HIA DEVELOPMENT IN THAI SOCIETY

"Empowering People Ensuring Health"

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The Asia and Pacific Regional Conference

on Health Impact Assessment

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By
Healthy Public Policy Foundation (HPPF)

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Preface

Evolution of democratic governance and its process, which is the foundation of the public policy, has permeated into every country in the world. However, its affects varied according to the time range of each country's political development and governing culture that allow the people's involvement in the public policy of their own country. Thus, the developing counties like Thailand may expose the atmosphere of participated governance in shorter time than those with long experiences and lessons learnt for political rights by majority in the western countries.

As well, majority of the Asia and Pacific countries may have drastically shifted from centralized control regime to recently decentralized authorities that allow more peoples' involvement in their own governance. Thus, the application of Health Impact Assessment (HIA), which has been recently developed in the western political context, has to concern the gap in the political evolution amongst variety of stakeholders in each country as well as in each issue. Particularly, most of developing countries or newly industrialized countries emphasize their structural development policy on basis of economic growth rather than human security or sustainable development.

To this perspective, misconceiving on the use and benefit of the HIA among the multitude of impacted peoples and related stakeholders for any development plan, program, or activities have to be taken into account. The contentions between the advantageous and disadvantageous parties would bring up confrontation without final resolution or may lead to violent solution. To persuade all the parties to joint learning circumstances, the HIA in the developing countries may need well-equipped strategy to empower the people so that they can realize

beneficial process of deliberative discourse rather than just to judge the solution of any conflicted issues.

This review and analysis of “HIA Development in Thai Society” can evidence the attempt to establish and institutionalize the HIA in Thailand in the last decade. HIA like policy evaluation has to take place at several level of policymaking process. The first part of the book provides the view of the globalization challenges contributed to the need of HIA in Thailand. It has provided the empirical development of the methodology and process of HIA in this country as well as analytical study of its institutionalization.

The second part of the book reviewed the role of HIA in creation of healthy public policy as cases study in various sector decision-makings. The third part, then, demonstrate some cases studies in empowerment of local authorities and communities.

Since HIA is an evolving discipline and there is as yet little shared understanding of what it is or how it should be done. The lesson learnt in Thailand may reflect the sense that evidence-based practices of HIA would support by practiced-based evidences of real fieldwork.

Dr.Wiput Phoolcharoen
President
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Contents

"Empowering People: Ensuring Health"

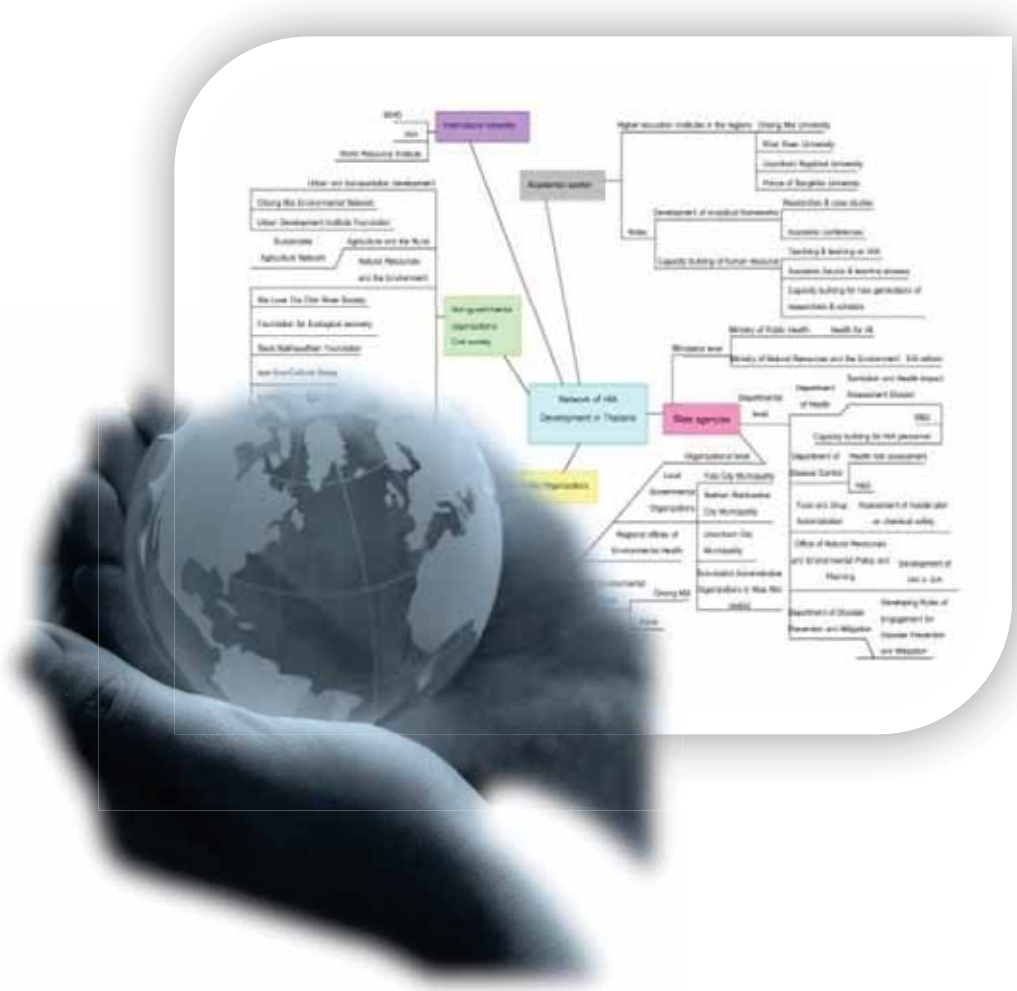
List of Acronyms and Abbreviations

APPC	Asia Pacific Potash Corporation
ASEAN	The Association of Southeast Asian Nations
BOP	Balance of Payment
CO2	Cabon dioxide
DALY	Disability Adjusted Life Year
DDC	Department of Disease Control
DoH	Department of Health
DSM	Demand Side Management
EGAT	The Electricity Generating Authority of Thailand
EIA	Environmental Impact Assessment
EPPO	Energy Planning and Policy Office
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GNH	Gross National Happiness
GPP	Gross Provincial Product
GWh	Giga Watt Hour
Hg	Mercury
HIA	Health Impact Assessment
HELI	Health and Environmental Linkage Initiatives
HPPF	Healthy Public Policy Foundation
HPP-HIA	Healthy Public Policy and Health Impact Assessment
HSRI	Health Systems Research Institute
HSRO	Health System Reform Office
IPPs	Independent Power Producers
IWMI	International Water Management Institute
ISAC	Sustainable Agriculture Community
KPI	King Prajadhipok's Institute
kW	Kilo Watt

List of Acronyms and Abbreviations

kWh	Kilo Watt Hour
MEA	Metropolitan Electricity Authority
MW	Mega Watt
NESAC	National Economic and Social Advisory Council
NESDP	National Economic and Social Development Plan
NHRC	National Human Rights Commission of Thailand
NOx	Nitrogen oxide
NMVOC	Non Methane Volatile Organic Compound
ONEP	Office of Natural Resources and Environmental Policy and Planning
PEA	Provincial Electricity Authority
PDP	Power Development Plan
PTP	Petroleum Authority of Thailand
PV	Photo Voltaic
SEA	Strategic Environmental Assessment
SO2	Sulfur dioxide
SPPs	Small Power Producers
TEI	Thailand Environment Institute
THB	Thai Baht
VOCs	Volatile Organic Compounds
TSP	Total Suspended Particulate
VSPPs	Very Small Power Producers
WHO	World Health Organization

Part I
HIA Institutional Development in Thailand



Health Impact Assessment and the Globalization Challenges[1]

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1. Introduction

Since the 1st International Conference for Health Promotion almost twenty years ago, the world health community has asserted the importance of inter-sectoral commitment and action to improve health determinants of populations in the efforts to ensure the ultimate goal of "Health for All", At the 5th Global Conference for Health Promotion in 2000, however, it was agreed that "high-sounding, general calls to improve social responsibility for health are not sufficient to stimulate action" (Banken, 2003).

In the 1990s, a global process of economic integration and expansion took off and rapidly accelerated around the world. Today, globalization is no longer simply an economic phenomenon. It also drives cultural trends, influences national politics, challenges traditional notions of state sovereignty, and reshapes societies (Ludicina, 2005). It is, therefore, not exaggerate to postulate that globalization affects the determinants of health of the entire world population in many, frequently complex ways. The main question in this section of the paper is how the world health community can deal with the, often dramatic, adverse effects and new opportunities in an ever more complex world that has become harder to govern.

This paper will focus on health impact assessment (HIA) as an important mechanism for the health sector to address the globalization challenges. HIA is closely related to the concept of healthy public policy, which facilitates and enhances societal capacities to influence policy directions towards protecting and

promoting the community health status. Clearly, globalization is an irreversible process, but its direction can be reoriented to give it a more human face. This paper reviews and analyzes actual practices of HIA around the world, in order to assess its potential and its limitations, and to design strategies where health promotion is pursued through the formulation of healthy public policy in the context of globalization.

2. Globalization and Health

In the media headlines, HIV/AIDS, SARS, and avian flu may raise high public concerns over the links between globalization and health. These health phenomena are, however, only the tip of the iceberg. The main health impacts of globalization are not related to the prospect of rapidly emerging microbes, but more to the significant changes of environmental and social health determinants around the world.

On the one hand, facilitating international trade has stimulated economic growth in many countries. For various parts of the developing world globalization has also reduced the sense of isolation. It has brought technological advancement, better infrastructure and educational progress within reach of large numbers of people around the world. Globalization tangibly contributes to raising concerns and awareness on environmental and human-right issues (Stiglitz, 2002).

On the other hand, as a result of the globalization process the determinants of health can deteriorate in several ways. First, it has

become more difficult for governments to safeguard people's socio-economic conditions, including unemployment, inflation, commodity price fluctuations, unsafe and unhealthy working conditions and so on. Regulatory frameworks are under pressure from the need for higher competitiveness and dwindling public sector resources to enforce them. Secondly, the pressure of global economic competition on natural resources can lead to environmental deterioration, natural disasters, exposure to toxic chemical, water and air pollution, vector-borne and other infectious diseases, accidents and injuries and the psycho-social disorders resulting from the dependency on a depleting resource base (Mc Murray and Smith, 2001).

Thirdly, changes in lifestyle and social structures resulting from the globalization process have been shown to lead to a rising incidence of non-communicable diseases, including heart disease, diabetes, cancers and mental disorder. Fourthly, the clash between the new global values and traditional values may cause social tensions in several communities. In several places around the world, these tensions have led to conflicts and violence (Barber, 2004). Lastly, the ability of the health sector to take care of their population also crucially depends on the macroeconomic policy framework in each country, especially with respect to global liberalization and national welfare policies.

Therefore, globalization brings many health opportunities as well as many health risks to the world population. Normally, these opportunities and risks are dynamically intertwined in socio-economic and political processes, making the formulation of healthy policy options a great challenge. The impacts on health of these opportunities and risks are also interrelated, often through complex mechanisms. This is reflected in the complexity of health

promotion and protection options. Importantly, these opportunities and risks are, as a rule, distributed unevenly within and between societies, leading to long-term social tensions and greater inequality.

3. Healthy Public Policy

In the period when the risk margins of our economies, the fragility of our ecosystems and the fragmentation of our societies are on the increase, the health and livelihood of billions of people are under threat. Therefore, the greatest need at present is for our societies to have the capacity to screen and analyze their development policies and projects, and, to select, develop, incorporate and nurture health safeguards to help protect and promote health.

The concept of healthy public policy, which is highly relevant in the context of health promotion, was introduced in the Ottawa charter for Health Promotion (WHO, 1986). Healthy public policy aims to create a supportive socio-environmental framework to enable people to lead a healthy life. Since our societies are complex and interrelated, healthy public policy must link economic, social, ecological and health issues into integrated development strategies and actions. At the same time, a healthy public policy should assign high priority to underprivileged and vulnerable groups within societies (WHO, 1988).

The core idea of healthy public policy is to put health on the agenda of policy-makers in all sectors and at all levels, so they are aware of the health consequences of their decisions, accept their responsibilities for health and strengthen their links with the health

sector on relevant issues. It is important to identify obstacles to the adoption of healthy public policies in non-health sectors, and design ways to remove them.

In addition to the government responsibilities, the Ottawa charter (WHO, 1986) also stresses that "health promotion is a process of enabling people to have control over, and to improve their health". This means the empowerment of communities - their ownership and control of their own endeavours and destinies - should be at the heart of any healthy public policy strategy.

Healthy public policy is, therefore, one of the key concepts for every society to protect and promote the health of its population, by integrating health dimension, in a more upstream fashion, into processes of policy formulation, adjustment and harmonization and into broader sustainable development goals, and, at the same time, by empowering people to have more control over their health, lives and destinies.

4. HIA and Health Promotion

A commitment to healthy public policy means that governments, at national and local levels, must measure the health impacts of their policies in a consultative way and communicate their findings to communities and societies. A systematic assessment of the health impact of a rapidly changing environment is equally essential and must be followed by action to ensure positive benefit to health of the public (WHO, 1988).

In line with this idea, Health Impact Assessment (HIA) was initially developed as a main tool to consider health consequences in all policymaking. HIA has been defined by WHO Regional Office for Europe. (1999) as "a combination of procedures, methods, and tools by which a policy, programme, or project may be judged as to its potential effects on health of population, and the distribution of those effects within the population".

The primary output of HIA is "a set of evidence-based recommendations geared to informing decision-making process" (National Institute for Health and Clinical Excellence, 2005). The fundamental goal of HIA goes beyond just providing information. Instead, "the aim of HIA is to achieve changes in policies and proposals so that they support better health and reduce health inequalities" (Taylor et al., 2003). In other words, HIA tries not only to predict the impacts of policies, programmes, and projects, but also to influence the political decision-making process on the basis of its findings and processes (Parry and Wright, 2003).

HIA, therefore, has its own specific role, compared to other tools in health promotion. HIA aims to provide a mechanism to achieve the engagement of other sectors in health promotion through the assessment of and recommendations for inter-sectoral actions. In pursuing this goal, HIA needs to address changes in health determinants "upstream" in the planning process, in order to find health opportunities and to avoid health risks in development. Furthermore, since HIA focuses on the distribution of health impacts, it also helps identify and protect disadvantage and vulnerable groups in the societies. Therefore, HIA can provide more cost-effective options and measures than typical curative health sector interventions. In other words, HIA can show how

healthier policy solutions are also more attractive investment options.

HIA, in this sense, fits in a larger frame of best practice for sustainable development planning, as presented by the World Commission on Dam (WCD, 2000) in the case of dams. HIA, therefore, should be recognized as the bridge for integrating health dimension into development and planning processes, and at the same time, as the window for the health sector to participate more pro-actively and meaningfully in wider public and private spheres of development.

5. HIA Development in the Recent Years

In the development of HIA in recent years two different approaches can be distinguished. The first approach is project-oriented and evolved from environmental impact assessment (EIA) (Kemm, 2003). This approach, was initially promoted by the WHO in the 1980s to address neglected health considerations in conventional EIA.

The second approach evolved from the concept of "healthy public policy". Although the idea of policy impact assessment on population health is not new, the emphasis on the relation between impact assessment and decision-making is (Kemm, 2003). In 2000, at the 5th Global Conference on Health Promotion, HIA was proposed to be "a device for forcing relevant bodies to take action in favour of healthy public policy" and "a potential catalyst for inter-sectoral action for health" (Banken, 2003).

This approach is based on the socio-environmental model of health, which considers wider determinants of health including individual, social, economic, and institutional factors. This approach has grown popular in industrialized countries, such as Canada, the UK, Sweden, and the Netherlands (Ahmad, 2004). Concurrently, some developing countries, like Thailand, have also played an active role in developing strategic HIA (Phoolcharoen et al., 2003). Recently, it has been applied to raise public awareness and address health inequalities, and has been called equity-focused health impact assessment (Mahoney et al., 2004).

6. HIA Methodological Development

Although there is no fixed, formally agreed model of applying HIA, there is a developing consensus about core elements or stages of the HIA process. In general, HIA process followed the same steps as those in EIA and Strategic Environmental Assessment (SEA). The HIA method applies a wide variety of tools; for example, literature reviews, epidemiological modeling of risk, mapping, key informant interviews and focus groups to elicit community views and perceptions. As it is such a new approach, it is difficult to determine the most appropriate combination of tools for a specific setting. In practice, the flexibility of applying tools depends very much on what is being studied and the possibility for inter-disciplinary co-operation. This is a strength of HIA. As stressed by Taylor and Quigley (2002), there continues to be a need for further methodological development, to make it both "universally accessible" and appropriate for "any users or groups" of HIA practitioners.

Although the main goal of HIA is to provide evidence-based recommendations, in reality, evidence can also be complex because of the interrelationship between different health determinants and the causal pathways. Moreover, it is difficult to isolate the influences of particular policy interventions on complex and dynamic social systems. Therefore, when predicting health impacts in complex situations, it needs to be understood as "the prediction of tendencies and types of impacts" rather than absolute measures (Taylor and Quigley, 2002).

7. Underpinning Principles of HIA

From the recent HIA practices in various countries, these following underpinning principles and values of HIA have been reflected and summarized by National Institute for Health and Clinical Excellence (2005) and European Policy Health Impact Assessment (2004) and turned to be guiding principles for new HIA studies;

- **Democracy:** HIA should assert and promote the right of people to participate in the formulation of policies that affect their lives through representatives and direct public involvement.
- **Equity:** HIA should aim to reduce inequality by assessing the differential distribution of health impact across the population.
- **Ethical Use of Evidence:** HIA should identify and use the best available quantitative and qualitative evidence from different disciplines and methodologies.

- **Practicability:** HIA should be designed to be appropriate for time and resource available and the recommendations should also be appropriate for the societal resources and contexts.
- **Collaboration:** HIA should promote the shared ownership with different stakeholders and inter-disciplinary viewpoints in its process and support the integration into public policy processes in different levels.
- **Comprehensiveness:** HIA should emphasize on the wider determinants of health or a broad range of factors from all sectors of society which can affect on health of population.
- **Sustainability:** HIA should assert and emphasize the sustainable development principles and goals as a core element of healthy society.

8. HIA and Policy-making

Although HIA has a clear aim to influence policy making, the early version of HIA assumed a linear process with a direct link between impact assessment and decision-making process. For example in Australia, Mahoney and Durham (2002) found that the links between policy development and the usefulness of HIA were not explicitly made in many HIA studies. In other words, in these studies, HIA has developed "without real consideration of the political and administrative frameworks within which it has to operate" (Mathers et al., 2004). Therefore, Kemm (2003) found that many HIAs failed to communicate to the decision-makers or to be policy-relevant, or arrive too late to influence decision-making.

Later versions of HIA tended to emphasize decision-making structures and political processes (Taylor et al., 2003). This requires the HIA process to fit with decision-making rules and procedures (Phoolcharoen et al., 2003 and Bekker et al. 2004). Some studies and guidelines also suggest that HIA studies are most likely to inform decision-making, if the decision-makers own the assessment and are closely involved in all stages of HIA (Kemm, 2003). However, this may be difficult to reconcile with the principles of openness and transparency. In numerous cases entrusting HIA to policy-makers could be dangerous, especially in developing countries as presented by Jobin (2003).

The review from UK experiences shows that several HIA studies can successfully influence policy-making such as in formulating mayoral strategies for London (Opinion Leader Research, 2003) or in urban development projects (Taylor et al., 2003). The key to success is apparent in terms of strong political commitment, participatory processes of different stakeholders and finding effective ways in fitting a non-statutory assessment into a statutory planning framework. The importance of an enabling institutional infrastructure has been emphasized in several HIA reviews such as Banken (2003) and Phoolcharoen et al.,(2003).

Since policy-making, in reality, is subject to a much fuller range of influences, it can be difficult to establish a cause-and-effect relationship between the HIA process and subsequent policy decisions. Therefore, the success of HIA should not necessarily be evaluated as a one-off event, but more as "a continual effect that brings change in organizational thinking about health and subsequent decision-making" (Mathers et al., 2004). This viewpoint asserts the importance of long-term involvement in the development of healthy public policy (Sukkumnoed, 2003).

9. HIA Institutionalization

As mentioned by Bartlett (quoted by Banken, 2003), "impact assessment does not influence through some magic inherent to its techniques or procedures. More than methodology and substantive focus, what determines the success of impact assessment is the appropriateness and effectiveness in particular circumstances of its implicit policy strategy". Therefore, the integration of HIA into existing procedures and roles for policy-making, which is usually known as institutionalization, is crucial to creating a firm basis for healthy public policy in the longer and broader term.

Institutionalization is, however, very complicated process with many uncertainties. While institutionalization in theory provides an opportunity for health aspects to become a routine part of policy-making, without appropriate design and quality control, HIA can become an inefficient process with merely a symbolic function in a bureaucratic environment, as seen in generic impact assessments in a number of countries (Banken, 2001).

Recently, HIA institutionalizations have taken place in different countries. Canada has developed HIA within the EIA legal framework supported by a comprehensive guideline for EHIA and close technical collaboration between the Ministry of Health and Ministry of Environment (Kwiatkowski and Ooi, 2003). In various parts of UK, political commitment to the health agenda provides a window of opportunity for public health agencies to institutionalize HIA together with the development of technical and practical aspects (National Institute for Health and Clinical Excellence, 2005). The Netherlands has developed an institutional

framework to fit HIA in the legislation process and annual budgeting (Netherlands School of Public Health, 2000). Thailand has developed HIA as a part of national health system reform with the strong support from social movements within the country. (Phoolcharoen et al., 2003).

Although the best institutionalization strategy for each country depends on its own political, administrative, and economic contexts, there are always some key aspects to be considered. To improve and maintain HIA effectiveness in a policy system, it is necessary to design and invest in quality control mechanisms, adequate provisions for external accountability and technical support systems for HIA implementation and its development (Banken, 2003).

10. HIA as a Social Learning Process

Based on the above principles, values and practices, it is clear that HIA has not been developed as yet another technical tool, but rather as a tool for "social learning". By positioning itself as such, HIA can bring different societal values, types of evidence, and potential societal resources into the public debate, which, in various cases, consequently turns into constructive processes and positive health outcomes (Sukkumnoed, 2003).

The opportunities for public involvement in the impact assessment of policy formulation is probably the main advantage of HIA as a health promotion tool. Through their participation people can learn about their attitudes and practices and change them, in relation to

various upstream health determinants. This process can also promote the sense of responsibility and self-esteem. At the same time, it can work as conflict resolution mechanism (Nuntavorakarn, 2003) and provide room for marginalized groups to raise societal concerns over health determinants, their health status and their destinies. The participatory process, which enables non-health actors to generate relevant public health knowledge, can also re-orient power relationships with and between professional decision-makers (Parry and Wright 2003 and Banken 2001).

So far, there has been no comprehensive evaluation of HIA in this manner. Perhaps it is too early for such a process. However, if the potential for social learning process can be achieved, HIA marks a great step forward for our societies to strengthen our own capacities to protect and promote the health of all members of society in a more risky and complicated world.

11. HIA and Globalization Challenges

While globalization has made great leaps, supported by powerful political and economic forces, for over a decade, HIA is just a small step in raising societal concerns and capacities to protect and promote our health. There is no reason for direct comparison between HIA attempts and globalization forces. However, the impacts on human health and risks of globalization will urge our societies and governments to pay more serious attention towards healthy lives and, therefore, healthy public policy.

HIA, therefore, provides a fertile ground for nurturing our social capacities in developing healthy public policy. Like other impact assessments, its effectiveness in supporting healthy public policy formulation does not depend on some kind of methodological magic, but more on its underpinning values and constructive process of involving health and affected, but previously unheard, stakeholders into public policy debate and decisions.

The future does hold great challenges. Good operational principles are far from adequate. It is important to turn principles into the actual practice, locally and nationally, which, inevitably, will have to face severe limitations in our knowledge and insufficiently uncontrolled political, economic and administrative structures. The appropriateness of its implicit policy strategies, including institutionalization and empowering social learning process, in each societal context will determine the ultimate success of HIA.

Concurrently, to re-orient the globalization process and open it for more health concerns, the other challenge is to move HIA a step forward, towards a meaningful participation in international and global policy. The number of international policies and trade issues, which cause negative health impacts in the developing world, such as dumping of unhealthy food from developed countries to the Pacific islands, the export of radioactive and other hazardous wastes to several developing countries, job losses due to trade diversions from free trade agreements, should be reconsidered through HIA process. This certainly will follow Adelaide recommendations on healthy public policy (the Second International Conference on Health Promotion 1988), which stressed, "the developed countries have an obligation to ensure that their own policies have a positive health impact on developing nations".

