; Health Promotion Center 1-12, and Provincial Health Offices, etc.

▪ For Development of the Indicators

- 1) There shall be indicators to assess regularity of Air and Water Quality data dissemination.
- 2) With regard to qualitative indicators, they shall include dissemination of information showing trends in form of graphs, or charts. These may be regarded as the highest score of indicators.