Although it is so obvious that HIA attempts alone cannot change powerful globalization track, the strategy is to link HIA with other sustainable goals, forums and movements, including the Millennium Development Goals. This collaborative approach may pave the way for HIA to become an active part of re-orienting globalization towards it having a more healthy human face.

The answers are not clear right now. But then, in a turbulent world, the roadmap for globalization is not clear either. What is clear is the innate and strong aspiration of humankind to pursue "living healthily together". Although, in the past, this aspiration has been blocked by various political and economic powers, it will not disappear. Hopefully, with all these attempts to make this aspiration visible and more powerful, the right answers will come out soon.

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HIA Institutionalization in Thailand :

The Struggle of Power and Rationality in Public Policy Processes [1]

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1. Introduction

In 2003, Reiner Banken raised the question on "HIA- How to start the process and make it last". He suggested that "institutionalization" is the key to make HIA effective in policy process. He also pointed out that "the evolving experience in Thailand should be followed closely, as it will provide important lessons for institutionalizing HIA in similar context".

Certainly, after 5 years of HIA implementation in Thailand, it is very relevant to raise the question of "how to make it last", again. Answering this question provides an opportunity to reflect and rethink the way HIA has been developed and implemented in Thailand. This central question will be mainly answered through the review and analysis of HIA development process experiences in the country. Apart from answering this question, this article also aims to raise further questions, which can lead to more critical thinking about HIA institutionalization and its effectiveness in pursuing healthy public policy in Thailand

2. The Hard Question: "How to make it last?"

Riener Banken published his study on "Strategies to Institutionalizing HIA" in 2001, when the concepts of HIA was well accepted especially in Europe and Canada and expanded to other parts of the world. He started his study by raising the question that "is HIA an idea whose the time has come?". Alex Scott-Samuel and Ruth Barns provided a positive view that[1]:

> "HIA's strength lies in providing a tool which enables informed policy decisions to be made based on a valid assessment of their potential health impacts, at the same time, adding health awareness to policy-making at every level. In the longer term it has the potential to make concern for improving public health the norm and a routine part of all policy development."

However, by asking the question "can HIA fulfill the expectations it raises?", John Kemm provide a critical and useful view that[2] ;

> *"This is certainty a time of opportunity for HIA. Policy-makers are interested in the health consequences of policy and seeking methods to predict those that are simple to use. The message that HIA can provide such a method has largely been accepted. This danger for HIA is that unless it makes good its promise and demonstrates its utility in the near future it will be discarded as yet another fashion that raised expectations but proved to lack substance."*

In his 2001 study, Riener Banken also provided the case study on the rise and fall of HIA in British Colombia. The rise and fall of HIA in this case seems to correspond to opening and closing windows of opportunity both in Cabinet and Ministerial level. In 1991, the HIA was introduced as a mechanism in analyzing governmental policy, program, and plan, as well as, integrated in

the EIA process. In 1993, HIA became the part of cabinet document system. HIA guidelines were distributed in 1994 and several workshops were organized during the period of 1994-1995. However, in 1996, the policy changes and later the organization restructuring had rapidly weakened the HIA development effort. In 1998, the complete review of HIA guidelines concluded that[3] ;

> *"There is no reliable evidence to date that the HIA processes in place in other jurisdictions are creating policy or program changes consistent with the determinants of health perspective".*

As a result of this 1998 report, HIA is no longer an active issue in British Colombia[4].

Certainly, with his questions and example and also John Kemm's critical reminding, it is also very relevant to raise this hard question to analyze and evaluate HIA development in Thailand, in order to avoid undesirable results as previously seen in British Colombia and other fantastic concepts.

3. Other International Experiences

To gain better understanding about how HIA has been integrated and institutionalized into policy process as wished, the other international experiences will be reviewed before answering the question in Thai context.

Although HIA has a clear aim in influencing policy making[5], the early version of HIA assumed a linear process with a direct link between impact assessment and decision-making process. For example in Australia[6], the links between policy development and the usefulness of HIA were not explicitly made in many HIA studies. In other words, in these studies, HIA has developed "without real consideration of the political and administrative frameworks within which it has to operate[7]. Therefore, many HIA studies failed to communicate to the decision-makers or to be policy-relevant, or arrive too late to influence decision-making[8].

Fortunately, the later versions of HIA have tended to emphasize more on decision-making structure and political process[9]. This requires HIA process to be fit with decision-making rules and procedures, including timeframe[10 11]. Some studies and guidelines also suggest that HIA studies are most likely to inform decision-making, if the decision-maker own the assessment and are closely involved in all stage of HIA. However, on the other hand, it is also difficult to reconcile the principle of openness and transparency[12]. Moreover, in various cases, entrusting HIA to policy-makers could also be dangerous, especially in developing countries[13].

The review from UK experiences shows that several HIA studies can successfully influence policy-making such as in formulating mayoral strategies for London[14] or in urban development projects[15]. The key to success can be seen in terms of strong political commitment, participatory processes of different stakeholders and finding effective ways in fitting a non-statutory assessment into statutory planning framework. The importance of enabling institutional infrastructure can be seen also in other HIA reviews[16], including in the developing countries[17 18].

As mentioned by Bartlett[19],

> *"impact assessment does not influence through some magic inherent in its techniques or procedures. More than methodology and substantive focus, what determines the success of impact assessment is the appropriateness and effectiveness in particular circumstances of its implicit policy strategy".*

Therefore, the integration of HIA into existing procedures and roles for policy-making, which is usually known as institutionalization, is certainly crucial for promoting healthy public policy in the longer and broader term[20].

However, institutionalization is very complicated and uncertain process. On the one hand, institutionalization seems to provide an opportunity for health aspects to be a routine part of policy-making. On the other hand, without appropriate design, HIA can become inefficient, or even just a symbolic function, in a bureaucratic environment, as seen in other impact assessment in various countries[21].

Recently, there have been several HIA institutionalizations being developed in different countries. Canada has developed HIA within the EIA legal framework supported by a comprehensive guideline for EHIA and close technical collaboration between the Ministry of Health and Ministry of Environment[22]. In various parts of the UK, political commitment on health agenda provides a window of opportunity for public health agencies to

institutionalize HIA together with the development of technical and practical aspects[23]. The Netherlands has developed an institutional framework to fit HIA in the legislation process and annual governmental budgeting[24].
Although the best institutionalization strategy for each country depends very much on its own political, administrative, and economic contexts where, there are still some certain aspects to be considered. Riener Banken also pointed out that, to improve and maintain HIA effectiveness in policy system, it is necessary to design and invest in quality control mechanism, adequate provision for external accountability and technical support system for HIA implementation and its development[25].

4. HIA Development in Thailand: *Origin and Evolution*

a) The Origin

HIA was firstly raised in Thailand under the concept of healthy public policy during the National Health System Reform in 2001-2002. The issues of health impacts and healthy public policy had become more important for Thai society, mainly because of the increasing trend of health risks from environmental hazards; such as air pollution, pesticide contaminations, improper waste treatments etc., as well as the evidence and concerns of health impacts from development projects; such as large dams, coal-fired power plants, trans-national gas pipelines, highways, etc.

After the issue was raised and echoed in the reform process, Health Systems Research Institute (HSRI) has set up the academic review process in 2001, which, consequently, reinforced the concept of healthy public policy, introduced 10 years earlier in the Ottawa Charter and HIA. The notions of healthy public policy and HIA

received good public response in combating the facing problems in Thai society and it was subsequently put into the framework for national health system reform[26].

Later, in 2001, the issue of healthy public policy became the first topic of discussion in the first National Health Assembly, showing its relevance and importance in Thai health reform's context. In the assembly discussion, two HIA studies on the industrial development project and agricultural policy were presented, showing clear negative health impacts from well-known governmental policy and project. As a result of the first assembly, the concepts of healthy public policy and HIA were included in the first draft of National Health Act, leading the way for HSRI to develop research program on healthy public policy and health impact assessment started in 2002 to support further development in healthy public policy and HIA in Thailand[27].

In the draft, healthy public policy refers to "the progressive guideline that intends to establish socio-physical environment facilitating to health and enabling people to approach the choices conducive to health"[28]. The draft stresses that the desirable health systems shall have "guidelines and measures to establish the healthy public policy and the process of HIA from the public policy, aimed at joint learning of all sectors in the society, through the sufficient academic utilization, with the transparent and accountable mechanism"[29]. The draft also asserts the right of Thai people to "participate in accessing the information, suggesting, performing, using the assessment outputs and making decision on the approval and permission of the policy implementation and crucial projects that may have an impact on health"[30].

After the long process of public hearing including special hearings for those who had been affected from development projects, a

special session on healthy public policy and health hazards was organized in the second National Health Assembly in 2002 to scrutinize and later endorsed the draft of National Health Act in August 2002.

b) The First Step

The first step of HIA development in Thailand was the review of the HIA experiences in some selected countries, from which HSRI identified two basic but crucial platforms of HIA development that are very crucial for Thailand to consider

- Firstly, HIA can be developed as an additional part of the EIA process, by focusing more on health as a holistic approach. This approach implies that HIA becomes an approval mechanism under the umbrella of the EIA process, which can be seen in Canada and New Zealand. The scope of HIA applications is mainly concentrated at project level.
- Secondly, HIA can be developed as an essential tool for influencing healthy public policy. This is experienced in the Netherlands and the United Kingdom, both of which aim to use HIA to tackle inequalities in health. HIA is this platform is recognized as a participatory learning process rather than an approval mechanism. It does not provide the finite answers, but, rather, provide recommendations to decision-makers, supported by strong evidence.

Initially, most of the researchers and local communities in Thailand tend to prefer the first platform, since it can provide the authority for accepting or rejecting a project proposal. However, this approach in Thai context contains some practical weaknesses.

Since the EIA is a legal mandate under the National Environmental Protection Act. To implement HIA with a broader scope of participation, changes are needed in the existing EIA process and that is complicated to achieve politically. Thus, a proposal to amend EIA law may encounter strong political opposition and trigger an offense against the movement of health system reform. At the same time, since HIA in Thai society is at an infant stage, it lacks adequate knowledge, experience, and human resources. It may also be highly exposed to political abuse, if it prematurely becomes a formal project approval mechanism.

Finally in August 2002, the National Health System Reform Committee decided to opt the second alternative of HIA development to cover broader ranges of the public policy process, both in terms of level and area. It will also support political acceptance of the whole concept of national health system reform, as well as allow the development of a critical mass of HIA knowledge.

c) The Expansions of Practices

From 2002, the HIA guidelines and capacity strengthening activities were carried out by both academicians and active citizens. Under the HSRI research program, over 50 HIA case studies were conducted in several policy issues, both at the national and local levels. Although all the cases aimed at desirable policy changes, only some of them can reach this expected policy outcomes, highlighting the importance of policy contexts in healthy public policy developments. To foster desirable policy changes, five policy networks were set up with the role in seeking opportunities and formulating strategies for healthier policy changes[31]. Later, the recent lessons from these policy networks,

was summed up and further developed as an operational framework for healthy public policy formulation in Thailand.

After the five years of introduction, the concept of healthy public policy and HIA was further elaborated and developed by several actors and in several sectors in Thai society. In civil sector, several HIA cases were conducted by the grassroots organizations and took a crucial part in their policy arguments. At the same time, the healthy public policy becomes part of their policy languages, especially in agricultural policy.

d) A Tool for the National Health Assembly

Although the formal legislative process of the National Health Act has taken in very long period than expected (up to now, it is still in the parliamentary process) due to detailed technical discussions and debates in governmental legislative process and the uncertainty of previous political commitments, instead of just waiting for the law to be promulgated, several suggestions and mechanisms made during the drafting process have been continuously developed both within governmental and civil sectors. This includes the continuation of annual National Health Assembly and provincial health assemblies, which now become the main public forum for deliberating the important issues in national health system.

In the National Health Assembly, HIA has been applied to provide better evidence in policy deliberation. Obviously, the issues of pesticide risks and healthy agriculture have been discussed within the National Health Assembly annually. In 2005, the policy recommendations from the National Health Assembly on health-oriented agricultural policy were acknowledged by the Thai cabinet. Moreover, several local administrative organization and civil groups apply this concept to change their own policy direction towards safer food system and healthier agricultural

production, which confirms that the healthy public policy is not only about governmental authorities, but also about the social responsibility[32].

e) HIA as a Governmental Infrastructure

The health system reform process since 2000 has allowed the members of diverse social sector to share their aspiration for the country health system. Then it has ignited public concern and instilled a visionary health system in the society. In the meantime, the public sector reform had demanded for renewal of the mission and infrastructure of the Ministry of Public Health. The core sense of novel roles and functions of deliberative health systems was thus integrated as core components of the Ministry in the process of MOPH restructuring in 2002. As a result, HIA was addressed as a principal role of the Department of Health (DOH) while the health hazardous control was imposed as a crucial role of the Department of Disease Control. The main role of DOH in HIA development is to support regional and provincial health offices for HIA works.

f) HIA in the EIA Reform

Although the HIA development has not used an EIA platform, the concepts of holistic health and participatory learning process in HIA development has some spillover effects to the formal EIA process. In 2002, the Ministry of Natural Resource and Environment called for the national EIA reform, conducted by the leading environmental academicians and stakeholders. In this reform, several HIA concepts and procedures, including the concepts of public scoping, public review, and broader determinants of health, had been discussed and incorporated into the final proposal for EIA reform. Unfortunately, the reform has been postponed due to the political changes at the Ministerial level

in 2004, resulting in the EIA process being stuck in the controversial and problematic situation.

g) HIA in the National Economic and Social Advisory Council

In parallel to the legislative process of the National Health Act, the National Health Assembly in 2002 also submitted its recommendation on the application of HIA the National Economic and Social Advisory Council (NESAC), Later, in 2005, after a period of study, the NESAC also recommended Thai government to implement and support the development of healthy public policy and HIA in the country. This recommendation was also acknowledged by the Cabinet later in the same year. The cabinet also asked the MOPH to systematically report the progress of HIA development to the cabinet and the NESAC. More importantly, to encourage the HIA applications, the NESAC also set up the committee for HIA development and use HIA as a process for formulating its policy recommendations to Thai government.

Apart from above-mentioned progress, HIA has also been developed in the higher education in Thailand. In 2005, four universities in Thailand offered the courses on healthy public policy and health impact assessment. Small grants were also offered to some graduated students for conducting HIA in their master thesis. HSRI, also plans to develop the appropriate teaching modules for high school education, aiming to equip local communities with the concepts and tools for healthy public policy in the long run.

5. A Co-evolutionary Approach

Although HIA in Thailand originated from the legislation process (i.e. drafting of National Health Act), it has, in fact, taken informal steps in its development. Instead of waiting for the enforcement of the National Health Act (or the amendment of formal EIA process), Thai research communities and civic groups took initial step to further develop the concepts and practice of HIA in Thai society. As a result, it has been gradually received the acceptance from the NHSRC in 2002, the DOH in 2002, the MONRE during 2002-2004, the NESAC in 2005, and from Thai cabinet in 2005. Even today, the legal status of HIA is still at the level of acknowledgement both by Thai cabinet and parliament (through the legislative process), not as a legal requirement.

It should be noted that HIA in Thailand has not been developed through one specific program. Although HSRI has established a research program for HIA development, its role is more likely to be a facilitator (or technical supporter) rather than a main responsible organization. Others can apply HIA in their own cases, without asking for permission or supervision from HSRI. As already seen, several groups have applied HIA in different ways, depending on their purposes and contexts.

This can be viewed as a co-evolutionary approach in HIA development rather than top-down well-designed program. The word "co-evolution" stresses the characteristics on

a) The variety of its development practices,

b) The dynamics of these practices,

c) The interconnections between different practices, and

d) The regulatory mechanisms within and among these different practices.

In other words, HIA development in Thailand allows different approaches for different groups to take their own paths, but their paths are certainly influenced by interrelationships and reflections from other approaches.

5.1 Its Necessities and Advantages

The co-evolutionary approach has emerged partly by design and partly by its necessities. Certainly, within the National Health Act, HIA has been designed as a social learning process. Therefore, it is less likely to be controlled by any organization. Moreover, due to the scale of problems relating to health impact, relying on one main organization cannot cope with the huge demand for applying HIA to solve their facing decisions and problems. This is why, at first the first place, HIA design was freely developed, depending on the societal needs and capacities.

However, some conditions also force HIA in Thailand to be developed in co-evolution way. Clearly, from the delays of EIA reform and the National Health Act, it is hard to expect the full political support for HIA development in the recent Thai politics. Waiting for the full political supports can result in the waste of time. Instead, a co-evolutionary approach may work as a way to gain more political supports from its policy contributions. Another key conditions is the limitations of resources, (including expertise, financial, and information resources). Although HIA gains more acceptance by Thai officials, the financial budget, including the budget from the HSRI, are gone in the opposite direction (this is

partly due to limited political support). A co-evolutionary approach provides a good basis and opportunities in sharing resources and expertise within Thai society.

Through its co-evolution, it is very good opportunity to see the learning diversification in HIA development. Importantly, this diversification largely depends on the differences in actual demands of using HIA to solve their specific problems. Therefore, it leads to the higher degree of ownership and self-awareness of different actors within the HIA development process. As a result, it can create broad societal capacity strengthening than programmatic top-down approach, as seen in case of EIA in Thailand.

5.2 Its Drawback

However, the co-evolution approach also brings some drawbacks too. Basically, free HIA applications mean it is difficult to control and compare the quality of HIA studies. Especially, when different applications originated from different perspectives or paradigms of health and democratic decision-making.

In formal decision-making process, this drawback is certainly affected the creditability of HIA. In principle, this drawback can be eliminated through the external accountability mechanisms, mainly within each decision-making process. But, in practice, the external accountability mechanisms are not always ensured or well conducted. As a result, several HIA studies, conducted by local communities, have been criticized by the government authorities, due to its less scientific manners, as seen in Fang Tangerine Plantation case study[33].

5.3 Its Outcome

The main outcome of the co-evolution in HIA development is obviously the different approaches in HIA development as today seen in Thailand. More importantly, this different approach is observably based on different purposes of applying and developing HIA. Recently, there are five main purposes of developing HIA in Thailand, as explained below;

a) **Formal Approval Process**: It is still an attempt to develop HIA as legal requirement process as seen in EIA reform and the NESAC suggestion. Under this direction, HIA is required to be more unified within specific legal requirement and instructions.

b) **Health Protection Mechanism**: Since Thailand is facing with several serious ongoing health impacts, HIA is sometimes be used in retrospective or concurrent aspects rather than prospective as previously expected. MOPH also pays interest in applying HIA to strengthen the existing public health act, especially in connection with the roles of local administrative organizations.

c) **Conflict Resolution Tool**; As a learning process tool, HIA is expected to be used as a part of conflict resolution in some controversial decision-making process. The good example can be seen in the case of controversial biomass power plants.

d) **Healthy Public Policy Development**; According to the draft of National Health Act, HSRI and National Health Assembly develop HIA based on this direction, which, in principle, is not a part of legal requirement. In this approach, HIA has been treated as one component within broader healthy public policy process. Therefore, HIA must be connected with other key components, such as

deliberative policy analysis, policy networking, or policy communication.

e) **Public Awareness Raising**; In several cases, HIA has been used by the local communities, which do not have any authorized power, in order to raise public awareness over specific issues, for example, uncontrolled pesticide use or local waste management. In this purpose, the external check is normally lacking (at least in the technical way), but, in some cases, it is an influential or convincing exercises in terms of public health campaign.

6. The Harder Question: *"What to make it last for?"*

Based on these different purposes of applying and developing HIA, the potential of HIA in making concern for improving health into the norm and a routine part of all policy development, as stressed by Scott-Samuel and Barn, is somehow complicated, but certainly not limited.

Under this condition, our key question of "how to make it last" cannot be answered directly in itself. The deeper issue is more related to the different objectives and potentials in using and developing HIA in Thai society. To answer the question of how to make it last, it is possibly essential to think about "what to make it last for". This question is raised not in the general way of explaining the benefits of HIA in view of health promotion as usually done, but rather in the specific way of how HIA should be used or integrated into the decision-making or policy-making process.

In an attempt to provide answer to this question, the idea of different democratic models will be applied to analyze the different views on democratic decisions that potentially lead to different uses of HIA in Thai society. Moreover, it is also important to refer the concept of W.R. Scott that, normally people always focus on the regulative pillar of institution, while, in fact, this regulative pillar is implicitly relied on normative pillar and cognitive pillar. Therefore, to understand different institutional regulations, it is essential to analyze different normative and cognitive pillars behind such regulation[34].

7. Different Democratic Decision Models

The different applications of HIA, as recently experienced in Thailand, can reflect different strategies in using HIA in decision-making process, as well as, the different perception of the (most desirable) decision-making process itself. Certainly, both of them are interconnected and influence each other. Therefore, it is very important to understand the differences in democratic decision-making model.

Robert E. Goodin[35] has categorized the democratic decision-making model in two main dimensions. The first dimension is "direct and indirect" participation within the decision-making process. The word "indirect" refers to the situation, when the people's preferences or other inputs are mediated through some other agencies, while, in the direct model, their preferences or inputs are directly respected in the decision-making process.

The second dimension is the "reflective or unreflective" decision-making process. In unreflective model, the preferences of people are counted by some certain rules, such as election, approval procedures etc., without asking further questions and thinking further consequences. But, in the reflective decision-making, people can reflect upon their own and others' preferences and deliberatively think about the consequences of different preferences or so-called different policy directions. In this reflective model, the ability of mutual understanding and possibility of achieving common agreements are well- recognized in the decision-making process[36].

Based on these two dimensions, the different democratic decision-making models can be seen, as shown in Table 1 and explained below[37];

- **Delegate Liberal Democracy** refers to a decision-making process which people cannot meaningfully and directly participate and the decision is basically made by certain authorities, rules and criteria. Certainly, the delegate liberal democracy is the today mainstream decision-making process in Thailand, as well as in other countries.
- **Populist Democracy** refers to the situation when "people's preferences are aggregated directly to form a social cohesion, with no intervening filters or substantive mediation along the way".
- **Pluralist Democracy** refers to a model that allows different people to participate directly in decision-making process and the preferences or inputs of the people are reflected through pluralist bargaining.

- **Directly Deliberative Democracy** is another model of direct and reflective decision making, which "involves face-to-face interaction among interlocutors who are expressing their preferences and perspectives directly to one another.
- **Trustee Democracy** is another indirect decision-making or representative democracy, but the representatives who conceive their roles to be one of "trustees" rather than delegates will reflect upon the different preferences and perhaps facilitate the reflection among the participants rather just making the decision.
- **Indirect Deliberative Democracy** emphasizes on interpersonal discussions and reflections upon the perspectives of one another, which will shape the decision-making indirectly through the mediating influence of one another's minds, or, in other words, through the achieving of better mutual understanding and sympathy.

Table 1: Democratic Decision-making Models

	Unreflective	*Reflective*
Direct	- Populist democracy	-Pluralist democracy -Directly deliberative democracy
Indirect	- Delegate liberal democracy	-Trustee democracy -Indirect deliberative democracy

Source: Adapted from R.E. Goodin, 2003.

Normally, these different democratic decision models require different kinds of process, input, participation, and rationality, leading to different applications in HIA within the decision-making process. For example, in the delegate liberal democracy model, the impact assessment, like EIA is more required as an evaluative assessment, rather than a social learning tools. In consequence, it is more relied on quantitative analysis for its evaluative purpose. In contrast, several HIAs applied to local planning have been used basically for social learning facilitation with more qualitative information from participatory and deliberative techniques. To sum up this viewpoint, UNEP/WHO introduced the four scenarios of the interrelationship between decision-making and impact assessment, as presented in the Figure 1.

However, all of these models and scenarios should be viewed as concepts for analytical purpose. In reality, the distinctions between these models and scenarios are less clear-cut. In one policy process, it can combine more than one decision-making model and scenarios. Within a delegate liberal democratic decision, it may

also comprise implicitly pluralist bargaining or, to some degree, of indirect deliberative democracy.

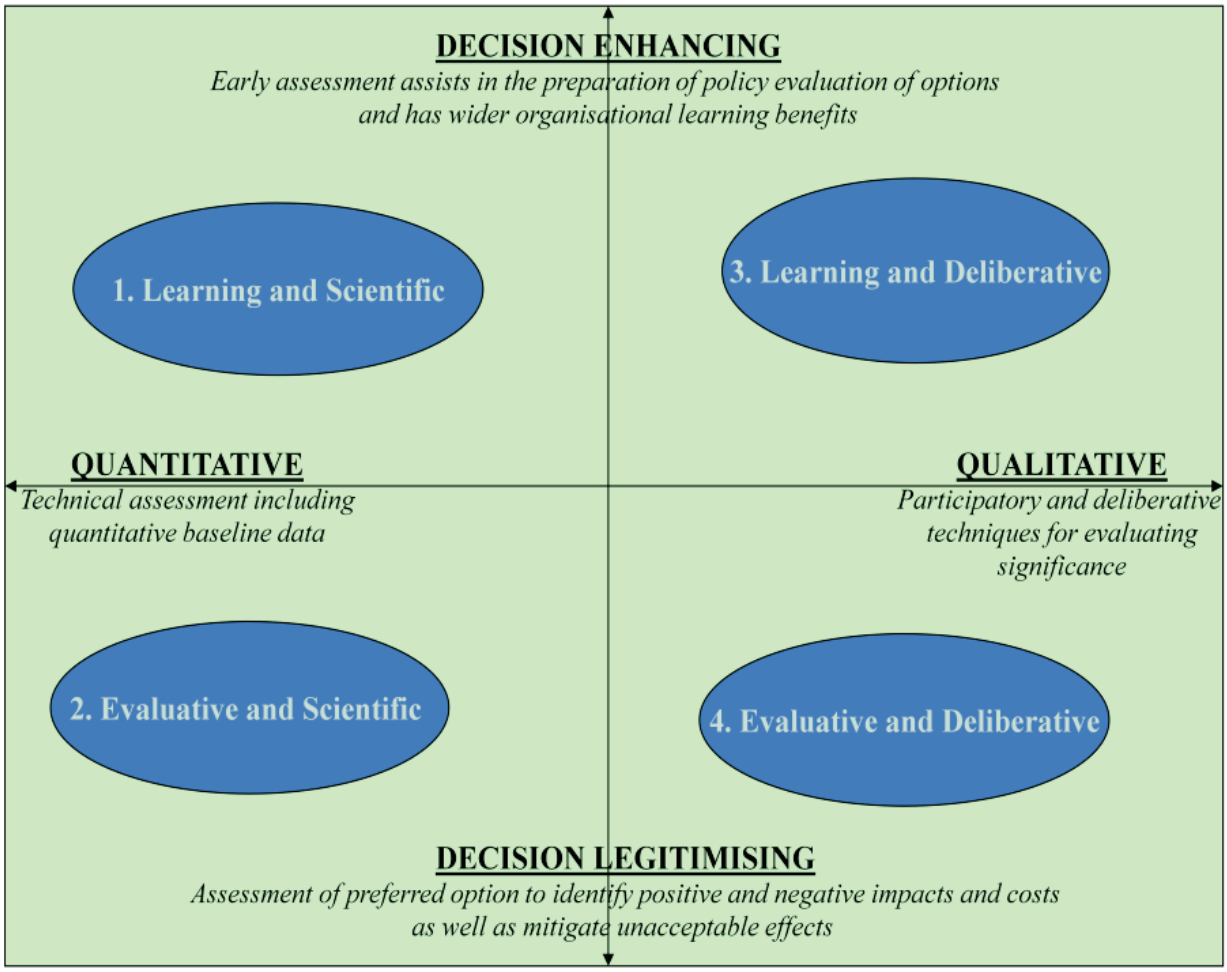

Figure 1: **Decision-making and Impact Assessment Scenario**
Source: UNEP/WHO, 2006 (forthcoming)[38]

8. The Struggle of Power and Rationality

Based on these analytical frameworks, i.e. different democratic decision models and decision-making and impact assessment scenarios, it is highly possible to view the different HIA applications in Thailand as a struggle of power and rationality of different actors within the decision and policy making process.

Evidently in Thailand, the absolute decision-making power of government organizations and its authorized rationalities have been increasingly challenged from other stakeholders and alternative rationalities, as seen in the EIA reform and different HIA applications. The challenges are not only how to conduct EIA and HIA (quantitative VS qualitative techniques), but also how to use it (evaluative VS learning proposes) in a more appropriate decision-making process (unreflective and reflective processes). In other words, they negotiate against a) how public decision-making should be made, b) how HIA should play role in the decision-making process and c), in consequence, how HIA should be conducted to support its strategic role and its appropriate democratic decision-making models.

This negotiation will determine the changes of power and rationality in the decision-making process. For example, moving away from delegate liberal democracy towards more deliberative decision-making will allow more public participation and different rationalities (including different kinds of public input) to play roles in the decision-making process. Therefore, it shifts decision-

making power away from the government authority and opens for more multi-rationality considerations.

Recently, we can find the five main ways of power and rationalities struggling in HIA development in Thailand, which reflect the differences in terms of their democratic models, their expected HIA roles, and their HIA practices. In connection to the three pillars of institution, this can also be viewed as a struggling in establishing cognitive pillar (their democratic models), normative pillar (HIA roles), and regulative pillar (expected practices) of HIA institutionalization. These five ways of struggling include;

- **Maintaining an authorized power**

The protection of authorized power can be easily seen from the political delay of EIA reform and also National Health Act legislation process. Despite the well-known problems of the existing EIA, its three institutional pillars, e.g. delegate democracy, evaluative function, and scientific techniques, are well served the full (or nearly full) control of government authorities. Based on this view, several HIA studies in Thailand have been criticized of lacking scientific information and clear-cut cause-effect relationships and threshold standard, as seen in the Tangerine plantation case[39]. In other words, HIA in this viewpoint should be strictly used with authorized approval or legal criteria and proven scientific information. In this model, the local people will hardly share decision-making power due to the limitation in authorized participation and required analytical techniques.

- **EIA reform initiative**

EIA reform initiative is an attempt to improve the existing EIA with more public participation and inputs. As already mentioned, it has started in 2002 partly with the spill-over effect from HIA development. In this initiative, the limitations of delegate liberal democracy are recognized and supplemented by the trustee roles in decision-making process. Furthermore, more public participation and inputs are welcome and integrated into decision-making process. This implies that HIA, in this view, do not necessarily strict with scientific information and broader aspects of health are somehow accepted. In other words, the EIA will be more reflective process. However, as the approval mechanism, the new EIA would still play an evaluative role. Thus, the tensions may arise due to the differences between scientific and participatory interpretations. This attempt has been politically blocked since 2004.

- **HIA as a local empowerment**

In Thailand, several HIA studies have been applied by the local civic groups as a main tool for local empowerment and public awareness campaign. For example, HIA has been used to understand the existing situation and future directions in their river basin management. HIA has been used to compare different farming practices, which have different impacts of their health. Some HIA studies have been used to support their policy campaign (such as healthy agriculture)[40] or to protest against the big investment projects affecting their health or their determinants of health (like the potash mining)[41]. Therefore, in this category, although they share the normative pillar (HIA as a learning tool) and regulative pillars (more depend on participatory techniques), their cognitive pillars quite differed from populist and pluralist democracy to the deliberative one. And, in several cases, these

cognitive pillars are mixed. Certainly, the main aim of this struggling is for local people to gain more decision-making power and to influence their rationalities in the decision-making process.

- **HIA as a conflict resolution**

As a participatory learning process, HIA has also been used as a conflict resolution in Thailand. The main idea is, due to its participatory and reflective characteristics, HIA should be able to facilitate better mutual understanding of different perspectives and standpoints within decision-making process. In other words, it is used to promote deliberative model of decision-making, with shared decision-making power and multi-rationalities consideration. Practically, it has been applied in case of local renewable energy projects, based on the direct deliberative model and participatory techniques with scientific information supports[42]. This HIA case received good responses from stakeholders. However, it is a highly context-dependent and demanding process. Moreover, it has never been used in the larger scale of decisions and conflicts, when the deliberations and understandings may be more difficult to emerge.

- **HIA as a tool for Healthy public policy**

Under the health system reform, HIA has been developed as a main tool for healthy public policy formulation. As earlier mentioned, the reform in itself is a struggling process towards deliberative decision-making and shared power and responsibilities within Thai society. Therefore, most of HIA studies have been done in order to facilitate public deliberations and social learning process within specific policy issues, such as energy or agricultural policies. They have basically applied both participatory and scientific techniques in their policy assessment, which mostly are

not required by law or existing practices in formal policy formulation. More importantly, as public deliberation requires some supportive conditions, such as public attention and media coverage, in practice, HIA has to run both in negotiation (Pluralist model) and policy deliberation (indirect deliberative model) mode. In fact, public negotiation is more likely to be a basic condition for (meaningful) public deliberation. Certainly, evidence from HIA can support both public negotiation (by raising public awareness and attention) and public deliberation (by furthering analysis of policy impacts in different perspectives).

However, Thai government still does not accept this HIA process as a mainstream approach for policy formulation. The recommendation from the NESAC in applying HIA to main public policy and the acknowledgement of Thai cabinet may change this situation. Obviously, the present application of NESAC is more likely to be a trustee model, when HIA is used to collect and reflect information and perspectives from different stakeholders before reaching the policy recommendation to the government. Perhaps, both indirect deliberative and trustee models, as both emphasize the reflective and learning roles, can pave the ways to more application of HIA in formal decision-making process.

Table 2: The Struggles of Power and Rationality in HIA Institutionalization in Thailand.

Struggle in HIA Development	Cognitive Pillar (Democratic Model)	Normative Pillar (HIA Roles)	Regulative Pillar (Expected practices)
Maintaining an authorized power	Delegate liberal	Evaluative	Mainly scientific techniques
EIA reform initiatives	Delegate liberal with more trustee roles	Evaluative	Scientific techniques with more public participation
HIA as a local empowerment	Populist, Pluralist, and Deliberative (varied by cases)	Learning	Mainly participatory techniques
HIA as a conflict resolution	Direct Deliberative	Learning	Participatory techniques with some technical information
HIA as a tool for healthy public policy	Pluralist and Indirect Deliberative and some trustee role (in NESAC)	Learning	Both Participatory and scientific techniques

9. Between Power and Rationality: *Working Space for HIA*

On the one hand, these different HIA applications cause the complications in terms of HIA evaluation, both in the sense of quality control and their policy impacts, since they are based on different cognitive, normative, and regulative pillars in their operations. In the longer term, it is also very difficult to foresee the future directions and applications of HIA development in Thailand.

However, on the other hand, these complications represent the real complexities in public decision-making in the country, like Thailand. In reality, public decision-making always involves different rationalities and values, which are mostly incompatible and incommensurable. Having different HIA applications, therefore, implies more open space for public participation in decision-making process through the different roles and meanings of HIA.

More importantly, as also suggested by Goodin, it is better to recognize the limitations of each democratic decision model and, at the same time, the complementarity between different democratic models in decision-making process. Obviously, the delegate liberal democracy is legitimized by law and has authorized power and resources. It cannot simply be ignored. On the opposite, it can be balanced and strengthened through the reflective and learning nature of pluralist or deliberative democratic model. Practically, the quantitative and qualitative data has a high potential to enrich each other for better reflections and understandings in the assessment and decision-making process.

Therefore, rather than forcing to develop only one type of HIA application, Thai society may better gain from the variety of HIA applications in different democratic roles. In between different power and rationalities within democratic society, the working space of HIA depend very much on three main working principles.

a) Its Reflective Contributions

As the impact assessment tools, the real aim of HIA is to inform and reflect health consequences of different policy directions. Concurrently, good democratic society always requires deliberative decision-making rather than just voting or allowing authorized persons to decide. Warren warned that[43] ;

> *"Democracy works poorly when individuals hold preferences and judgement in isolation from one another, as they often do in today's liberal democracies. When individuals lack the opportunities, incentives, and necessities to test, articulate, defend, and ultimately act on their judgements, they will also be lacking in empathy for others, poor information, and unlikely to have the critical skill necessary to articulate, defend, and revise their views."*

Therefore, in this perspective, HIA must always be reviewed and its capacities improved in providing the reflections and reflective skills for Thai society. Better reflections and reflective skills require good participatory process, appropriate analytical frameworks and skills (both quantitatively and qualitatively), and

effective communication process. All these components can be further improved in Thailand.

b) Its Adaptability

Although, in terms of concept, HIA is quite well-accepted in Thai society. Question, however, remains in practice regarding its appropriateness and effectiveness within policy process. Recently, the suggestion from the NESAC together with the acknowledgement from Thai government, urges for formal uses of HIA in governmental policy-making processes, which differ from sector to sector and from issue to issue. The real challenge of future HIA institutionalization in Thailand, therefore, includes the ability of integrating into different policy-making processes. Concurrently, the use of HIA outside the governmental decision, which is proven to be useful for healthy public policy in Thai society, also needs further development and better integration into or influences in formal policy-making or decision-making process.

This suggestion raises the importance of detailed designs of HIA process. Since different policy sectors have their own specific policy processes and styles, the detail and specific design of HIA is therefore essential and must be integrated or attached to the main policy process. More importantly, this integration and attachment must allow the balancing of different power and rationalities within the policy process. In other words, HIA must not be used only to be part of formal policy process but also to improve policy process, which allows meaningful participation and balancing views of the different sector in the society. In practice, this general suggesting is demanding tasks and requires continuous works and improvement.

Although, its adaptability is crucial for HIA institutionalization, connectivity and reflection between different HIA applications is also important, especially for reflecting the appropriateness of HIA applications and proposing for future HIA development ideas. As a facilitator, HSRI may take an initiative to bring different HIA approach to learn from each other in more systematic way.

c) Its Practical Wisdom

Within public decision and policy making process, different perspectives, values, and rationalities always play roles in proposing their policy directions. Hence, to develop healthy public policy with the support of HIA process, it certainly requires more than any technical analyses (or instrumental rationalities). The value judgement is needed in order to ensure what the desirable aims (or directions) for the society should be.

This refers to the concept of "phronesis" or (practical wisdom), introduced by Aristotle. According to Aristotle, phronesis is an intellectual virtue that is "resonsoned, and capable of actions with regard to things that are good or bad for man"[44]. Phronesis is very important since it concerns values and goes beyond scientific and technical knowledge. Therefore, phronesis is an intellectual deliberation by which instrumental rationality is balanced by value-rationality[45].

Phronesis must include both involving a true understanding of an end and also discerning means to an end determined by moral virtue. Practical wisdom comprehends the various powers and qualities in its deliberations over means and ends, which are highly context-dependent. Practical wisdom is more likely to be "a sense

or a tacit skill for doing the ethically practical rather than a kind of science"[46].

Practical wisdom in HIA process should allow different policy values and rationalities to play more creative roles together in their contested policy arena through public deliberation. This refers to concept of trans-rationality (or reflective rationalities) in which different rationalities are deliberatively analyzed and meaningfully contribute to the following decisions and actions.

10. Future of Co-evolutionary Struggling

At least in the near future, HIA development in Thailand seems to continue lasting. Through its co-evolution approach, it gradually expands its applications and consequently institutional acceptances into several parts of Thai society. However, the assumptions and expectations of applying and developing HIA differ among different institutional grounds and links to different perspectives in democratic decision-making. Therefore, the question of "what to make it for" is very crucial in order to make HIA long lasting and useful in Thai society.

This paper does not provide any finite answer to this question. But, between the different power and rationalities, HIA can still play a crucial role in facilitating democratic decision-making and policy-making process through its reflective contributions, its adaptability to different policy processes, and its practical wisdom. In other words, if these three characteristics can be maintained and

improved, HIA will still be useful for Thai society and consequently last long in Thai society.

To be specific, perhaps it is timely appropriate for Thailand to take a full reflective thinking activity of its development paths, where the whole different interpretations of HIA development and applications will be deconstructed, based on their actual practices, underpinning assumptions (and values) and contributions to healthy public policy process. The main idea of this deconstructive evaluation is to recheck and reconstruct the whole idea of HIA development in Thailand in order to be fit with its purposes and its future policy and societal contexts.

Referring back to the concept of co-evolution, while the variety, the dynamics, and the interactions of and within HIA development are somehow assured in Thailand, the focus must be placed on "the regulating mechanism", which, in natural philosophy, is also one of the most important processes for each species to survive in the complex and changing environments.

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The New Era of HIA in Thailand :

The HIA Development Report 2006 and the future HIA development strategy 2007-2011[1]

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1 This paper is the summary of the full report. For more details, see Working Group on the 2006 HIA Development Report and Working Group on the 2006 National Health Assembly's HIA Thematic Workshop, 2007, ***Thailand's HIA Development Report 2006 and HIA Development Strategy during the 10th National Economic and Social Development Plan (2007-2011)***, Health Systems Research Institute, Nonthaburi.

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1. Introduction

For over five years Thailand's Health Impact Assessment (HIA) system has been growing and contributing positive information and change to society. From recommendations on health system reform to the setup of research and development programs at the Health Systems Research Institute and other relevant bodies under the Ministry of Public Health, HIA has been making an impact. HIA development has now progressed into the National Economic and Social Advisory Council's Recommendation, which calls for the Government's continuous action on HIA development. The Ministerial Cabinet's Resolution in May 2005 has accordingly assigned the Ministry of Public Health to report HIA development progress to the Cabinet and the National Economic and Social Advisory Council.

Although the involved organizations such as Department of Health, Department of Disease Control, Health Systems Research Institute, and National Health System Reform Office have joined hands in HIA development for five years, they never produced a report on their progress together. Nor did they ever set a concrete, common action plan together.

The 2006 HIA Development Report is, therefore, an output of the collaboration between involved organizations for the evaluation and summary of HIA development progress by different organizations and the synthesis of the country's experiences. In addition, the draft of the 10th National Economic and Social Development Plan also indicates the continuous HIA development during the period of the plan. Thus, the report will present the

visions, goals, and action plan of HIA development in the 10th National Economic and Social Development Plan as well.

The HIA Development report is presented to the Ministry of Public Health in order to report to the Ministerial Cabinet, and National Economic and Social Advisory Council, according to the Cabinet Resolution in 2005, as well as to be used for communication with the other sectors in the society.

This paper is the summary of the key issues of the 2006 HIA Development Report. The first part covers the progress and experiences of HIA development by different organizations. Then, the second part is on the HIA development strategies in the 10th National Development Plan 2007-2011. The third part will be the conclusion on the progress of HIA development up to the present.

2. Thailand's HIA Development 2006

From past to present, there has been continuous development of HIA analytical frameworks, with participation by various sectors in society. For this reason, HIA has been applied to diverse cases and in different levels. Several organizations including public agencies, local governmental organizations, community organizations, academics, non-governmental organizations and the private sector are interested in applying HIA to their activities.

The Sanitation and Health Impact Assessment Division, Department of Health has been studying and applying HIA to several cases. Examples include HIAs of a public park in an urban area, pesticide use on a tangerine plantation, a dam project, and an

international collaborative project called 'Health and Environmental Linkage Initiatives' (HELI).

Moreover, the division also implements various capacity-strengthening activities, particularly for inter-sectoral health impact assessment. These include workshops, seminars, and development of training modules.

Health Assemblies are also interested in using HIA as a tool and a mechanism according to the National Health Act. For example, We Love Tha Chin River Society, Nakhon Pathom Provincial Health Assembly, the Eco-Cultural Study Group in the case of potash mining in Udonthani province, Loei Civil Society in the case of gold mining, and the network of non-governmental organizations and community organizations in the case of impacts from agricultural chemical use in Chiang Mai.

Health Systems Research Institute also researches and develops Health Impact Assessment (HIA) and Healthy Public Policy (HPP) approaches for Thai society through many HIA case studies and public communication through diverse channels.

Furthermore, Chiang Mai University, Khon Kaen University, Mahasarakham University, and Prince of Songkhla University have provided teaching and learning on HIA and HPP. A number of graduate students are also interested in developing thesis and independent study on these subjects.

Based on these experiences, National Economic and Social Advisory Council developed and submitted the recommendation on HIA development for healthy public policy to the government. This led to the Ministerial Cabinet's Resolution on 31st May 2005,

Which assigns roles and responsibilities to the Ministry of Public Health. In addition, the Council also set up a working group on HIA to further implement HIA according to their own roles and responsibilities.

Apart from the Cabinet's Resolution, more attention from the Government is also paid to HIA development as can be seen from the indication of HIA development in the Environmental Impact Assessment (EIA) system in the 10th National Economic and Social Development Plan. The Bangkok Charter for Health Promotion in A Globalized World[3] also emphasizes the importance of health impact assessment in international policies in this era of globalization.

Consequently, Office of Natural Resources and Environmental Policy and Planning, who has the main role in the EIA system, is working on developing HIA in the EIA system. They set up a working group, comprising of related organizations, to explore the integration and develop a guideline.

Moreover, Department of Disease Control also has interest in developing HIA approaches for all project types that require EIA. Examples include guideline development for HIA in airport and cement plant projects.

Figure 1 shows the network of HIA development in Thailand, which involves various sectors in the society.

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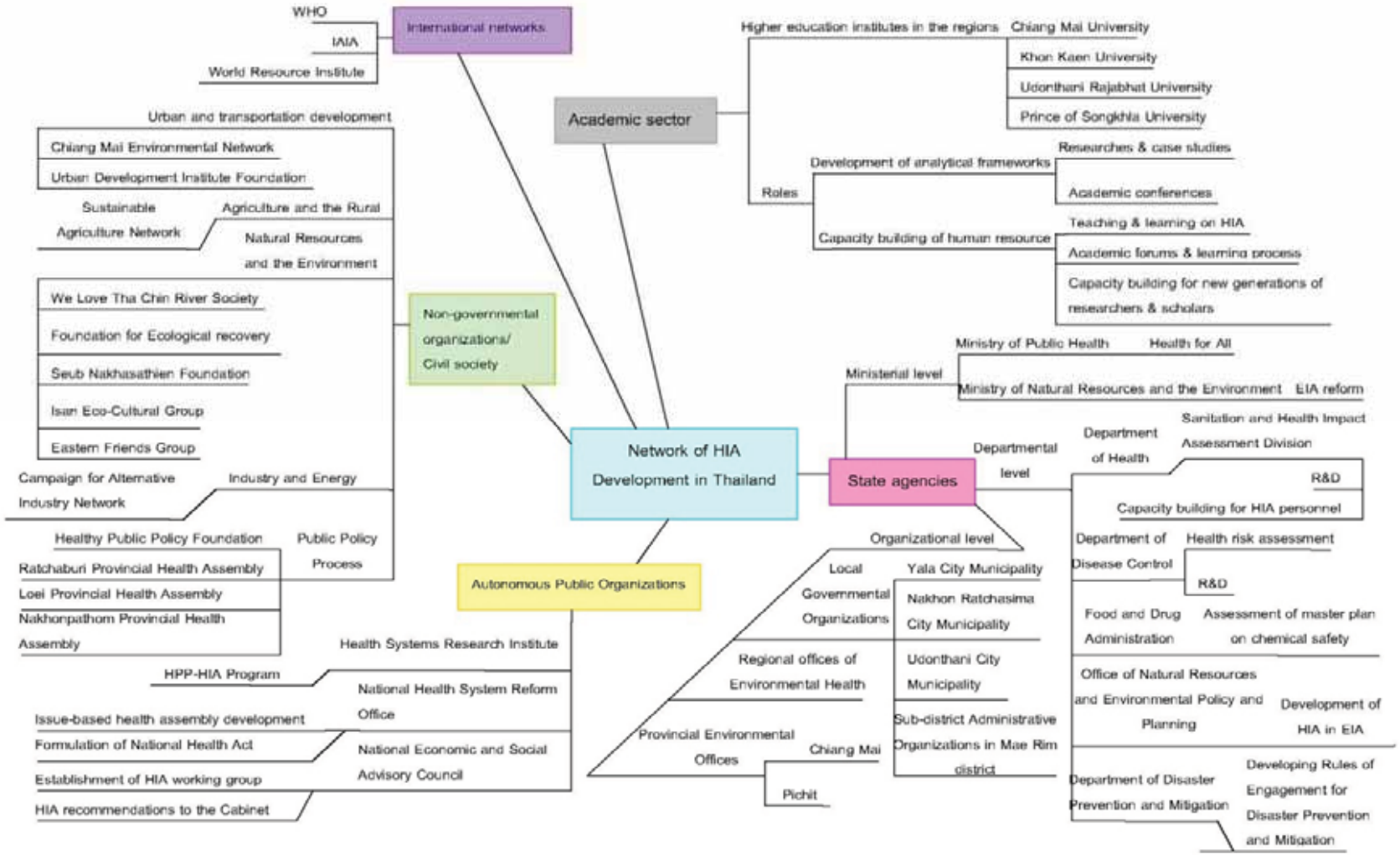
[3] The Charter adopted at the 6th Global Conference on Health Promotion, Bangkok, Thailand, August 2005

Figure 1 Network of HIA Development in Thailand



3. The key issues from the past HIA development

There are several cases which clearly show that HIA can lead to positive changes at community level. For example, the HIA on high-rise building in Chiang Mai Province led to the improvement of the high-rise building project of the municipality as well as supporting the public movement on healthy city. The quarry mining HIA case in Mae Hong Son Province supported the local people movement leading to the decision by the authority to withdraw the permission. Another example is the HIA on pesticide use in Thungthong sub-district, Kampaengphet Province that led to the decrease of pesticide use among farmers and also incorporated into the plan of the local government.

In terms of HIA development for HPP, some concrete outcomes have been witnessed in specific policy issues. For instance, in regards to healthy agricultural policy, the import and sale of some specific hazardous chemicals are prohibited, while the Ministerial Cabinet's Resolution on 31st May 2005 indicates the control of chemical pesticides and the promotion of food safety. Several communities and local health assemblies have also become more aware of chemical pesticide control and reduction as well as the development of various agricultural alternatives.

Furthermore, Thailand's HIA development has been recognized by international academic society and has the potential to be the coordinating center for an HIA network in Southeast Asia and collaborations within the International Association for Impact Assessment (IAIA).

However, there are still challenges to further HIA development. The key weak points, arising from the discussions during the production of the Annual HIA Development Report 2006 include the lack of a coordinating system or mechanism among various organizations involved in HIA development to support one another's work.

Moreover, the existing mechanisms for coordinating and linking the works of health assemblies to the policy advocacy level are not clear or effective enough. In addition, approaches to the support and reinforcement of human resource capacity and long-term development of teaching and learning systems are still far from completion.

In short, HIA development in Thai society has passed from an introductory and experimental period to a more settled stage in policy and development process, that is, HIA is becoming a more practical approach to health promotion and public policy process. It also becomes clear from the discussions process of producing the Annual HIA Report that, in the future, HIA development should be carried out in four main approaches as follows:

HIA development in Environmental Impact Assessment system (HIA in EIA), which is impact assessment at the project level. This can be called "EIA-based HIA".

HIA application in community and local level (Community-based HIA) either by a community itself or by local governmental organization.

HIA development for healthy public policy (HIA for HPP) in various policy areas such as agriculture, energy, transportation, waste management, water resources, etc.

HIA application for trans-boundary health impact management and international policy development (HIA beyond the border), which includes infrastructure development and international agreements.

4. HIA Development Strategy in the 10th National Economic and Social Development Plan (2007-2011)

The main guiding principle of HIA development is the Sufficiency Economy philosophy, which was given by His Majesty King Bhumibol Adulyadej to Thai people for more than 25 years. The philosophy stresses *the middle path* as an overriding principle for appropriate conduct by the populace at all levels so as to modernize in line with the forces of globalization. In the modern society, there are various risks in many aspects, economics, environment, social, and human health risks, and globalization increases both the scope and scale of these risks. Being not too extreme on one side and keep balance of several aspects is the key to be prepared and be able to cope with various risks of present as well as the future world.

Sufficiency, as defined by Suthawan Sathirathai and Priyanut Piboolsravut, means moderation, reasonableness, and the need of a self-immunity mechanism for sufficient protection from impacts arising from internal and external changes. To achieve this, an application of knowledge with due consideration and prudence is essential. At the same time, it is essential to strengthen the moral fiber of the nation, so that everyone, particularly public officials, academia, and businessmen, adhere first and foremost to the principle of honesty and integrity.[4]The 10th National Economic and

Social Development Plan (2007-2011) has taken the philosophy of Sufficiency Economy as guidance for national development. The components and conditions of the Sufficiency Economy philosophy link directly to HIA and therefore, demonstrate many essential applications to HIA development.

4.1 The challenges for HIA development strategy in the 10th National Development Plan

HIA faces many challenges in moving forward to develop a balanced strategy, specifically in the 10th National Development Plan.

The first challenge is the plan's indication of HIA as part of EIA system and Strategic Environmental Assessment (SEA) development at policy and planning levels. Also, the promotion of good governance in impact assessment systems and processes is also essential for the two mechanisms to be truly beneficial for all sectors in the society.

HIA is further challenged by public policy development at the local level. Although past experiences have shown that HIA is a useful tool for communities, the outcomes in terms of policy and planning by local governmental organizations are still limited.

Furthermore, HIA for HPP must be substantially and continuously developed in other policy issues. This may particularly focus on the development of principles and methods for strategic health impact assessment and in-depth policy analysis, as well as of the coordinating mechanisms for relevant thematic policy networks.

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4 Quoted in Suthawan Sathirathai and Priyanut Piboolsravut, "Sufficiency Economy and A Healthy Community" Paper for the 3rd IUCN World Conservation Congress, 17-25 November 2004, Bangkok, 9.

Due to the diverse dimensions and forms of the challenges for HIA development, mechanisms for knowledge enhancement must be created to support the variety of HIA applications. A long-term plan for strengthening human resource capacity is another important task.

Trans-boundary health impacts have been increasing both in scope and in scale whereas there is still no mechanism in regards to health impact assessment or healthy public policy development despite the statement in the Bangkok Charter. Therefore, an initiative on this critical issue should be prompted and Thailand should take this opportunity to coordinate and initiate trans-boundary HIA learning and development as well as to strengthen regional networks.

4.2 Four main approaches for future HIA development

1) HIA Development in the EIA system

The 10th National Economic and Social Development Plan has suggested the integration of health impact assessment and social impact assessment into EIA systems, aiming to make EIA more inclusive and complete. However, HIA should not be seen as separate from other dimensions of impact assessment. They must be connected and integrated together for health-supportive environmental management.

Therefore, HIA development in the EIA system is not only the inclusion of HIA in EIA reports but also the readjustment of EIA to emphasize integration and good governance. As a consequence, the following activities are proposed:

1.1) Develop of concepts and guidelines for HIA in EIA, which includes the overall concept of impact assessment and the application in different project types. Additionally, the specific guidelines for HIA practices in the projects on energy, water resources, mining, transportation, and others should be produced.

1.2) Apply good governance principles and assessment for monitoring and supporting the development of EIA, HIA and other impact assessments.

1.3) Build the capacity of the organizations involving in HIA in EIA system. Through the promotion of mutual understandings and collaborative actions as well as the planning for human resource capacity building.

1.4) Create guidelines for people participating in HIA in EIA systems in order to protect the rights and strengthen the capacities of civil society and community organization through appropriate application of academic principles, evidence, and local wisdom.

2) HIA application for community and local governmental organization

One of the main approaches to future HIA development will focus on capacity strengthening for HIA application in decision-making process, local legislation, and healthy public policy at the local level. The future HIA development for community and local governmental organization during the 10th National Development Plan will consist of five components as follows:

2.1) Development of HIA as a tool for healthy public policy promotion by local governmental organizations through the following activities:
1) Study approaches to HIA application in local public policy making through the study of local problems and resolutions as well as the past HIA experiences at community level.
2) Perform HIA case studies on local public policy development in all regions of Thailand, but may begin with the most potential areas.
3) Develop guidelines of HIA application in HPP development by local governmental organizations, including training and practices.

2.2) Develop and apply HIA as a supporting mechanism for environmental and health legislation by local governmental organizations and communities according to the Public Health Act, B.E.2535.

2.3) Develop mechanisms for building and supporting HIA capacities for community and local governmental organization to strengthen policy and academic potentials. These mechanisms should also include academic supports, policy recommendations, and financial assistance, if necessary.

2.4) Synthesize HIA experiences for community and local governmental organization in order to make HIA methodologies and tools more compatible with local contexts and applicable to national policy development.

2.5) Local campaigning for awareness on HIA.

3) HIA development for healthy public policy

HIA development for healthy public policy in the 10th National development Plan will emphasize the following activities:

3.1) **Develop HIA concepts, processes, and tools for strategic environmental assessment** by focusing on the selected policy issues.

3.2) **Link health and other dimensions of impact assessment,** in particular the dimensions of economics, social equality, and sustainable eco-cultural system.

3.3) **Develop healthy public policy alternatives and knowledge base on impacts at strategic level in diverse policy areas** This is to provide new policy concepts and approaches to minimize negative impacts and maximize health benefits through publications.

3.4) **Create diverse spaces for policy deliberation** to facilitate dialogues and discussion on alternatives for healthy public policy in Thai society.

3.5) **Develop concepts and approaches to policy process analysis** to support the policy watch, the search for policy windows, and understanding of different policy meanings and recommendations.

4) HIA for international policy and agreement

Health impacts have spread beyond national borders through international policies and agreements and large-scale projects, urging HIA and HPP development to get across national territory. Therefore, HIA development during the 10th National

Development Plan must be ready for trans-boundary health impacts management by coordinating and networking on HIA and HPP with neighboring countries in Southeast Asia.

Additionally, there should be the establishment of contacts with international policy practitioners in order to support healthy public policy development.

Another approach to promoting the HIA and HPP learning process at regional level is international research and development on trans-boundary health impact assessment. The topics may be chosen from the many international projects having trans-boundary impacts.

Last but not least, the improvement of HIA cooperation in Southeast Asia should extend to the policy processes of relevant international organizations such as the Association of Southeast Asian Nations (ASEAN), and World Health Organization (WHO), in particular its Southeast Asian Office and Western Pacific Office. The uplifting of regional assessment practice will facilitate and support HIA development in different countries.

4.3 HIA development according to the National Health Act B.E.2550

The National Health Act B.E.2550 (2007) is among a few laws in Thailand which have extensive participation by the people. This Act is the first to sections on HIA. People's rights and public participation, core values of HIA, are addressed in four section of the National Health Act.

Section 5 A person shall enjoy the right to live in the environment and environmental conditions beneficial to health.

A person shall have the duties in cooperation with State agency in generating the environment and environmental conditions under paragraph one.

Section 10 In the case where there exists an incident affecting public health, a State agency having information relating to such incident shall expeditiously disclose such information and the protection thereof to the public.

Section 11 An individual or group of people has the right to request and participate in the assessment of health impact resulting from a public policy.

An individual or group of people shall have access to information, explanation and underlying reason prior to a permission or implementation of any project or activity which may affect the health of individual or of a community, and shall have the right to express his or her opinion on such matter.

Section 25(5) National Health Commission shall have duties and authorities to prescribe rules and procedure on monitoring and evaluation in respect of national health system and the impact on health resulting from public policies, both in the levels of policy making and implementation.

In order to develop HIA as a social process for protecting the rights of the people, as well as to be a social immunity for a healthy society, the following tasks should be implemented:

1. Develop the institutional structure of HIA system, especially expanding the HIA network to all stakeholders, in order to lead to regular practice, which is the essential part of HIA institutionalization in the society.
2. Support Health Assemblies at all levels, including area-based, issue-based, and national Health Assembly, to apply HIA as a learning process for Healthy Public Policy development.
3. Include the essential contents of HIA in the Statute on National Health System, which, according to the Act, will be developed by the National Health Commission and after the approval of the Ministerial Cabinet, the Statute shall be binding upon relevant State agencies.

4.4 Knowledge base development

Public policy with respect to health impact is complex and interconnected with several dynamic factors, thus requiring a strong and diverse knowledge base. Accordingly, it is essential that the knowledge base for HIA development be seriously and continuously improved so that the goals of HIA development can be achieved.

The essential knowledge base for HIA development is the **knowledge base on 'ecosystem health'** or holistic health system, which will be the foundation for holistic health impact assessment. Likewise, the consideration of impacts in spiritual dimensions will also need a well-clarified knowledge base.

In addition, **the linkage of health with other dimensions** is necessary, particularly economics and social equity. For this reason, HIA development must include the development of an economic concept which values health and social equality. This can be called 'rights-based economics.'

Apart from the creation of knowledge base, capacity and potential building for HIA human resources is also important. There should be an integrated and collaborative plan for capacity building, which may be carried out through several channels including personnel training, domestic and international scholarships, the organization of international academic conferences, and the development of curricula and learning modules at different levels.

4.5 The public communication system

In addition to the development of concepts, approaches, and a knowledge base, HIA development needs to promote perception and understanding among relevant parties and the general public so that HIA can be applied by different sectors. For this reason, HIA development must take into account the development of a public communication system, which may be carried out as follows:

Promoting perception and understandings at fundamental level through leaflets, posters, audio-visual media, etc.

Campaigning in potential communities and local governmental organizations by focusing on practical approaches related to specific local contexts.

Presenting HIA experiences in various cases through synthesis documents, published documentaries, videos, television programs, news report, public forums, etc.

Creating and improving local curricula as well as teaching and learning materials for HIA-related courses

Presenting academic work in relevant academic forums at different levels

Creating core website and library to collect information and support the links between different organizations and case studies as well as to disseminate the progress and outcomes of HIA development in Thailand.

Producing annual HIA development in Thailand report to keep up with and disseminate HIA development progress each year.

4.6 The HIA Development Goals and Action Plan

The meetings and brainstorming between the working group on HIA Development Report and other relevant parties have resulted in the formulation of common action plan for HIA development in Thailand. The roles and agenda are set within the HIA development strategy during the 10th National Development Plan, and the 2007 action plan has been finally launched. (See details in table 1).

The organizations which participated in the formulation of this action plan include:

Health Systems Research Institute (HSRI)
National Health System Reform Office (HSRO)
Department of Health, through Sanitation and Health Impact Assessment Division
Department of Disease Control, through Occupational and Environmental Health Bureau

Office of Natural Resources and Environmental Policy and Planning (ONEP)
King Prajadhipok's Institute (KPI)
Thailand Environment Institute (TEI)
National Economic and Social Advisory Council (NESAC)
Healthy Public Policy Foundation (HPPF)

4.7 The mechanisms for governance and coordination

The coordinating mechanisms for HIA development will provide the framework and process for inter-sectoral collaborations, facilitating mutual learning and support. The coordinating mechanisms will cover three levels as the following.

1. **Executive level** To consider, frame, and steer HIA development direction and approaches, the key mechanism will be the National Health Commission according to the National Health Act B.E.2550 and National Health Assembly.

2. **Directive level** By setting up a directing committee on HIA development, comprising of senior staff from relevant governmental agencies, constitutional independent organizations, mass communication, civil society, and academic sector.

3. **Operational level** To coordinate the action plans of all relevant organizations, the HIA Development Coordinating Committee should be set up, consisting of all agencies that are responsible for HIA development.

Table 1 The work agenda and roles of relevant organizations in Thailand's HIA development in 2007

Work Agenda	Operating and Supporting Organizations							
	HSRI	HSRO	Dept.of Health	Dept.of Disease Control	ONEP	TEI KPI	NESAC	HPPF
1. HIA in EIA								
1.1 Development of Guideline and manual for HIA application in EIA	√			√	√√			
1.2 Application and assessment of good governance in EIA and other IA systems	√			√		√√		
1.3 HIA capacity building for relevant agencies and stakeholders in EIA process	√			√√	√			
1.4 Development of people manual for participating in HIA in EIA				√	√	√	√	√√
2. HIA for communities and the local								
2.1 Development of HIA tools for communities and the local	√		√√				√	√
2.2 HIA development and application according to the Public Health Act B.E.2535	√		√√	√				√
2.3 Development of supporting mechanisms for HIA application in the local level	√	√	√√	√			√	√
2.4 Synthesis of experiences on HIA application in communities and the local level	√√		√				√	√
3. HIA for Healthy Public Policy								
3.1 Concepts and tools for HIA application in the strategic level	√				√		√	√√
3.2 Linkage of health with other dimensions	√		√				√	√√
3.3 Development of alternatives policy database	√		√	√			√	√√
3.4 Forums for sharing of information and policy deliberation	√	√√					√√	√√
3.5 Development of concept and approach to policy process analysis	√		√					√√
3.6 Public policy development for health and environmental health promotion			√					
4. HIA for international policy and agreement	√						√	√√
5. Knowledge base for HIA development								
5.1 Knowledge base on "Ecosystem Health"	√√		√					√
5.2 Linkage of health with other dimensions	√√		√					√
5.3 Long-term capacity building of human resources	√√	√	√	√	√	√	√	√
6. HIA in the National Health Act								
6.1 Supports to legislative processes	√	√√					√	√
6.2 Development of HIA institutional structure	√	√√					√	√
6.3 Supports to HIA application in the Health Assembly at all levels	√	√√						√
7. Development of public communication systems for HIA	√	√	√	√	√		√	√
8. Central coordination	√√	√√						√√

5. Conclusion: the challenges of HIA development in Thailand

At present, different tasks in the HIA Development Action Plan are implemented by each organization. As the Plan has made progress, more challenges become apparent.

First, the National Health Act has provided a great foundation for future HIA development. Now, effective and flexible operating and coordinating systems for implementing the HIA according to the Act have to be developed. Specifically areas of need are information disclosure and the demand for HIA in different public policy issues.

Second, the most important part of the development of HIA in the EIA system is the broad consideration of integrating the concepts, applications, and good governance principles.

However, the present direction of the integration tends to limit its focus on addressing health impact in the EIA report mainly through health risk approach, while other important issues receive much less attention. The case studies can be very useful to link the conceptual thinking and discussion to the problems and the needs of the society on the EIA system improvement. This can start from the cases which exercise their rights according to the National Health Act.

The first case in which local people exercised their rights, according to the National Health Act, was with regard to a large

industrial development in Mab Ta Phut area, Rayong province, and more and more cases are expected to arise.

Third, the HIA at community level has made quite impressive progress. The Regional Health Centers around the country under Department of Health is working with the local governmental organizations on the issue of Healthy City. They are interested in applying HIA as the tool for participatory learning process as well as for healthy public policy development at the local level.

Regarding HIA development for HPP, the conditions in the public policy process of the country are multi-facet and highly dynamics and thus, it requires both expertise and active participation to meaningfully contribute to the policy process. The strategy for capacity-building as well as learning-by-practicing is needed to appropriately work with the policy process. More specifically, strategic impact assessment as well as the policy process analysis should be further developed as they have proven to be very useful.

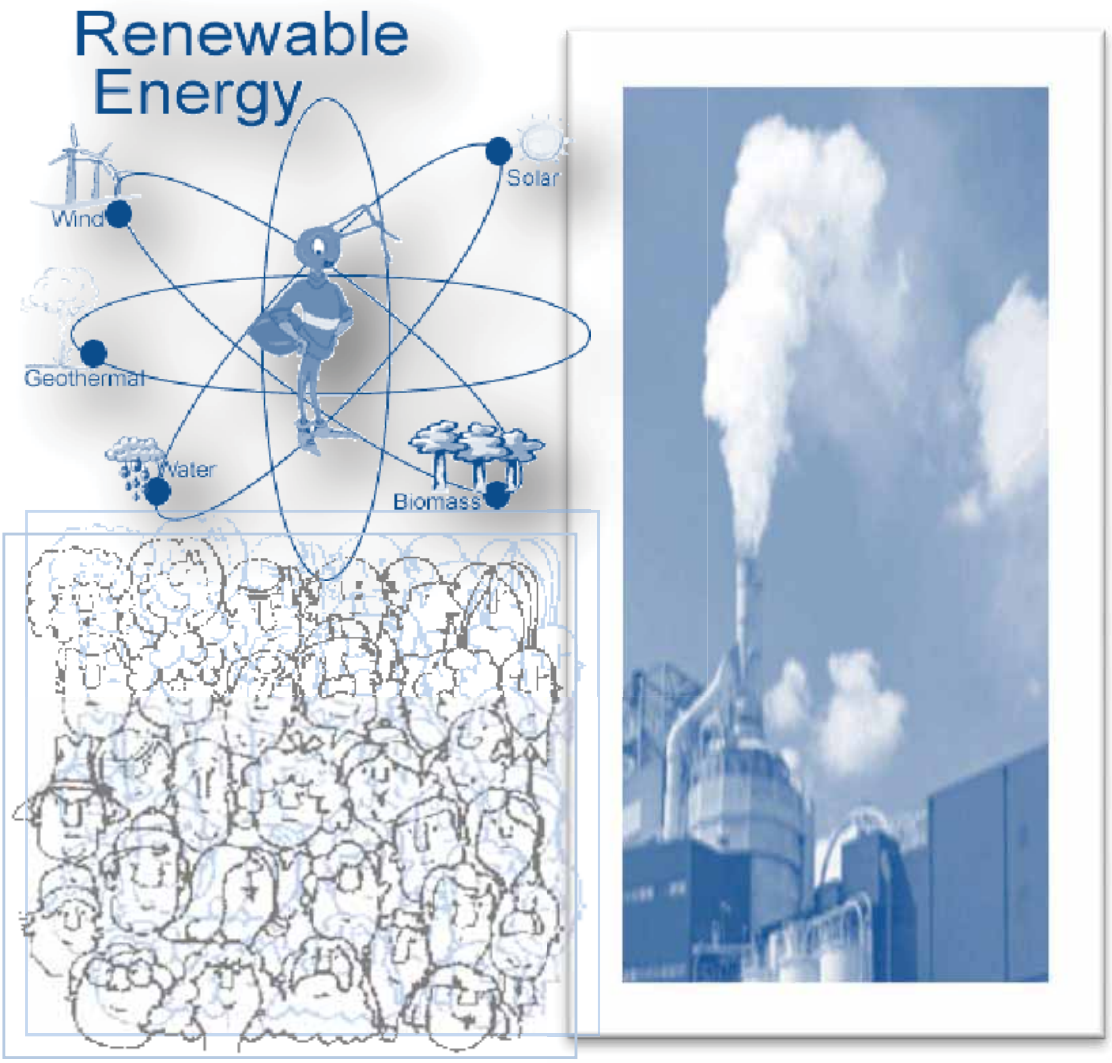
Concerning the HIA beyond Thailand, the initiatives on HIA capacity-building for countries in the region have made good progress. Furthermore, the Mekong inter-sectoral capacity building program by WHO is another important effort to build capacity and contribute to the development the HIA system in the Mekong countries.

The challenge now is to make the best use of the regional HIA network and the resource mobilization for regional research and development. Strengthening cooperation both within the region and also with WHO poses another hurdle.

Even though some tasks in the HIA Development Action Plan have made good progress, other tasks have experiences less

favorable outcomes. The knowledge base development for HIA is still struggling to be implemented and coordination mechanisms need to play a more effective role, particularly at the operational level.

Part II
HIA for Healthy Public Policy



Making a Healthier Choice an Easier Choice:

The Roles of HIA and Institutional Analysis in Thai Renewable Energy Policy[i]

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1. Introduction: Healthy Public Policy Concept

The concept of "healthy public policy" is to create supportive environment for healthy living by putting health in agenda of all policy-making related to health and by making the healthier choice the easier choice for decision-makers.

Health Impact Assessment has been developed as one of the tools for healthy public policy. In this study, it has been applied in Thailand to assess the benefits of renewable energy development with regard to health and other aspects compared to the existing power development plan and other policy options. This is to identify both the healthier choice and, at the same time, the easier choice in decision-making.

The main aim of this paper is to analyze the recent experiences in making a "healthier choice" an easier choice in Thai renewable energy policy during 2004-2006. The paper will start from introducing three policy options assessed in this study. Then, a "healthier choice" will be identified and followed by an attempt to make an easier choice, based on economic potential and advantages of renewable energy and energy efficiency. After that, the institutional analysis will be applied to understand the real-life difficulties in the existing institutional structure. Last, the experiences in reaching policy changes will be summarized and reflected.

2. Three PDP options

This study will apply strategic environmental assessment and health impact assessment with the focus on three policy options in the so-called Power Development Plan (PDP) -- the long-term investment plan of the Thai power sector. The PDP determines the construction of all new power plants according to the long-term power demand forecast. The decisions on energy options will be made in the planning process and these include fuel and power plant technology, power generating capacity of each project, and potential area for construction[1]. Hence, it will determine the impacts and consequences to the society not only the emissions and other externalities but also the investment, import burden, fuel costs, employment, technological development, etc.

Three PDP options, based on on-going policy discourses, have been identified in this study. The first option is the existing PDP, which relies mostly on natural gas and its combined-cycle power plants, which is referred to as PDP-Gas in this study. The second option reflects the attempt, mostly by the Egat, to promote the increasing use of coal in Thailand's fuel-mix, or PDP-Coal. Last, the alternative proposal, suggested by civil society groups, on more renewable energy and DSM contributions and revising excessive demand forecasting has been developed further to be one of PDP options, which is referred as PDP-Renewables. The detail about these PDP options will be presented in the next section.

Table 1 presents the main differences in three PDP options. Obviously, the revising of demand forecasting and DSM can lower

the power demand and consequently installed capacity and energy generation in the PDP-Renewables.

It is also clear that the proportions of energy generation in these three PDP options are significantly different as shown in both Table 1. Obviously, PDP-Gas will push Thai power system to be based on natural gas up to 81%. PDP-Coal tries to avoid this situation by increasing coal's fuel share from 11% to 27% and reduce natural gas share to 65%. In contrast, PDP-Renewables maintains natural gas' share at 70%, reducing the coal's share to 10% but increase the renewable energy share from 2% to almost 10% in 2015.

Table 1: Main Differences in Three PDP Options

Items	PDP-Gas	PDP-Coal	PDP-Renewables
1. Assumed Economic Growth Rate (%)	6.5	6.5	5.2
2. Power Demand in 2015 (MW)	40,978	40,978	34,557
3. Install Capacity in 2015 (MW)	47,334	47,334	41,485
4. Energy Generation in 2015 (GWh)	265,786	265,786	232,534 (218,134)
5. Proportion of Energy Generation in 2015 (%)			
- Gas	81	65	70 (75)

Table 1: (cont.) Main Differences in Three PDP Options

Items	PDP-Gas	PDP-Coal	PDP-Renewables
- Lignite & Coal	11	27	10 (10)
- Oil	1	1	1 (1)
- Renewable energy	2	2	9 (10)
- Large hydro	2	2	2 (2)
- Import	3	3	2 (2)
- DSM	-	-	6 (0)

Note: The Figures in Parenthesis are the energy generation and the proportion of energy generation excluding DSM.

3. A "Healthier Choice": PDP Renewables

To identify a "healthier choice", it is necessary to analyze the environmental and health impact. Due to space constraints, however, this study will present only the summary of the study report on "Better Power for Health[2]" as follows.

3.1 Environmental Impacts

Power generation and its required investments can lead to several environmental impacts, both at the local and global levels. However, there are only two types of impacts quantitatively assessed in this study; namely climate change impact and air

pollution impact, which are among the most serious concern in Thai society.

- *Carbon dioxide Emissions*

Based on the existing power development plan, i.e. PDP-Gas, The Thai power sector is estimated to increase its greenhouse gas emissions from 66.1 million tons CO2 in 2003 to 143.6 million tons CO2 in 2015. Adding more coal in Thai fuel-mix, as planned in PDP-Coal, will lead to higher greenhouse gas emissions, up to 162.4 million tons CO2 in 2015. On the contrary, improving energy efficiency, investing in renewable energy and revising demand forecasting, as mentioned in PDP -Renewables, will reduce greenhouse emissions down to 106.4 million tons CO2 in 2015, or 25.9% lower compared to PDP-Gas and 34.5% lower than PDP-Coal.

- *Nitrogen oxide Emissions*

The pattern of NOX emission in three PDP options is quite similar to what is presented in the greenhouse gas emissions. PDP-Coal is the worst polluting PDP options with the NOX emission of 530,310 tons, while PDP-Gas is expected to emit 423,684 tons in 2015. PDP-Renewables is still the best possible options with the emission of 352,439 tons in 2015, or 16.8% lower than PDP-gas and 33.5% lower than PDP-Coal.

- *Sulphurdioxide Emission*

In 2015, PDP-Gas is expected to emit 213,351 tons of SO2. Switching to PDP-Coal will increase SO2 emission sharply after 2011 and end up with 358,011 tons of SO2 in 2015. On the contrary, investing in renewable energy, as planned in PDP-

Renewables, will reduce the SO2 emissions by 23.2% compared to PDP-Gas and 54.2% compared to PDP-Coal.

- *Total Suspended Particulates Emission*

The existing PDP or PDP-Gas will lead to an increasing in TSP emission to 17,875 tons in 2015. In 2015, PDP-Renewables will emit 16,172 tons of TSP, or 9.5% lower than PDP-gas. Obviously, PDP-Coal is still the most polluting option in terms of TSP with 31,263 tons of TSP emission in 2015.

- *Mercury Emission*

Hg emission is highly associated with power generation from coal. Therefore, with smaller portion of coal in their fuel mixes, PDP-Gas and PDP-Renewables will almost stabilize their Hg emission around 5.0-5.5 tons/year from 2008 till 2015. In this case, PDP-Renewables can provide only little reduction in Hg emission, around 5.7% compared to PDP-Gas. Oppositely, shifting to coal as intended in PDP-Coal will lead to sharp increasing in Hg emission and end up with 20.5 tons of Hg mission in 2015.

- *Non-methane Volatile Organic Compounds Emission*

Unlike other environmental indicators, PDP-Gas becomes the top in term of NMVOC emission with the level of 36,976 tons while PDP-Coal is expected to emit 31,309 tons in 2015. PDP-Renewables is still the best possible option with 28,834 tons of NMVOC emission, which provides 7.9% emission reduction compared to PDP-Coal and 22.0% compared to PDP-Gas.

Based on these six environmental indicators, summarized in Table 2, it can be concluded that PDP-Coal is certainly not a good solution in environmental aspect and PDP-Renewable is the most

desirable option for Thai society, both in terms of climate change and air pollution mitigation. However, improving in environmental management for renewable technologies is still highly recommended in order to lower its remaining negative impacts, especially in terms of TSP and NMVOC.

Table 2: Overall Impacts of Three PDP Options

Impact Indicators	2015			Difference			
	PDP-Gas	PDP-Coal	Renew.	Gas-Renew.	%	Coal-Renew.	%
Environmental Indicators							
CO2 Emission (million Ton)	143.63	162.43	106.42	37.20	25.90	56.01	34.48
NOX Emission(ton)	423,684	530,310	352,439	71,245.13	16.82	177,871.79	33.54
SO2 Emission (ton)	213,351	358,011	163,949	49,402.11	23.16	194,061.75	54.21
TSP Emission (ton)	17,872	31,263	16,172	1,700.00	9.51	15,091.30	48.27
Hg Emission (kg)	5,426	20,496	5,117	309.32	5.70	15,379.78	75.04
NMVOC Emission (ton)	36,976	31,309	28,834	8,141.82	22.02	2,474.65	7.90

3.2 Physical Health Impacts

There are two main ways of analyzing physical health impacts from power generation applied to this study, namely the mortality and morbidity assessment (or the ExternE approach) and the disability-adjusted life year assessment (or the Eco-indicator approach).

3.2.1 Mortality and Morbidity Assessment (Extern-E Approach)

Based on health effect co-efficients from the ExternE project, three kinds of health impacts can be quantified as presented below.

- *Injuries*

Table 3 shows that PDP-Coal, with 12 cases in death, 239 cases in severe injuries and 1,907 cases in minor injuries in 2015, is the most serious PDP options in terms of injuries. Following is PDP-Gas with 9.5 cases in death, 138 cases in severe injuries and 1,030 cases in minor injuries. With more reliance on renewable energy generation, PDP-Renewables is the best possible options with 36.1% reduction in terms of death, 22.9% reduction in severe injuries and 23.2% reduction in minor injuries in 2015, compared to PDP-Gas.

- *Acute Health Effects*

PDP-Renewables can play a key role in reducing acute health effects, since it provides the least negative impacts in all acute health indicators. PDP-Renewables can lower acute mortality by 22.4% compared to PDP-Gas (or 25.2 cases in 2015) and 61.6% compared to PDP-Coal (or 140.6 cases in 2015). It can also reduce acute hospital admission by 22.9% compared to PDP-Gas (or

124.3 cases in 2015) and 36.6% compared to PDP-Coal (or 241.8 cases in 2015). Moreover, PDP-Renewables will also reduces the number of cases in acute congestive heart failure by 20.1% and the acute restricted activity days by 21.1% compared to PDP-Gas.

- *Chronic Health Effects*

Like acute health effects, PDP-Renewables provides much better results in terms of chronic health impact. In 2015, when compared to PDP Gas, PDP-Renewables can annually reduce the number of cases in chronic mortality by 292 (20.4% of the effect from PDP-Gas), of cases in chronic bronchitis by 2,808 (19.9%) and of episodes in chronic cough by 3,358 (19.8%). Compared to PDP-Coal, the reduction in health effects from PDP-Renewables in 2015 will be almost 50%. In conclusion, considering all three health impacts, it is obvious that PDP-Renewables is the best possible option in health perspective. It can reduce negative health impacts by approximately 20% in 2015, which can save more than 300 lives and prevent 3,000 people from chronic disease a year, compared to the existing PDP (or PDP-Gas).

3.2.2 Disability-adjusted Life Year Assessment (Eco-indicator Approach)

An alternative approach in analyzing health impacts is to calculate health impacts from the amount of selected pollutants with the health damage factors provided by the Eco-indicator project. The result of this calculation is presented in terms of the disability-adjusted life year (or DALY), which combines both years of life loss (mortality cases) and the years lost due to disability (morbidity cases) in the population. Thus, applying DALY is an effort to represent the overall effect in terms of the years of “healthy life loss”

Figure 1 shows that the PDP-Gas will lead to 81,405 years of healthy life loss in all Thai population in 2015, which compose of 30,162 years of healthy life loss from climate change and 51,243 years of healthy life loss from air pollution.

Like the previous approach, PDP-Coal is still the most negative health impact option with the years of healthy life loss from climate change effect accounting for 34,111 in 2015, and 70,065 from air pollution effect. In all, PDP-Coal will lead to 104,176 years of healthy life loss in total Thai population.

Since PDP-Renewables is the best PDP option in all environmental indicators, it is not surprising that PDP-Renewables is also the best possible option in terms of disability adjusted life years (Figure 1). In 2015, PDP-Renewables will cause 22,349 years of healthy life loss from climate change effect, which is equal to 25.9% reduction compared to PDP-Gas and 34.5% reduction compared to PDP-Coal. In terms of air pollution effect, PDP-Renewables will decrease the healthy years of life loss by 18.0% compared to PDP-Gas (or 9,214 years in reduction) and by 40.0% compared to PDP-Coal (or 28,036 years in reduction).

In total, PDP-Renewables can save Thai population's healthy life by 17,027 years compared to PDP-Gas (equal to 20.9% of PDP-Gas' impact) and by 39,799 compared to PDP-Coal (equal to 38.2% of PDP-Coal's impact).

Table 3: Health Impacts from Air Pollution in Three PDP Options

Items	Unit	2015			2003-2015			Gas-Renewable				Coal-Renewable			
		Gas	Coal	Renew.	Gas	Coal	Renew.	2015	%	2003-2015	%	2015	%	2003-2015	%
Injuries															
Total Death from Injuries	Cases	9.5	12.0	6.1	83.9	90.9	72.2	3.4	36.1	11.7	14.0	5.9	49.4	18.7	20.6
Severe Injuries	Cases	137.9	239.0	106.3	1,416.2	1,699.0	1,305.8	31.6	22.9	110.3	7.8	132.7	55.5	393.1	23.1
Minor Injuries	Cases	1,029.5	1,907.4	791.1	10,883.1	13,340.1	10,072.1	238.4	23.2	811.0	7.5	1,116.3	58.5	3,268.0	24.5
Acute Health Effects															
Acute Mortality	Cases	113.0	228.3	87.7	1,439.4	1,762.1	1,361.1	25.2	22.4	78.3	5.4	140.6	61.6	401.1	22.8
Acute Years of Life Loss	Years	84.7	171.1	65.8	1,079.0	1,321.0	1,020.5	18.9	22.3	58.5	5.4	105.4	61.6	300.5	22.7
Acute Hospital Admission	Cases	542.9	660.4	418.6	5,259.6	5,588.6	4,750.7	124.3	22.9	509.0	9.7	241.8	36.6	837.9	15.0
Acute Congestive Heart Failure	Cases	82.4	128.9	65.8	895.4	1,025.5	837.6	16.6	20.1	57.9	6.5	63.0	48.9	187.9	18.3
Acute Restricted Activity Days	Thousand days	483.6	758.7	381.4	5,263.1	6,033.0	4,900.6	102.2	21.1	362.5	6.9	377.3	49.7	1,132.3	18.8
Chronic Health Effects															

Source: Own Calculation

Table 3: (Cont.) Health Impacts from Air Pollution in Three PDP Options

Items	Unit	2015			2003-2015			Gas-Renewable				Coal-Renewable			
		Gas	Coal	Renew.	Gas	Coal	Renew.	2015	%	2003-2015	%	2015	%	2003-2015	%
Chronic Mortality	Cases	1,428.7	2,223.0	1,136.7	15,314.5	17,537.4	14,340.1	292.0	20.4	974.4	6.4	1,086.2	48.9	3,197.3	18.2
Chronic Year of Life Loss	Years	14,282.4	22,223.2	11,369.0	153,084.2	175,308.1	143,366.1	2,913.4	20.4	9,718.1	6.3	10,854.1	48.8	31,942.0	18.2
Chronic Bronchitis (Adult)	Cases	947.5	1,478.8	758.6	10,267.0	11,753.9	9,613.3	188.9	19.9	653.7	6.4	720.2	48.7	2,140.7	18.2
Chronic Bronchitis (Children)	Cases	13,173.7	20,654.8	10,554.5	143,372.0	164,309.5	134,273.0	2,619.2	19.9	9,099.0	6.3	10,100.3	48.9	30,036.4	18.3
Chronic Cough	Episodes	16,927.2	26,501.8	13,568.9	184,283.9	211,080.5	172,636.3	3,358.3	19.8	11,647.6	6.3	12,932.9	48.8	38,444.1	18.2

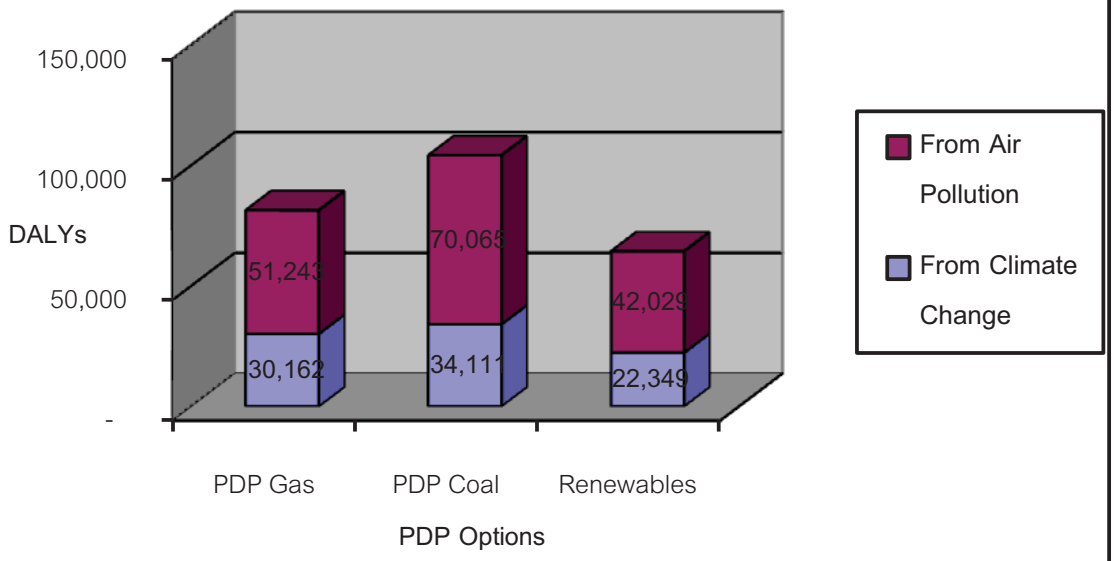
Source: Own Calculation

3.2.3 Overall Results on Physical Health Impacts

In conclusion, both health impact analytical methods confirm that PDP-Renewables is the best PDP option in protecting health for Thai population. In relative term, in 2015, PDP-Renewables is expected to annually save 300 lives from acute and chronic mortality and prevent 3,000 people from chronic disease (compared to PDP-Gas). At the same time, PDP-Renewables can save 17,000 healthy life years for all Thai population. In general, the health benefits from PDP-Renewables will be around 20% reduction in negative health impacts compared to the PDP-Gas and 40% reduction compared to PDP-Coal.

Like other impact analysis and energy modeling, limitations and uncertainties always lie behind the assumptions used in the analysis. However, the sensitivity analysis shows that the benefits of PDP-Renewables can be confirmed within the wide ranges of uncertain and contestable emission and health impact factors for main fossil-based technologies[3].

Figure 1 Health Impacts of Three PDP Options in 2015 Disability-adjusted Life Years



4. An Easier Choice

4.1 Alternative Ideas of An Easier Choice

Although PDP-Renewables is clearly a more desirable option than PDP-Gas and PDP-Coal in term of environmental and health, the comparison of their economic impacts is much more crucial in policy debate and policy-making in Thai power sector. While most researchers conventionally apply economic evaluations techniques to convert environmental and health benefits into monetary values and compare together with the generation costs of each policy option, this study takes another approach by directly comparing the economic impacts of PDP-Renewables with other two PDP options. This approach is basically based on two main facts.

Firstly, the externality concept seems to be a good theoretical approach, but it does not work well politically. Politicians seem to pay more interest in "money in the pocket" rather than "money converted from the healthier air". Secondly, in the situation of the risky energy market, the renewable energy has its own economic advantages, which are normally ignored in planning process.

To prepare for direct economic comparison, the selection or the formulation of alternative options is very crucial.To make this renewable alternative an easier choice for decision-makers especially in terms of financial perspective, this PDP-options will combine

a) cheaper solutions (compared to conventional power plants) such as revising demand forecasting and DSM with
b) competitive solutions, like Industrial CHP, biomass and biogas and
c) more expensive solutions, like wind and solar energy.

4.2 Economic Benefits

To facilitate further discussion on healthy public policy in Thai power sectors, this part provides the comparison of four economic impact indicators in three sections as presented below.

- *Impact on Investment Requirement*

Following the existing PDP, or PDP-Gas will require investment for additional install capacity around 651.6 billion THB (only in generation sub-sector), during the period of 2003-2015. Moving to

PDP-Coal will lead to a higher investment requirement, around 758.7 billion THB for the same period. Investing more in renewable energy will also push investment requirement of PDP-Renewables slightly higher than PDP-Gas, but still lower than PDP-Coal. For the whole period, PDP-Renewables requires 683.3 billion THB, which is 31.7 billion THB (or equal to 4.9%) higher than PDP-Gas. The difference in investment requirement between PDP-Renewables and PDP-Gas is smaller than normal expectation because PDP-Renewables combines cheaper solutions, and competitive solutions, like biomass power plants or co-generation, with the present expensive solutions, e.g. solar PV and wind energy.

- *Impact on Generation Cost*

Although PDP-Gas requires least additional investment, the higher price of natural gas as its main fuel source makes PDP-Gas the most expensive PDP options in the terms of generation costs. Figure 2 shows the generation cost of three PDP options in 2015. Total generation cost of PDP-Gas in 2015 is expected to be 408.7 billion THB, while the anticipated costs of PDP-Coal and PDP-Renewables are 400.6 and 366.5 billion THB, respectively. In comparison, PDP-Renewables is 42.2 billion THB or around 5.2% cheaper than the existing PDP due to its lower fuel cost. With the lower fuel costs from renewable energy and better demand management, PDP-Renewables obviously becomes the cheapest solution.

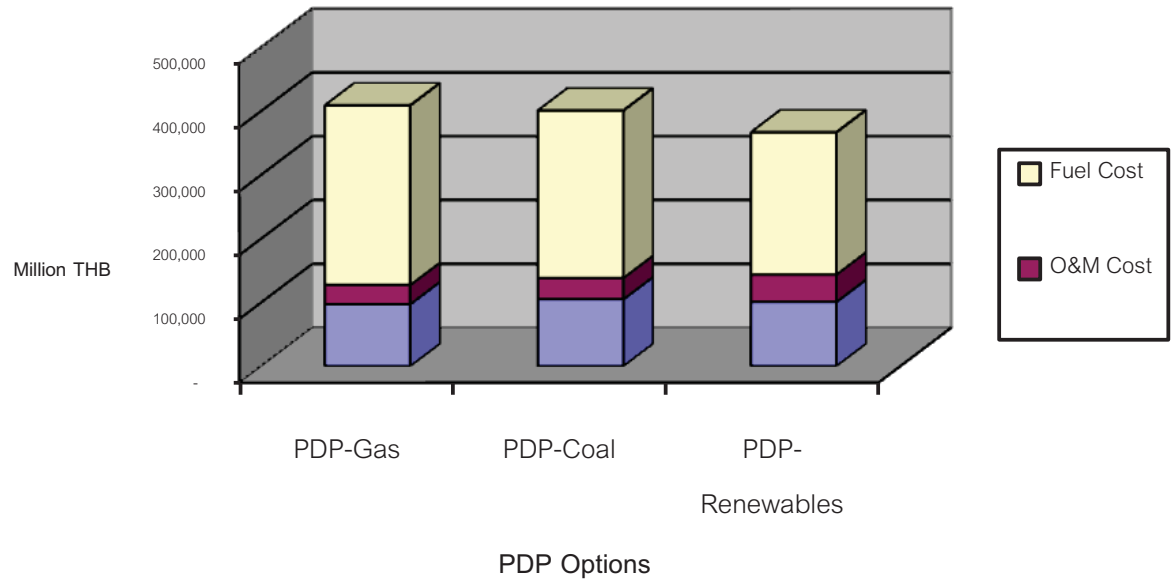
- *Impact on GDP contribution and Balance of Payment*

The analysis of cost distribution within and outside the country is quite essential for small economy like Thailand, since higher costs of imported fuels and power technologies can also lead to the increasing of import burden, the potential deficits in balance of

trade and balance of payment (BOP). On the contrary, increasing reliance on domestic resources and investments can directly contribute to the growth of national economy and lower import burden.

For the whole PDP period (2003-2015), PDP-Gas will contribute 905.7 billion THB to national economy and, at the same time, raise an import burden by 1,677.9 billion THB in the present value term. The GDP contribution of PDP-Coal, with the higher share for imported coal in its fuel mix, will be 896.1 billion THB, which is slightly smaller than PDP-Gas. However, with the import cost of 1,675.3 billion THB, the import burden of PDP-Coal is also expected to be slightly smaller than PDP-Gas too.

Figure 2
Generation Cost of Three PDP Options in 2015

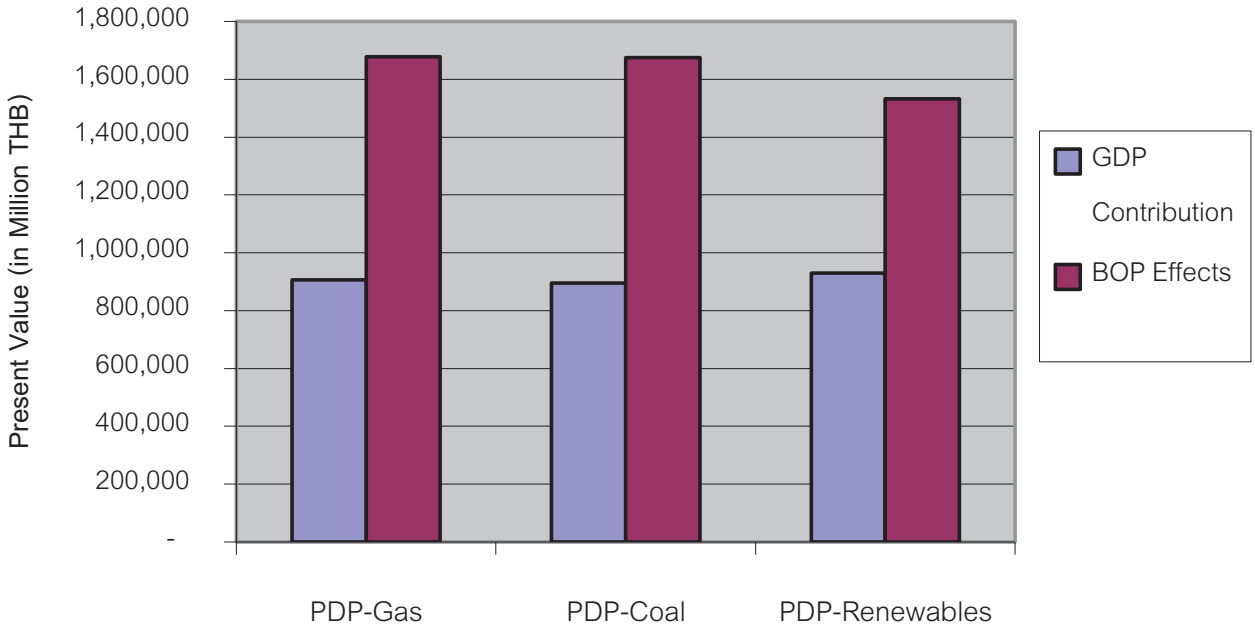


As shown in Figure 3, PDP-Renewables provides the best outcomes both in GDP contribution and balance of payment effects. In terms of GDP, PDP-Renewables is expected to contribute 929.7 billion THB to Thai economy during the same period, which equals to 2.65% higher than PDP-Gas. In terms of BOP, the import cost of PDP-Renewables is estimated at 1,532.0 billion THB for the whole period, which is around 8.7% lower than PDP-Gas.

- *External Cost*

Another important economic indicator is the comparison of external cost from three PDP options. This indicator represents the idea that economic analysis should incorporate environmental, health and other societal consequences (both positive and negative) into its analysis by monetarizing these consequences (or impacts) into an external cost.

Figure 3
GDP Contribution and BOP Effects of Three PDP Options



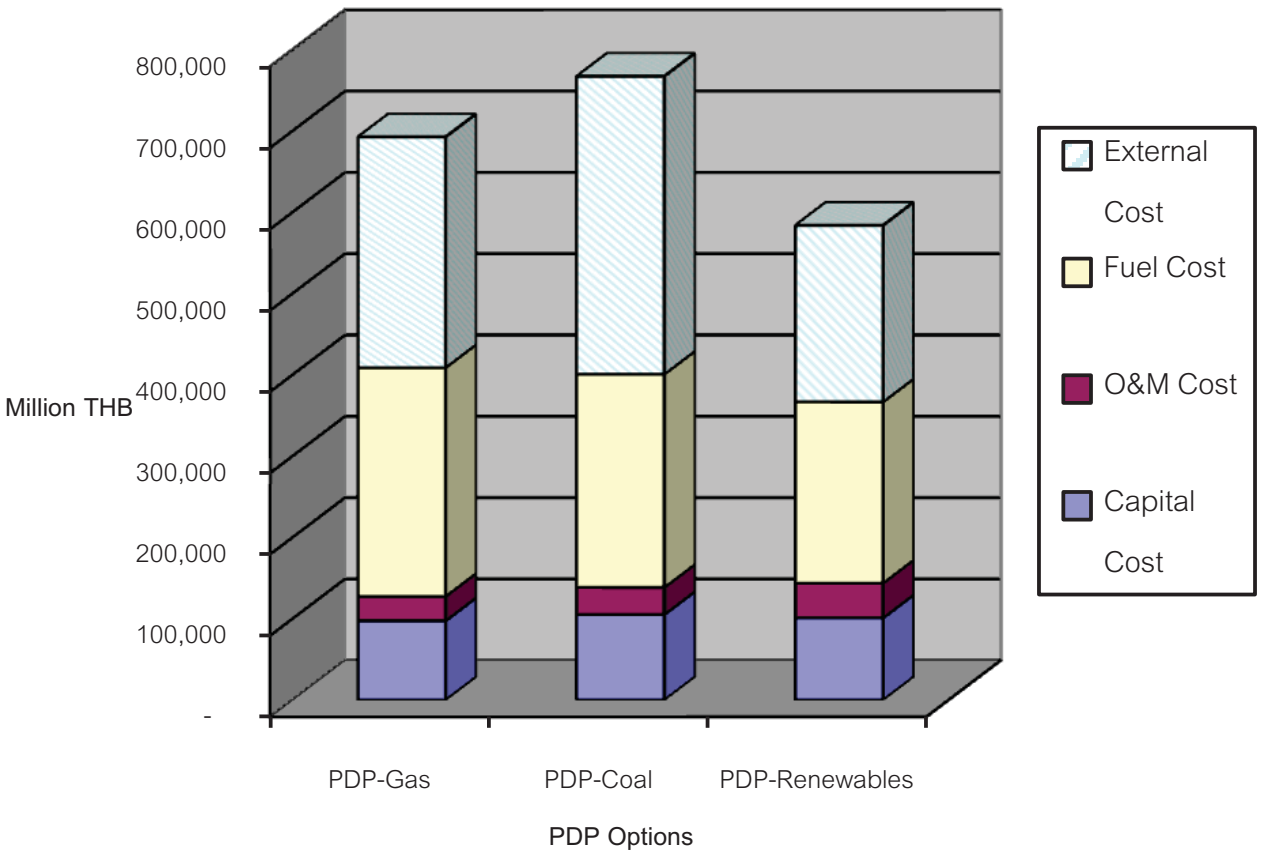
Related to its lowest negative impacts on environment and health, PDP-Renewables is again the most favorable PDP choice. In 2015, the external cost of power generation based on PDP-Coal is estimated to be 366.4 billion THB, which almost equals to its own generation cost (400.6 billion THB in 2015). For PDP-Gas, its external cost will be 283.7 billion THB in 2015, which is much lower compared to PDP-Coal. The external cost of PDP-Renewables is expected to be around 217.2 billion THB in 2015, which is 66.5 billion THB/ year lower than PDP-Gas (or equal to 23.45% lower than PDP-Gas). When combined with its lower generation cost as discussed in previous section, the total economic saving of PDP-Renewables at 2015 will be 108.7 billion THB a year (also see Figure 3 for comparison). Therefore, this study suggests that PDP-Renewables has its own economic advantages,

which can be used to stimulate economic growth, to stabilize national economy, and to promote sustainable development in the country.

- *Impacts of Fuel Risks*

The assumption of fuel price is certainly crucial for every energy planning. Moreover, it is almost impossible to provide today a realistic prediction of a tomorrow world energy market. In this situation, the sensitivity analysis of different fuel situations is, therefore, useful, not only to find the least cost solutions in different situations but also to search for the most secure options for uncertain futures.

Figure 4
Generation and External Costs of Three PDP Options in 2015



There are three different price situations applied to fuel price sensitivity analysis in this study. The base case scenario is based on the assumptions used in the existing PDP, i.e. 2003 normal price situation (or the price of natural gas at 155 THB/btu). The second scenario (so-called situation II) is the scenario of an increasing Thailand's natural gas price up to the highest level of 2005, at 190 THB/btu. The last scenario (situation III) is the situation when the prices of both imported coal and biomass are also proportionally increased according to natural gas price.

The result shows that, PDP-Renewables still holds its advantage over the lowest generation costs in all three pricing situations. In 2015, the generation cost of PDP-Renewables in Situation II is 401.1 billion THB (12.9% lower than PDP-Gas) and in situation III is 404.6 billion THB (12.5% lower than PDP-Gas), which is even lower than the generation cost of PDP-Gas in the base case scenario (see also Figure 5). Therefore, PDP-Renewables is the best PDP option in dealing with future high price situation.

In terms of import saving, PDP-Renewables also provides the import saving for Thai economy in both Situation II and III. In Situation II, the total present value of import saving by PDP-Renewables is 180.2 billion THB for the whole period compared to PDP-Gas (or equal to 9.6% saving). This shows the larger import saving compared to the base case scenario, which has 145.9 billion THB (or 8.7%) difference between PDP-Renewables and PDP-Gas. In Situation III, when the increasing price of biomass is also assumed, the import saving of PDP-Renewables (compared to PDP-Gas) is slightly dropped to 179.3 billion THB (or 9.5% saving).

This suggests that PDP-Renewables is a good choice in stabilizing national balance of payment by reducing import costs, especially when import burden is on the increase in the wake of rising fuel prices.

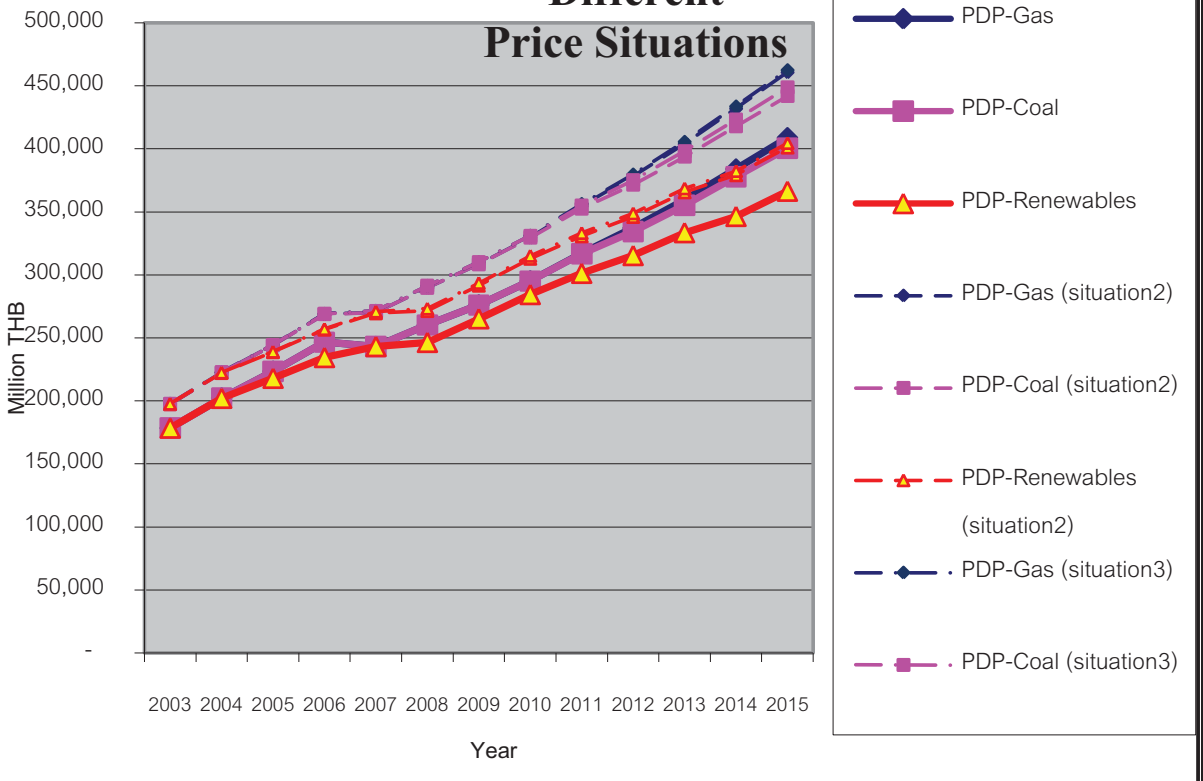
- *Employment Impact*

One of the main advantages of renewable energy is to create jobs at local levels. Based on a life-cycle employment factor, the employment effect of three PDP options is calculated and shows that the existing PDP, or PDP-Gas will increase the total

employment in power and fuel sectors from 31,785 in 2003 to 81,200 person-year in 2015. Since new coal-fired power plant will solely rely on imported coal, PDP-Coal will lead to slightly lower employment effect (78,741 person-year in 2015) compared to PDP-Gas.

Since it is more dependent on domestic resources and small-scale technologies, the employment effect of PDP-Renewables, thus, is much higher than PDP-Gas and PDP-Coal. In 2015, PDP-Renewables is estimated to employ 98,811 person-year, which is 17,611 persons higher than PDP-Gas (or equal to 21.7% higher than employment effect of PDP-Gas).

Figure 5
Generation Cost of three PDP Options in Three Different Price Situations



- *Flexibility in High Demand Growth Scenario*

Apart from their different fuel mixes, another main difference between PDP-Renewables and other two PDP options is the demand growth expectation. Although the figures of peak demand in 2004 and 2005 are much more closer to what is predicted in PDP-Renewables than those of other two options, several expansionist planners never stop concern for the return of unexpected high growth economy and, consequently, high electricity demand growth. This sensitivity analysis will deal with this concern by analyzing the flexibility of PDP-Renewables in maintaining system reliability as well as its environmental, health, social, and economic advantages.

The analysis shows that although the environmental impacts of the adjusted PDP-Renewables with more renewable energy investments and DSM, so-called PDP-Renewables (High), are generally 8-9% higher than the normal PDP-Renewables, PDP-Renewables (High) still provides the better result compared to PDP-Gas in all environmental indicators. The advantage in the reduction of greenhouse gas emissions is still more than 19%. And, in other pollutants, the emission reduction ranges from 2% reduction in TSP to 17% reduction in SO2. This confirms the environmental advantage of PDP-Renewables over PDP-Gas in high demand growth situation.

At the same time, the result also confirms the health advantage of PDP-Renewables (High) over the PDP-Gas. In mortality assessment, the benefits of PDP-Renewables (high) is still around 220 cases lower than PDP-Gas, which equals to 17.2% reduction in acute mortality and 13.9% reduction in chronic mortality. In terms of the loss of healthy life years (or DALY), in total, PDP-

Renewables (high) can still save 11,323 healthy life years (around 13.9% reduction compared to PDP-Gas) for all Thai population

In terms of economic impacts the results indicates that, with the additional investments to meet higher expected demand, PDP-Renewables (High) requires 1.8% higher generation cost, 1.4% higher import burden, 1.5% higher fuel cost compared to the normal PDP-Renewables. However, all these costs of PDP-Renewables (High) are still lower than PDP-Gas (i.e. 3.1% lower in generation cost, 7.4% lower in import burden and 9.1% lower in fuel cost). The economic saving in terms of generation cost is still nearly 80 billion THB and in terms of BOP is still more than 124 billion THB (both in present value term). Concurrently, with more investment, the GDP contribution of PDP-Renewables (High) becomes 2.3% higher than the normal PDP-Renewables, which results in 45.3 billion THB higher GDP contribution compared to PDP-Gas (around 5% of PDP-Gas). The external cost of PDP-Renewables (high) is also 16.8% lower than of PDP-Gas.

All the results in this sensitivity analysis represent the flexibility of PDP-Renewables in coping with higher demand growth situation and its ability in maintaining all advantages over other PDP options.

4.3 Government Target Achievement

Another important aspect for impact analysis is how these three PDP-options will help Thai power sector to achieve the government target. As mentioned earlier in Chapter 4, the two important targets for power sector are a) to lower the energy intensity from 1.4:1 (energy generation expansion : GDP growth)

to 1:1 and b) to increase the share of renewable energy generation from 0.8% to 6.0% by 2011.

Table 4 shows that neither PDP-Gas nor PDP-Coal can provide satisfactory results in reaching both targets. Both PDP options can lower energy intensity down to 1.1:1 (not 1:1 as planned by the Thai government) and increase renewable energy proportion up to 1.26% in 2011 (not 6% as wished). Even with the expansion period to 2015, the renewable share in these two PDP options will still be lower than 2%.

Therefore, it is quite clear that, within three PDP options, only PDP-Renewables can successfully reach the government target, with 1.02:1 energy intensity (which in fact still a bit higher than the target) and 6.43% renewable energy in 2011. And, in 2015, the renewable share in PDP-Renewables will nearly reach 10%.

Table 4 The Comparison of Three PDP Options in Achieving Government Targets

Items	Government Target	PDP-Gas	PDP-Coal	PDP-Renewables
Assumed GDP Growth (%)		6.5	6.5	5.20
Growth in energy generation (%)		7.1	7.1	5.35
Energy Intensity 2015	1 : 1	1.09 : 1	1.09 : 1	1.02 : 1

Table 4 (cont.) The Comparison of Three PDP Options in Achieving Government Targets

Items	Government Target	PDP-Gas	PDP-Coal	PDP-Renewables
Renewable Energy Share 2011 (%)	6.0	1.26	1.26	6.43
Renewable Energy Share 2015 (%)	>6.0	1.95	1.95	9.87

Source: Own Calculation

4.4 The Conclusion of an Easier Choice

As healthy public policy aims to create supportive environment for healthy living and, at the same time, to make the healthier choice the easier choice for decision-makers, this study provides a wide range of impact assessment from health to economic perspectives for policy discussion within Thai society. And the results show that

- **PDP-Renewables is a cleaner solution.** Through the lower power consumption and renewable energy generation, the emission of greenhouse gas as well as main air pollutants will be significantly reduced.
- **PDP-Renewables is a healthier option.** It creates lower health risks and results in lower health impacts in terms of mortality, chronic diseases, and loss of healthy life year. Through PDP-Renewables, annually around 300 lives are

expected to be saved and 3,000 people are prevented from the chronic diseases.

- **PDP-Renewables is a socially benefit.** Due to its higher domestic investment and fuel share, PDP-Renewables creates more jobs.
- **PDP-Renewables is a feasible choice.** It requires only small additional investment which consequently yields lower generation cost, lower import burden and higher GDP contribution for Thai economy.
- **PDP-Renewables is a more secure and flexible investment option.** It provides less risk regarding higher fuel prices. It can also cope with higher demand growth while maintaining its benefits over other PDP options.
- **PDP-Renewables is an answer to reaching political targets.** As shown in this chapter, within three PDP options, PDP-Renewables is the only option that can enable the Thai power sector to reach the government's goals of 6% renewable share and 1:1 energy intensity.

Instead of highlighting on externality costs, this study challenges directly to economic considerations in Thailand's energy planning. Obviously, by combining the cheaper and competitive renewable solutions with reasonable forecasting plus some expensive technology, the healthier option, in this case PDP-Renewables, can in itself be a more economic attractive option. Especially if the stability of the economy is being concerned, the benefits of PDP-Renewables become more prominent.

The study also involves in the process of communicating this argument through policy workshops and sustainable energy trip. The aim is to bring the real healthier changes in the Thai power

sector, as wished in healthy public policy. It can also be seen as the test of this argument. Does this argument make a "healthier choice" an easier choice? The answer is in the next two sections.

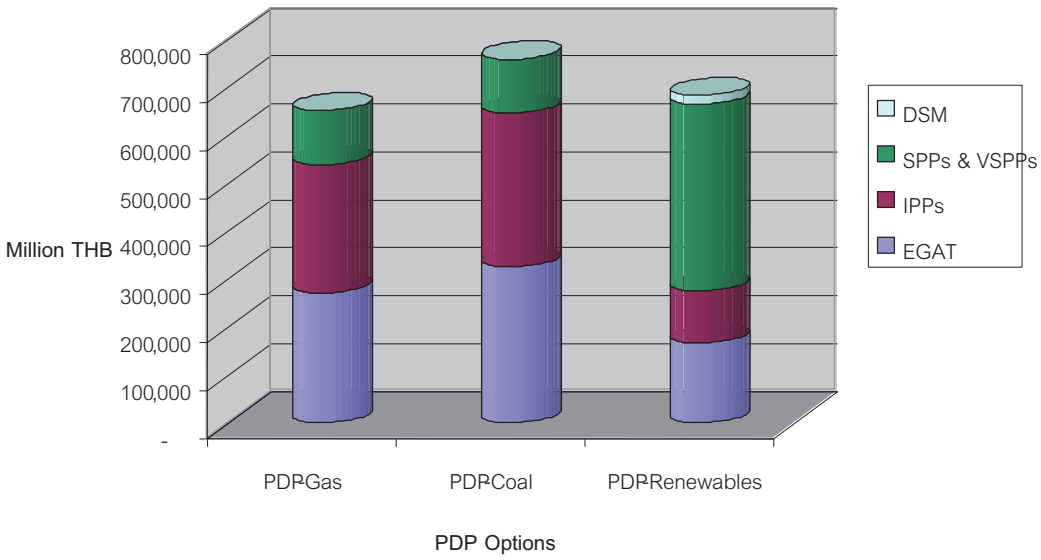
5. The Real-life Difficulties

5.1 Reasons of Difficulties

From the analysis in the previous sections, it is obvious that policy changes towards healthier option in Thai power sector requires not only technical solutions or fuel changes but also new forms of organization, practices, investing and earning profits in the power sector.

Figure 6 provides a clear picture on how investment scheme must be changed if PDP-Renewables will be opted in a real action plan for Thai society. While PDP-Gas and PDP-Coal are basically require the investment from large power producers, like the EGAT and IPPs, as usually done today, PDP-Renewables involves in much more investment by small and very small power producers (SPP and VSPPs) and also in demand-side management. The sensible question is, then, "Does this required investment scheme already exist?" or "how can we make this supportive investment scheme ready in place in order to develop PDP-Renewables?".

Figure 6 Investment Requirement Classified by Investors



Experiences from recent field studies cannot provide an optimistic answer, however. Although renewable energy can have more room to play in Thai power sector with quite impressive growth in the past few years, Thai power sector in general is still under the control of monopoly chain and few powerful big investors. Evidently, renewable energy producers still face with several institutional obstacles and unfavorable regulations, from market and governance structure to interconnection practices. Following are three examples of institutional analysis that demonstrate practical difficulties

5.2 Institutional Analysis I: Pricing Policy

In principle, the price of renewable power "should at least be equal to the avoided cost of electricity on the lower voltage grid of a distributor" (i.e. the wholesale price at which a municipal grid operator buying electricity from the transmission network) "plus a

premium reflecting the renewables' social and environmental benefits"[4] .

However, in practice, this concept is not fully applied in Thailand. The most important pricing scheme for renewable energy in Thailand is the "firm and non-firm Small Power Producers (SPP)" pricing scheme. Firm SPPs have to generate electricity 4,670 hours/year. The payment for firm SPPs include the monthly capacity or availability payment (in THB/kW/month) and energy payment (in THB/kWh), which are based on EGAT's long-run avoided capacity and energy cost[5].

Generally, non-firm SPPs are those who fail to meet the criteria for firm SPPs and they can only get an energy payment based on EGAT's short run avoided energy costs[6]. Normally, the payment they get is much lower than firm SPPs. With the seasonal characteristics of their biomass resources, most of current and foreseeable renewable power producers (both in terms of number and install capacity) are non-firm SPPs (see Table 5).

In 2002, Thai government decided to use Energy Conservation Fund (Encon Fund) to provide the first 5 year subsidy for renewable SPPs based on a single round of bidding program. At the same time, Thai government also set up another scheme for very small power producers (VSPPs) with less than 1 MW capacity sold to the grid. The VSPP pricing scheme is similar to net metering system in the USA, where the excess capacity generated by renewable producers will spin the existing customer's electricity meter backward and bank it until it is needed by the

customers. In Thailand, in the case of excessive generation, the payment will based on EGAT's wholesale price[7].

For Small Power Producers (SPPs) scheme, based on the marginal cost of 1.93 THB/kWh at 115 kV line (where most of SPPs connect and sell their electricity to the grid[8]) , only firm SPPs (both with and without 5 years subsidy) can get more than EGAT's avoided costs, as seen in the Table 5 while non-firm SPPs are not granted with such privilege. In 2005, the average purchasing price for non-firm SPP without 5 years subsidy is only 1.76 THB/kWh. With the average 5 years subsidy, only a few non-firm SPPs can get exactly EGAT's avoided costs for the first 5 years of their operation.

For the case of Very Small Power Producers (VSPPs), the concept of avoided costs is fulfilled as they sell their electricity to the Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA) -- both using the Electricity Generating Authority of Thailand (EGAT) wholesale price as their reference. But, they do not receive any payment for their contributions to the better environment. In fact, it is fair to say "there is no subsidy at all for non-firm SPPs and VSPPs in Thailand".

Table 5: Price Comparison between Different Power Purchasing Schemes

RE Producers	No.	Install Capacity (MW)	Power Sold (MW)	Power Sold with subsidy (MW)	Average Price in 2005 (THB/k Wh)	Average 5 yr. Subsidy (THB/k Wh)	Price + Subsidy (THB/k Wh)
Firm SPP with 5 yrs Subsidy	9	250.60	201.40	144.70	2.32	0.17	2.49
Firm SPP w/o 5 yr. subsidy	3	106.60	42.80	-	2.32	-	2.32
Non-firm SPP with5yrs. Subsidy	7	157.00	70.00	59.60	1.76	0.17	1.93
Non-firm SPP w/o 5 yr. subsidy	25	414.20	114.30	-	1.76	-	1.76
VSPP	59	16.02	7.65	-	2.19	-	2.19
Total	103	944.42	436.15	204.30			

Source: Complied from EPPO, 2006.

As seen from the Table, the criteria of "firm and non-firm" SPPs is the main obstacle that block 42% of renewable power sold by non-firm SPPs (equal to 60% of total renewable install capacity) to get a fair rate of their power contributions (even without mentioning their positive externalities). The results of this unfair pricing scheme are the lower investment in their power generation (compared to their potentials) and their lower electricity sales (compared to their install capacity) as seen in many cases during the field visits. By taking into account the seasonal nature of biomass resources, this criterion can be biased against the renewable power generation.

5.3 Institutional Analysis II :Grid Accessing and Interconnection

Principally, all producers should be able to gain fair access to the grid with sound technical considerations for grid stability. However, in practice, it is not only a technical rationality that plays role in regulating grid access and interconnection. In several cases, what determines the technical regulations is the institutional power within the electricity system, rather than technical rationalities alone. The analysis in this section will basically based on an institutional point of view.

During the field visits, SPPs and VSPPs raised practical problems in grid access and interconnection based on their own experiences, as presented in Table 6.

For SPPs, the main issues are unnecessary investment and unfair charges. In SPP scheme, SPPs are required to invest both in interconnection equipment and upgrading the grid. Some SPPs do not understand why they are not allowed to connect to the grid at lower voltage rather than EGAT's 115kV. They also feel that putting burden in upgrading the grid on their side is not fair, as utilities own the grid and can use it for any other purposes[9]. Some of them also mentioned about high interconnection and back-up charge and, more interestingly, unsold supply penalty, which is imposed by the PEA, when it cannot sell electricity supplied by SPPs (through EGAT transmission line) in some off-peak hours (in some specific areas) and requires SPPs to transfer their electricity payment (from the EGAT) to the PEA for its loss of income.

Table 6 Practical Problems in Grid Accessing and Interconnection Found in Field Visit and Policy Forums

Pricing schemes	Practical Problems Found
Firm SPPs & Non-firm SPPs	- High interconnection and back-up charge - Unnecessarily expensive interconnection equipments - Unnecessarily expensive upgrading the grid - Unsold supply penalty (when PEA cannot sell electricity provided by SPPs)
VSPP	- Bottleneck in registration process - Only 17% of applications can sell and get electricity payment - Disagreement in inverter certification forces 40 PV producers to sell electricity for free to the grid - Continuation of 6 months electricity charges after switching to VSPPs.
Co-generation SPP (apart from biomass)	- No access to the grid (or no new contract) since 1999 - Now only allow for EGAT, PEA, MEA, and their subsidiaries to run new co-generation plants

While all of these issues require case-by-case studies and discussions, there are two major problems. The first is the lack of space and mechanism for SPPs to ask for reconsiderations as all

these regulations have been set up by utilities, which also operate in the same business. The second is that the utilities do not recognize the benefits of SPPs in stabilizing the grid by providing the electricity and reactive power at low voltage (as most biomass power plants are located outside district). In the case of Mitr Phol Biomass power plant (Firm SPP), it can provide 8 MW power for the grid, the investment of one sub-station (for servicing around 6-8 districts) has been saved, while the quality of service can be maintained.

For VSPPs, bottleneck in registration process is identified as their main problem. Up to now, only 17% of applicants can sell and get electricity payment. 40 PV producers in the MEA area cannot get payment for their electricity sold to the grid due to disagreement in inverter certification. Certainly, for the MEA, grid stability issue is the main rationale for this disagreement and, consequently, non-payment decision, though the MEA is now receiving free electricity with no experiences in system interruption.

5.4 Institutional Analysis III: Market and Governance Structure

Certainly, all the above-mentioned problems are linked to monopoly market structure and conflicts of roles and interests, which allow utilities to set up their rules without any channel for renewable SPPs to appeal and the public to reconsider.

- **Centralized Power System in Thailand**

From the 1960s, Thai power system has depended on three state-own enterprises, namely the Electricity Generation Authority of Thailand (EGAT) for generation and transmission, the Metropolitan Electricity Authority (MEA) and the Provincial

Electricity Authority (PEA) for distribution in the Greater Bangkok and the provinces, respectively. Moreover, the supply of natural gas, main fuel sources for power generation is also controlled by the Petroleum Authority of Thailand (PTT)[10].

From 1992, the private power producers have been allowed to generate power and sell power to the grid through the EGAT. In 2005, around 50% of power generation was still operated by the EGAT and 39% was controlled by 6 independent power producers (IPPs)[11], of which the 2 largest IPPs are the EGAT's subsidiaries (equal to 27% of total power generation). All of them rely on the centralized power and fossil fuel technology. The contribution of small power producers (SPP) using renewable energy and co-generation is only around 10%[12].

From the total turnover of almost 240 billion THB in 2002, these four enterprises and subsidiaries absorbed more than 90% of total turn-over (Figure 1). The total profit margin within the system summed up to 38% of the turnover[13]. The high control of power and profit, combined with new trend in vertical integration, like establishing new IPPs, and capitalization in the stock exchange market, encourages them to maintain the fossil-based centralized power system, as their path dependency. Unsurprisingly, the EGAT's contribution to renewable energy generation is only 0.54 MW and 1.8 GWh a year[14].

Recently, the EGAT has proposed future structure of power generation sector with even more centralized power plants[15]. In the EGAT's Power Development Plan 2004 (or PDP-Gas in this study), the contribution of distributed generation was to be reduced from 11.3% in 2003 to 6.9% in 2015. According to PDP 2004, new

installed power plants will mostly be developed by new IPPs based on centralized power generation, through the bidding program for the EGAT power purchasing agreement. It is quite clear that the market structure and planning process of Thai power sector provides little room for renewable energy.

- **Present Governance Structure**

Apart from their superiority in power market structure, these three enterprises, as state-own enterprises, also hold several crucial roles and authorities in power governance structure. Apart from their role as the operator, they still responsible for policy and planning, especially in terms of investment plan. Moreover, they still take the role of regulator, including in approving new power plants (by the EGAT), approving IPP, SPP, and VSPP purchasing agreement, and technical standard in interconnecting to the grid[16] . In other words, they have authorized power to decide who should access to the grid and how they should connect to and operate within the grid system.

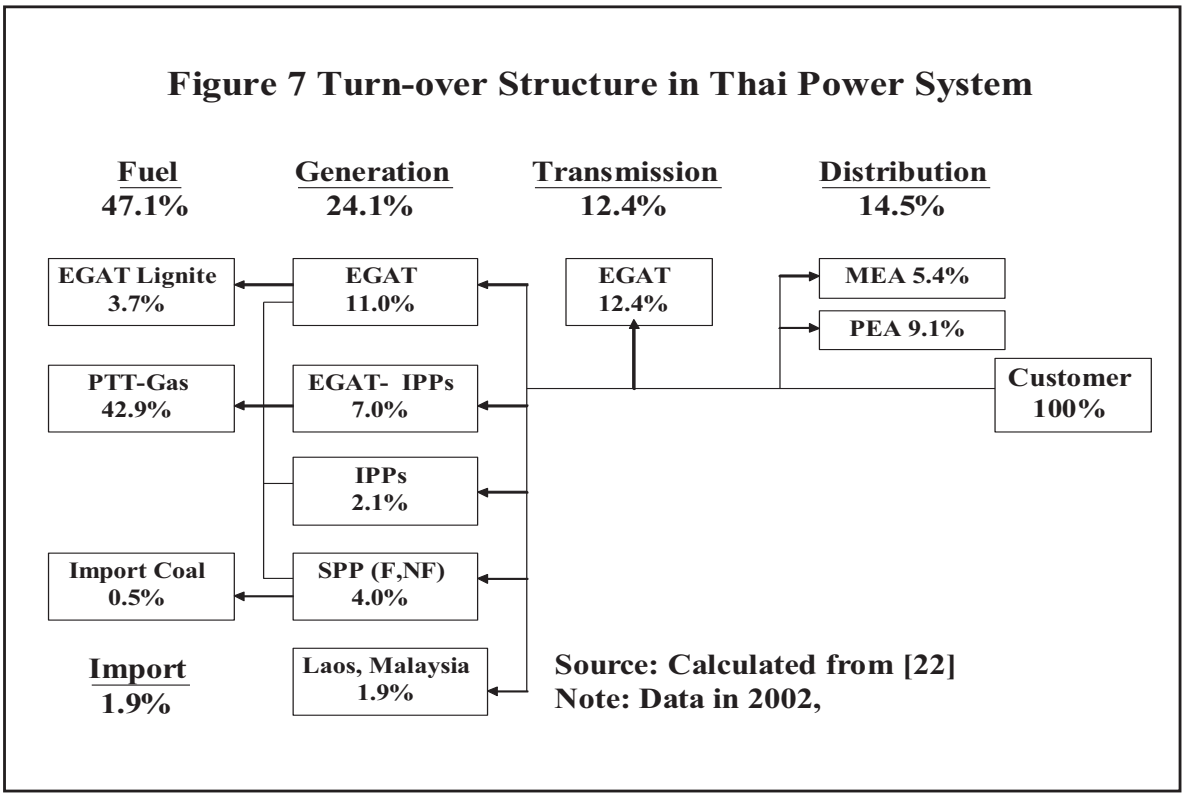


Table 7: Roles and Authorities of Different Institutes in the Present Power Governance Structure

Roles	MoEn.	EGAT	PEA	MEA	Regulator
Policy Roles					
Fuel Mix	λ	λ			?
Investment Plan	λ	λ	λ	λ	?
Social Policy	λ				?
Regulation Roles					
Electricity tariff	ʘ	ʘ	ʘ	ʘ	λ
Demand forecasting	λ	ʘ	ʘ	ʘ	λ
Technical Standard	ʘ	λ	λ	λ	

Table 7 (cont.): Roles and Authorities of Different Institutes in the Present Power Governance Structure

Roles	MoEn.	EGAT	PEA	MEA	Regulator
Regulation Roles					
Approval	λ	λ	λ	λ	?
Operational Roles					
Generation		λ			
Transmission		λ			
System Operator		λ			
Distribution			λ	λ	

Note: λ represents the major roles and
O represents the minor roles.

Source: Adapted from NESAC, 2003[17].

- **Problems within existing structure**

In short, with this existing market and governance structure, renewable producers have to run their business in a marginalized condition. They are competing in the monopoly market, where their strongest competitors (i.e, the EGAT and its subsidiaries in generation sub-sector) are their monopolistic buyer. Moreover, these monopolistic players, (i.e., the EGAT, the MEA, and the PEA) have authorized rights in dealing business with renewable power producers.

As all these enterprises also run the same businesses (i.e., generation and distribution) with more profit-oriented (under the EGAT's privatization policy), without proper governance mechanism, these authorized powers can be turned to be a tool to

protect their vested interests and, consequently, an institutional barriers for renewable energy producers, as later shown in this chapter.

One of the mechanisms in avoiding unfair regulations is the effective intervention from independent regulator. However, the regulator in Thailand right now is interim (not permanent). It has just been established without genuine independence (as easily dissolved by the minister). There are question about its role which is unclear as well as its authority in regulating the market. Although the interim regulator can be one of the opportunities in developing more fair market for renewables, this opportunity is still highly uncertain and, therefore, less effective.

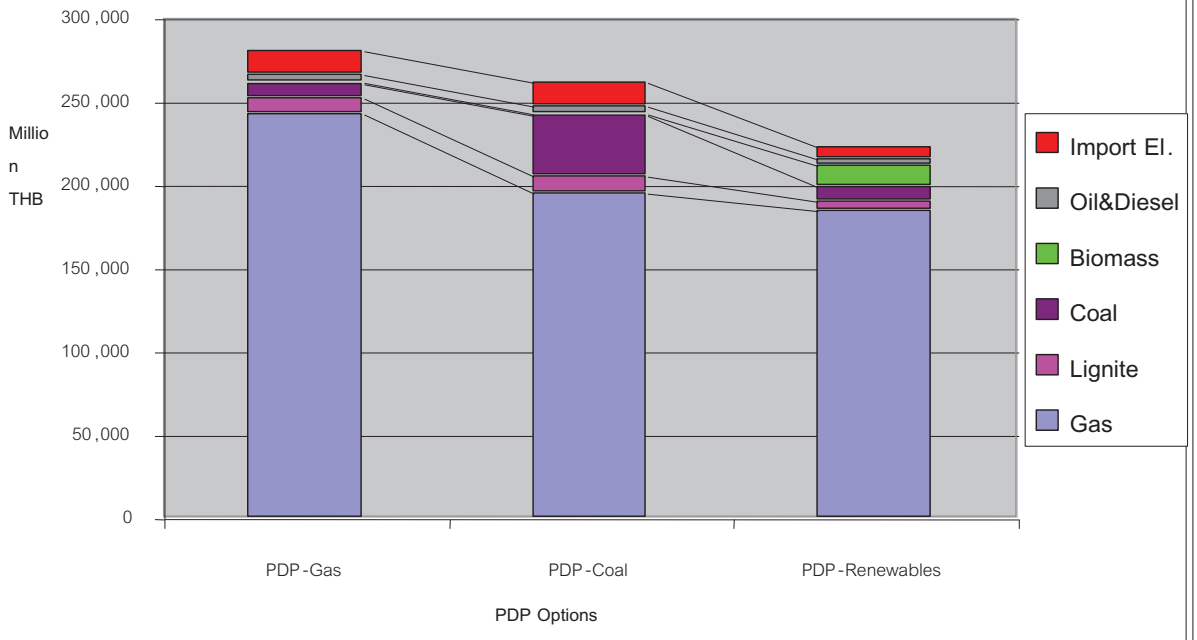
More pessimistically, it is hard to imagine that the powerful big investors, like the EGAT and the IPPs will easily accept the changes from PDP-Gas to PDP-Renewables, which will reduce their investment opportunities (and consequently their profit earnings) by more than half of their status quo position. Moreover, apart from power investment market, PDP-Renewables also affects the fuel marketl. Figure 7 demonstrates that PDP-Renewables will lead to the reduction of PTT's gas market (as a monopoly seller) in the power sector (the most important gas consuming sector) by 24% in 2015. As the PTT was the highest profitable company in Thailand's stock exchanges in 2005, it is also logical to expect the PTT to protect its market.

Therefore, only by stressing the previous conclusion that "PDP-Renewables is healthier, viable, and even more economically feasible", healthy public policy is less likely to happen in the Thai power sector. To ensure that PDP-Renewables will become an

action, huge efforts must be made to put the supportive institutional framework and regulations in place. Among other things, the most important institutional framework includes:

- **Fair and stable pricing regulation,** such as feed-in tariff, which determines the price of renewable power differently based on its external benefits and stages of technological development
- **Fair access to the grid,** strongly regulated by Independent Regulator, which will allow renewable producers to fairly gain access to the market.
- **More decentralization structure of the Thai power system**, which reduces excess controls of monopoly power, including the reconsideration of the EGAT privatization as a private monopoly power.

Figure 8 Fuel Market in 2015 in Three PDP Options



6. Policy Outcomes of the three-year attempts

As earlier mentioned, the study also aims to bring the real changes to Thai society. Table 8 summarizes the latest policy situations in the Thai power sector, with regard to the policy recommendations to support PDP renewables. From the table, it is clear that some desirable changes, according to healthy public policy standpoint, are now taking shape. For example, the revising of PDP with lower demand growth, as suggested in PDP-Renewables, is going on. The privatization of EGAT under the Enhanced single buyer model has been cancelled since March 2006. The Thai government also tends to agree in the more effectiveness of feed-in tariff pricing mechanism in supporting renewable energy development.

However, within these three years, there are some policy issues that cannot be changed in order to foster PDP-Renewables as a healthy public policy option. Obviously, although the existing PDP2004 is being revised, the process is not yet opened to the public, nor integrated with broader national sustainable development goals, as suggested in this study. Concurrently, though the privatization is suspended, the monopoly chain of power still remains and it is less likely that PDP-Renewables will become the mainstream (or formal) of power development plan any time soon. In fact, the future is not clear for both PDP-Renewables and its supportive institutional framework.

Table 8: The Summary of Policy Recommendations from the Study, Initial Responses from the Authorities and Latest Policy Situations in Thai Power Sector.

Recommendations	Initial Responses from the Authorities	Latest Situations
On Strategic Impact Assessment Results		
1. Revising demand forecasting (January 2005)	EGAT denied to revise PDP2004 (July 2005)	MoEn and Interim regulator agreed to revise demand forecasting due to lower demand growth (January 2006)
2. More DSM investment	No direct response	EGAT announced plan for more DSM during peak period in summer (March 2006)
3. More renewable energy investment	No direct response	No positive and negative signs
4. PDP-Renewables is healthier option	No direct response	No positive and negative signs
5. PDP-Renewables is an economically viable option	Government asserted that Renewables are still expensive (August 2005)	No positive and negative signs
6. PDP-Coal is the most negative impacts in health perspective	EGAT organized APEC clean coal conference (February 2006)	Interim regulator do not yet consider coal as an fuel option in IPP bidding (March 2006)

Table 8: (cont.) The Summary of Policy Recommendations from the Study, Initial Responses from the Authorities and Latest Policy Situations in Thai Power Sector.

Recommendations	Initial Responses from the Authorities	Latest Situations
On Purposed Institutional Framework and Regulations		
7. Enhanced Single Buyer Model and EGAT privatization is not fit for PDP-Renewables	Government strict with ESB model and EGAT privatization plan	Administrative Court cancel the EGAT privatization due to unlawful process (March 2006)
8. Introduction of Decentralization model	Government strict with ESB model	No positive signs, government still fixes with ESB model (March 2006)
9. Clear division of roles in governance structure	No direct response	Interim regulators set up in December 2005 but without clear authorities and autonomy
10. Changes from Firm and Non-firm SPPs to on-peak and off-peak basis	No direct response	No positive signs
11. Expanding scope for VSPPs from 1 MW to 6 or 10 MW	EPPO took earlier action in expanding scope for VSPPs	Expanding scope for VSPPs is still in the process
12. Changes from RPS to feed-in tariff	No direct response	DEDE announced the introduction of feed-in tariff mechanism with collaboration with FTI (March 2006)

Table 8: (cont.) The Summary of Policy Recommendations from the Study, Initial Responses from the Authorities and Latest Policy Situations in Thai Power Sector.

Recommendations	Initial Responses from the Authorities	Latest Situations
On Purposed Institutional Framework and Regulations		
13. Improvement in Grid Access and Interconnection	No direct response	- No positive signs - Hopefully the interim regulator will take consideration soon
14. New practices in PDP process with broader national objectives and more public participation	No direct response	Revising of PDP is on-going without clear changes and public participation process (March 2006)
15. Participatory process in environmental regulation and governance structure of renewable energy development	-EPPO agreed and continued works on Tri-parties committee - EIA reform has been stopped since 2003	No positive and negative signs

From these experiences, the desirable policy changes in healthy public policy perspective can take place within these four situations, when:

1. The policy information is available for public deliberation and, more importantly, the Thai Public takes the case seriously, which lead to meaningful public actions and finally desirable policy changes.

2. Concrete or inevitable facts emerge, and are presented to the public, forcing authorities to change the assumptions and plans, as seen in the lower demand growth that forced government to revise PDP2004.
3. Academic agreements can be reached at least in some certain levels, as seen in the introduction of feed-in tariff mechanism.
4. New policy institutions and actors (or networks) emerge and actively participate in policy process as seen in The establishment of interim regulator leading to revising of demand forecasting and PDP.

On the contrary, the positive changes will hardly happen in the situations when:

1. The public has not been well-informed with too sophisticated, or too technical as well as too much case-specific information.
2. Academic studies and forums are not sufficient to understand the issue systematically (as in grid-access and interconnection issues), raise the issue publicly, and reach some certain levels of academic agreements.
3. Government adopts a non-action policy strategy which means while it does not explicitly decline the policy proposal, it deliberately makes slow progress (as seen in call for more renewable energy investment and VSPP approval process).
4. Access to formal decision-making process is limited (as seen in PDP revising process), therefore, public inputs cannot be fed into the consideration process and at the

same time, logics and rationalities of the decision are never reported to and scrutinized by the public in appropriate timing.

Therefore, based on these recent experiences, it is hard to see the formal complete changes towards PDP-Renewables or the whole recommended institutional framework. It is more likely that the formal policy process will take each decision separately. For example, in the near future, some of these following changes may happen:

- The exclusion of coal-fired power plant in the new IPP bidding round, due to environmental and health concern.
- The introduction of feed-in tariff mechanism to support more contribution from renewable energy.
- Interim regulator may consider the grid access and interconnection regulations more seriously and introduce better regulations for this issue.
- EGAT may invest more on DSM and biomass power purchasing to reduce the investment and generating cost during the peak hours, as public continuously keep strong pressure on tariff rising.

7. Conclusion

Certainly, in Thai power sector, making a "healthier choice" an easier choice for decision-makers, is not an easy task. Obviously, although health impact assessment can provide an idea of what should be a healthier direction, it cannot provide enough understanding of how difficult we face in changing into this direction. Instead of calculating externality costs, this study argues that the healthier policy option, PDP-Renewables, has a lot of its own economic advantages. But this effort still cannot easily lead to desirable policy changes, since the existing decision-making process is basically based on different aspects of economic interests.

Institutional analysis can provide more insight on how decision is made within the existing power structure and, consequently, can block the attempts of moving towards healthier direction. However, with this understanding, there is nothing that seems to be easier, since the supportive institutional framework for healthier choice in this case requires substantial changes, including market and governance structural reform. More importantly, from the study experiences, these suggested changes are less likely to be occurred mainly through any specific research processes, but rather based on the inevitable facts, political conditions, academic agreements, and public actions.

Making the healthier choice the easier choice (for decision-makers) is a useful concept but inadequate to reaching healthier policy change. Perhaps, to ensure that health benefits will be adequately taken into account in policy-making process, better governance system and more balanced processes are also required.

In several cases, instead of making an easier choice, pressuring the decision-makers can rather lead to the healthier changes more effectively. Focusing too much on decision-makers may lead us to forget that, in fact, the decision-making power for healthier future belongs to all of us, not just our authorized experts and officials.

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The Quest for Development Alternatives:

HIA and the Health Assembly on industrial development in Mab Ta Phut and Rayong province[1]

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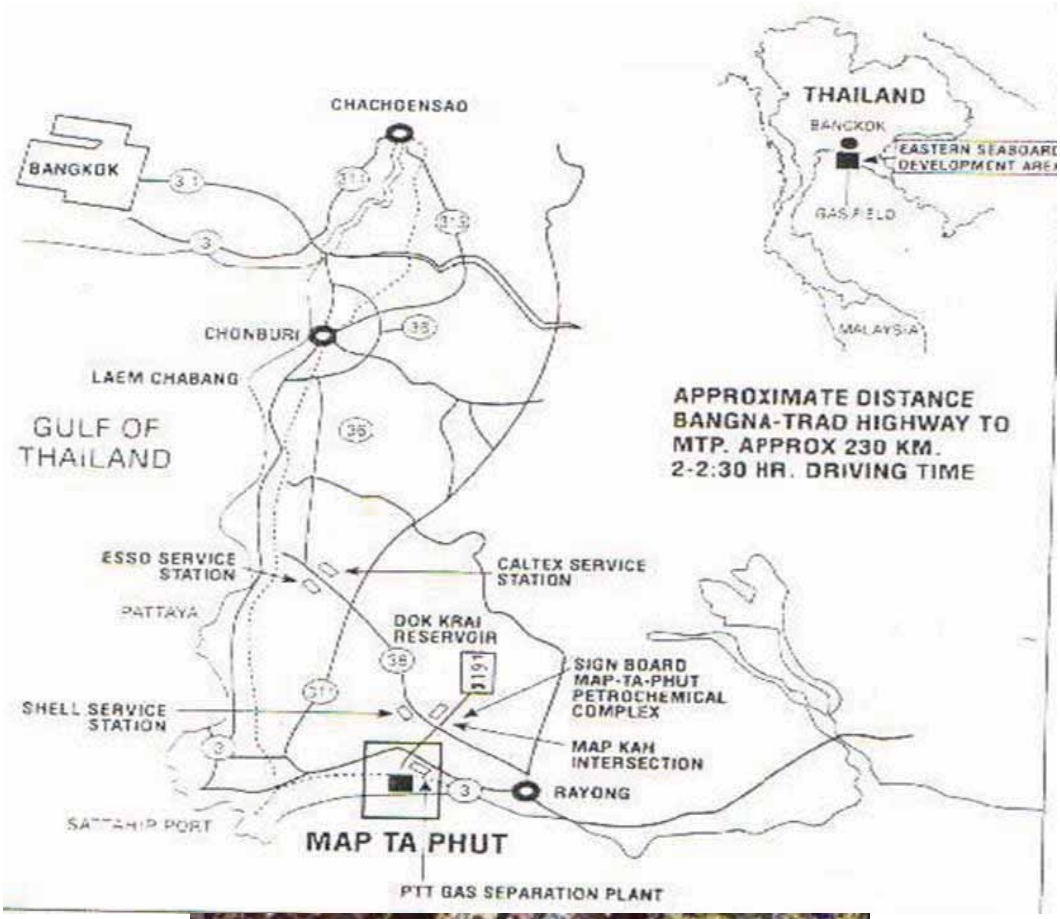
1. Mab Ta Phut and the Industrial Expansions

Mab Ta Phut is an area by the sea in Rayong province. In the past, Mab Ta Phut was a small rural farming and fishing community. But since 1980s, the government had implemented the Eastern Seaboard Development Program, which has been the largest regional development plan of the country to date and Mab Ta Phut was identified as a main target area for large industrial development.

Since 1981, natural gas pipelines, Petroleum refinery facilities, Petrochemical factories and its downstream industries, power plants, industrial seaports, and many other infrastructure and industries have been developed and operated in Mab Ta Phut area. Billions of USD was invested in these industries and tens of thousands of jobs have been created both direct and indirect employment. Nowadays, Mab Ta Phut Industrial Estate is the biggest industrial estate in Thailand, comprising of three industrial estates with the total area of 10,000 Rais (about 1,600 Acres) and 95 large industrial plants.

Picture 1: The Eastern Seaboard and Mab Ta Phut Industrial Estate



However, the industrial development does not create only those positive impacts. These industries cause many environmental, social, and health impacts. Ten years ago, the pollution crisis was exploded in Mab Ta Phut area. Hundreds of students in a local high school, adjacent with a big oil refinery plant, were ill due to the severe air pollution. Soon after the crisis, many ministers and authorities were very active in solving the problems. But after a few years, the school was moved out of the area.

In the beginning of 2007, the pollution and health crisis in Mab Ta Phut has been the headings in many newspapers again. Many ministers and authorities have been very active in solving the problems. But among various measures to mitigate the pollution and ease the problems, the local hospital in Mab Ta Phut Industrial Estate is planned to be moved out of the area.

Picture 2: The pollution crisis in a local school 1997 and the affected local people

Despite all of these environmental, health, and social problems associated with industrial and economic development, much more industrial expansions are planned and implemented both for Mab Ta Phut and other areas in Rayong province. The Petrochemical Industry Master Development Plan 2004-2018, developed by the Ministry of Energy, has been the key driver for the expansions.

At present, the Mab Ta Phut Industrial Estate as well as the other Industrial Estates in Rayong are implementing expansion plans. A new large Petrochemical complex is being constructed in the north of Mab Ta Phut area. Many companies already planned and invested to build new industrial plants, including new power plants. Only in the Mab Ta Phut area alone, 18 large industrial projects have submitted the Environmental Impact Assessment reports to get the governmental permission. More large industrial projects are expected to be developed in the near future.

Picture 3 The plan to further expand the Mab Ta Phut Industrial Estate and the industrial expansions at present

Therefore, the industrial development in the Mab Ta Phut area as well as in Rayong province is definitely one of the most critical challenges to Healthy Public Policy in Thai society.

2. Brief Historical Background

Local people in Mab Ta Phut area have been suffered not only from various pollution in air, water, soil, and the sea, but also natural resources degradation, social problems, and health impacts. They have tried countless times to raise their voices and push for the solutions. Other parts of the society, including NGOs, academics, some authorities, and HIA practitioners, also contribute to the efforts to solve the problems. But the industrial expansion seems to be indefinitely. (See the historical background in Table 1)

Table 1: Historical Background

Year	Events
1980s	The beginning of the Eastern Seaboard Development Program, following by the establishment of the Mab Ta Phut Industrial Estate
1997	The case of air pollution crisis in a local high school, adjacent with a large oil refinery plant. Many ministers and authorities were very active to solve the problems. But later on, the school was moved to the new area.
1998-2000	Several studies, including a Health Risk Assessment and Management, were conducted by health and environmental authorities.
2001	HIA of the Mab Ta Phut Industrial Estates was conducted and presented to the Demonstration Health Assembly.

Table 1: (cont.) Historical Background

Year	Events
2002-2003	Two more HIAs were conducted on the Mab Ta Phut case. One HIA focused on extensive community participation, while another one was the scientific analysis of the air pollution and health impact.
2003	Local people in Mab Ta Phut complained and protested against a large coal-fired power plant project. But finally, the plant has been built and operated.
2005	A study on Volatile Organic Compounds (VOCs) in Mab Ta Phut area by the NGOs found that there are several carcinogen VOCs which are much higher than the international standard. The report was released to the public and the mass media.
2006	An analysis by Pollution Control Department found that there are more than 40 VOCs in the Mab Ta Phut area, of which 20 are known as carcinogen. Comparing to the US-EPA Region 6 Screening level, 19 carcinogen-VOCs are higher than the standard.
Dec. 2006	A public seminar was held by the National Health Commission Office and NGOs. A report synthesizing the data on VOCs, other pollution, health impacts, and social impacts was released to the public and the mass media.

Table 1: (cont.) Historical Background

Year	Events
Jan. 2007	- Many newspapers report the Mab Ta Phut case. - Referring to the Environmental Act, the local people and other organizations demand the government to announce and enforce 'the Pollution Control Area' in the Mab Ta Phut area. The authorities and industrial sector strongly oppose the proposal.
Feb. 2007	- National Environmental Board, which has been chaired by the Deputy Prime Minister and the Minister of Industry, denies the enforcement of 'the Pollution Control Area' and instead, set up two committees for further study and preparing the action plan to solve the problems. - Many newspaper report that the industrial development in the area will be put on hold.
Mar. 2007	- The National Health Act B.E.2550 is entry into force - The government announces the Pollution Control Action Plan for Rayong Province 2007-2012 and plans to announce the standard for nine VOCs.
Apr. 2007	- The local people in Mab Ta Phut submits a letter to the National Health Commission Office to exercise their rights according to the National Health Act - Many newspapers report the progress of air pollution control in the area with no evidence but some figures from the authorities. Later on, the government announces that the industrial development in Mab Ta Phut will go forward with the support from the government.

Source: By the author

Picture 4: The recent protests against industrial development in Rayong

Regarding to the letter of the Mab Ta Phut local people to the National Health Commission Office, they explained those environmental impacts, social impacts, and diseases as the impacts to their health and demanding several solutions according to the articles in the National Health Act B.E.2550, which is among the laws that have the most extensive public participation in the development and drafting process.

- According to Article 5, the Mab Ta Phut and Rayong people have the rights to live in the healthy environment and environmental conditions.
- According to Article 10, all related State agencies must expeditiously provide and disclose health impacts from the industrial activities in the Mab Ta Phut area.
- According to Article 11, before proceeding with any industrial development in the area, the Health Impact Assessment on the industrial development policy in Rayong province must be conducted with meaningful public participation. The definition of health in the HIA must be followed the definition in Article 3, which states

that *"health means the state of human being which is perfect in physical, mental, intellectual and social aspects, all of which are holistic in balance."*

- According to Article 40, the Health Assembly must be arranged to utilize the knowledge and intellect for solving the problems and the conflicts in the area. The Health Assembly should also empower the local community to participate meaningfully in the public policy in order to create healthy people and community as well as health equity for the Mab Ta Phut and Rayong people.

3. Environmental and Health Impacts

There are various pollution, natural resources degradation, social impacts, and health impacts from the industrial development, and many impacts are not only limited to the Mab Ta Phut area, but have the effects to Rayong as a whole. This part will provide more details of the impacts.

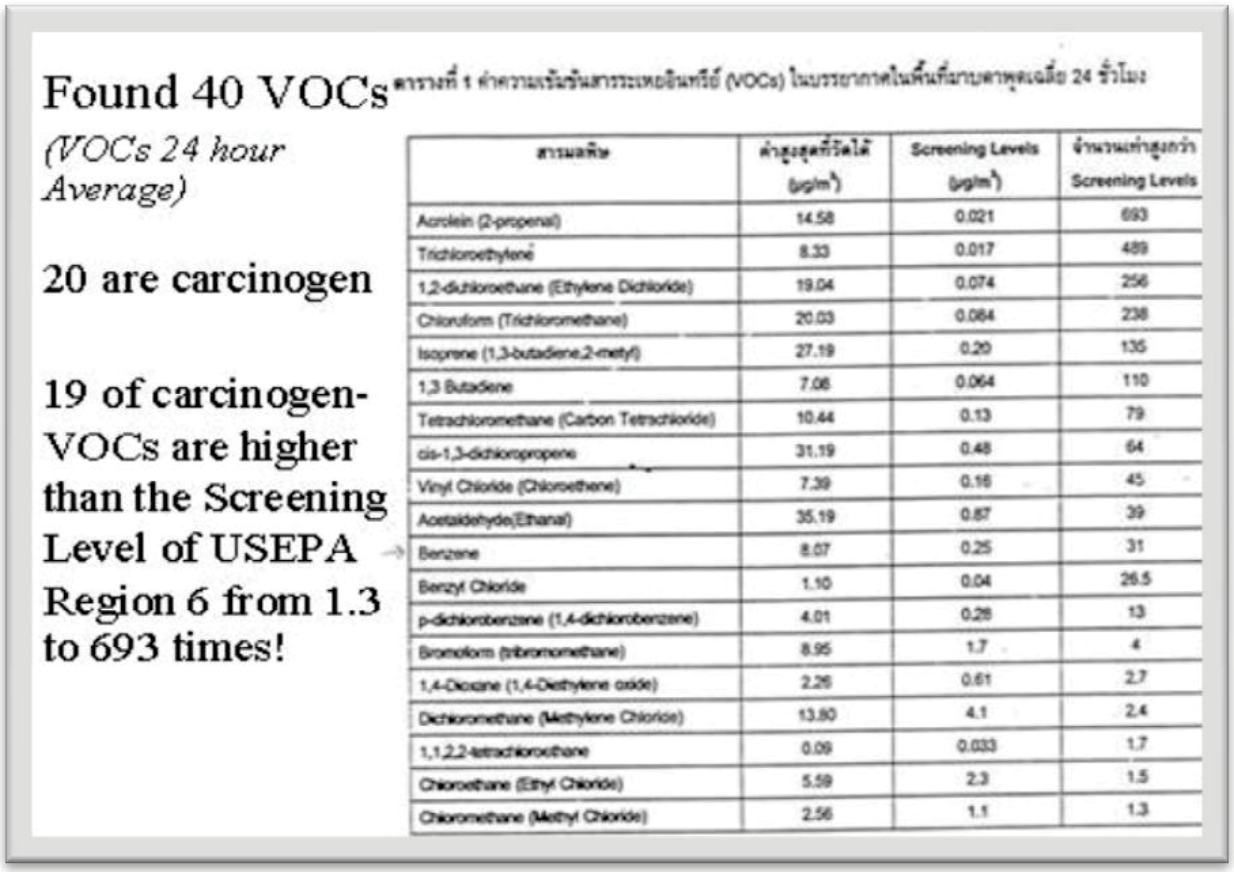
3.1 Environmental impacts

Air pollution

First and foremost, Volatile Organic Compounds (VOCs) have been a serious danger in Mab Ta Phut for a long time. Even though, VOCs are well known for their threats to human health and several studies conducted in the Mab Ta Phut area since 1998 confirm that there are many VOCs in the area, but no mechanisms were implemented to prevent the problems, particularly no environmental standard for VOCs in Thailand until 2007.

Consequently, all of the EIA studied and approved never analyzed VOCs at all. Until 2006 that the official analysis by the Pollution Control Department confirms that there are more than 40 VOCs in the area, of which 19 carcinogen-VOCs are higher than the screening level of USEPA Region Six by 1.3 to 693 times! This information was presented to the public together with many other impacts, then leading to many actions from the government, including announcing the standard for nine VOCs.

Picture 5: The analysis of Volatile Organic Compounds in Mab Ta Phut area by Pollution Control Department in 2006



สารมลพิษ	ค่าสูงสุดที่วัดได้ (µg/m³)	Screening Levels (µg/m³)	จำนวนเท่าสูงกว่า Screening Levels
Acrolein (2-propenal)	14.58	0.021	693
Trichloroethylene	8.33	0.017	489
1,2-dichloroethane (Ethylene Dichloride)	19.04	0.074	256
Chloroform (Trichloromethane)	20.03	0.084	238
Isoprene (1,3-butadiene,2-methyl)	27.19	0.20	135
1,3 Butadiene	7.06	0.064	110
Tetrachloromethane (Carbon Tetrachloride)	10.44	0.13	79
cis-1,3-dichloropropene	31.19	0.48	64
Vinyl Chloride (Chloroethene)	7.39	0.16	45
Acetaldehyde(Ethanal)	35.19	0.87	39
Benzene	8.07	0.25	31
Benzyl Chloride	1.10	0.04	26.5
p-dichlorobenzene (1,4-dichlorobenzene)	4.01	0.28	13
Bromoform (tribromomethane)	8.95	1.7	4
1,4-Dioxane (1,4-Diethylene oxide)	2.26	0.61	2.7
Dichloromethane (Methylene Chloride)	13.80	4.1	2.4
1,1,2,2-tetrachloroethane	0.09	0.033	1.7
Chloroethane (Ethyl Chloride)	5.59	2.3	1.5
Chloromethane (Methyl Chloride)	2.56	1.1	1.3

All of these Volatile Organic Compounds (VOCs) are related to the use of raw materials or primary products of many plants in the Industrial Estate. It has been found that, each year, total use of Vinyl Chloride amounted to 610,000 tons, Benzene more than 600,000 tons, Ethylene Dichloride more than 250,000 tons, and the

use of solvent e.g. Hexane is approximately 2 million liters per year.

The other significant air pollutants are NOx and SO2, which mainly emitted from the fuel burning and industrial production processes. The preliminary result from the study on the environmental carrying capacity in Mab Ta Phut area shows that if all 64 plants in the Mab Ta Phut area release the two air pollutants according to the permission in each EIA report, the concentration of SO2 and NOx will be higher than the air quality standard. Therefore if the industrial development is still going on, the air quality in the Mab Ta Phut area will very likely be severely affected.

Water pollution

Contamination of heavy metals in the ground water is another serious problem for all communities surrounding the Mab Ta Phut Industrial Estate. The recent analysis[i] found that all water samples from 80 local ponds in the Mab Ta Phut area are contaminated with several kinds of heavy metal and the most contaminated samples are 6 to 151 times higher than the Thai standard.

Table 2: The analysis of heavy metals in the water samples from local ponds in Mab Ta Phut

Heavy Metal	No. of samples that exceed standard	Quantity (mg/liter)				
		The Standard	Average	Maximum	Minimum	The maximum higher than standard (times)
Cadmium	65	0.005	0.023	0.030	0.0030	6
Iron	40	0.5	2.969	75.717	0.0139	151
Manganese	29	0.3	0.610	10.301	0.0050	34
Lead	28	0.05	0.108	2.329	0.0007	47
Zinc	1	5	0.762	49.237	0.0009	10

Note: The standard is the Thai standard on the water quality for domestic use in rural area

Source: Arpa Wangkiat, 2007, the Study of Heavy Metal Quantity in the Local Ponds in Mab Ta Phut Municipality, Muang, Rayong Province, Environmental Engineering Department, Rangsit University (in Thai)

Furthermore, the water quality of both surface water and seashore water in the Mab Ta Phut area are rapidly declined. The quality measurement of the surface water by Pollution Control Department found that the amount of BOD (Biological Oxygen Demand) and the concentration of heavy metal e.g. Copper, Manganese, Nickel and Arsenic, are higher than the standard. Concerning the sea water, the water pollution will lead to the accumulation of heavy

metal in fishery resources, such as shellfish and fish, as well as the problem of Plankton Boom.

Seashore erosion

Another serious impact in this area is seashore erosion. There have been many industrial development activities, particularly large land reclamation and the construction of the industrial seaport that severely affected the tide and the stream of the seashore ecology system. Several beaches were completely destroyed and many Break Walls were constructed to prevent further erosion toward the road and the buildings. Mab Ta Phut is among the most critical seashore erosion area in Thailand[ii].

Hazardous waste

The capacity of the hazardous waste treatment facilities in the area is not enough. Consequently, the waste has to be transported to facilities in other provinces, but the monitoring system is not fully developed and enforced. This is the cause of many illegal dumpings of hazardous waste, which have been occurred both in the Mab Ta Phut area as well as many other area and provinces.

These hazardous waste illegal dumpings cause problems to local people, such as terrible odors, chemical contaminations in soils and community water sources. There are a number of local people who had irritation after using water pumping from their community pond located near the dumping area.

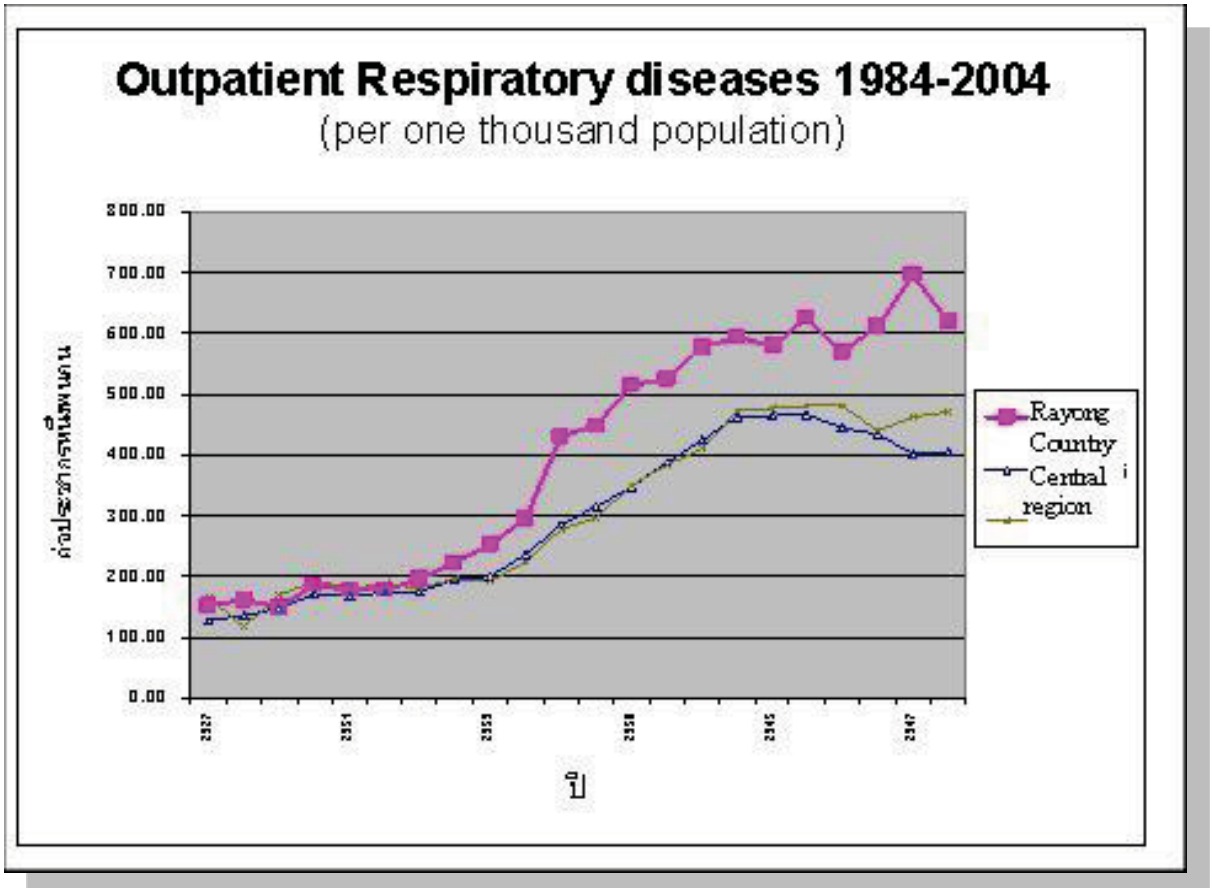
Picture 6: Seashore erosion and a industrial waste treatment facility in Mab Ta Phut[iii]

3.2 The Health of the People

Physical health

Concerning respiratory diseases, the comparison of the outpatient between 1984-2005 in Rayong, the central region, and the country shows that the figures of Rayong were a little higher than those of the central region and the country in the beginning period. But since 1992, the figures of Rayong increased significantly until the rate was 696.09 per one thousand of populations in 2004, while the rate of the country was decreased since 2001.

Figure 1: Outpatient respiratory diseases



For cancers, the epidemiological study in 1997-2001 by the National Institute of Cancer found that both all sites cancer and Leukemia are clearly higher in the Muang district, which is the location of the Mab Ta Phut Industrial Estate, than in other districts in Rayong. The next study for 2001-2003 found the increased figures from the first study both for lung cancer and Leukemia.

Figure 2: Statistic of All Sites Cancer in each district of Rayong

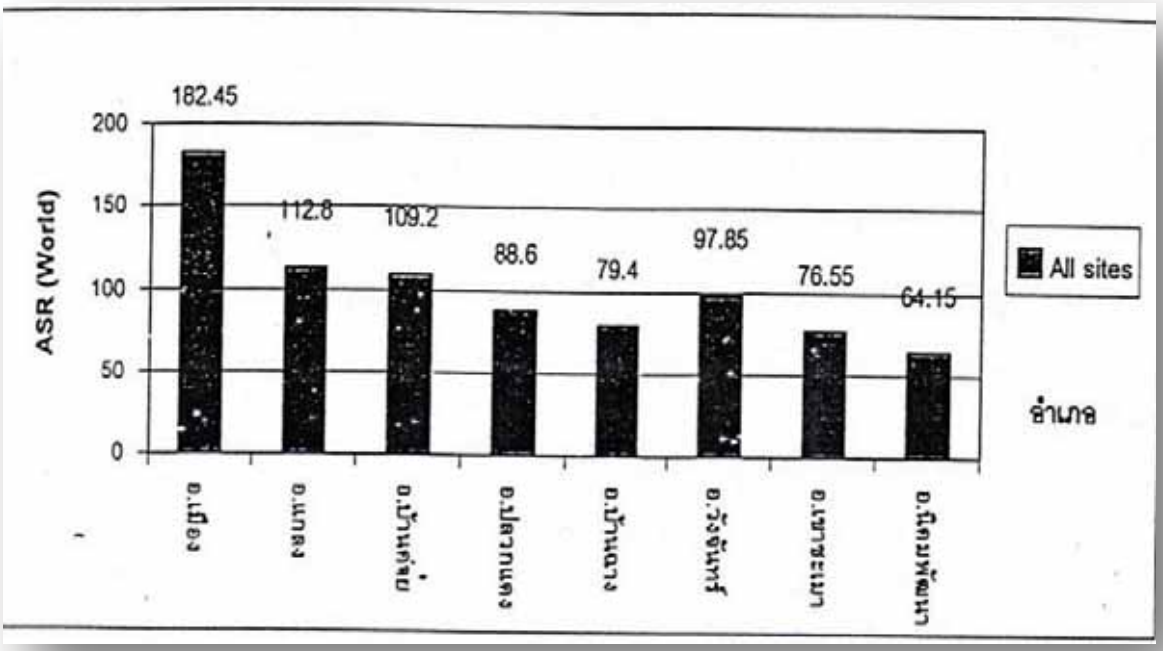
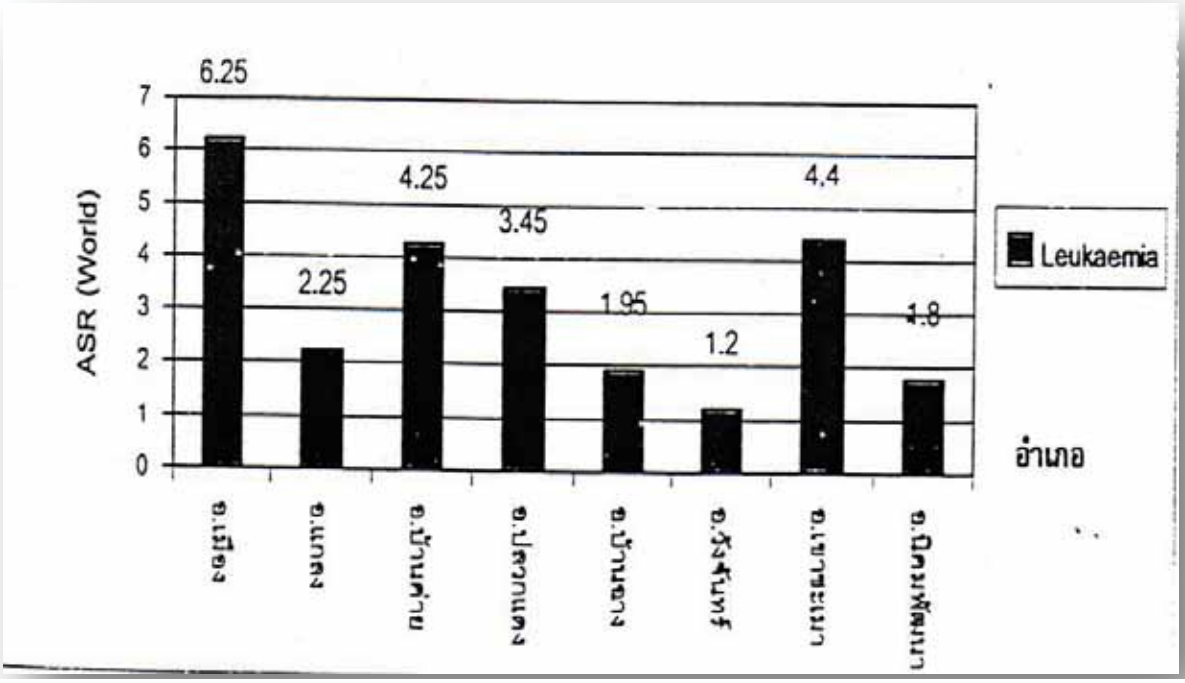


Figure 3: Statistic of Leukemia in each district of Rayong



Note: the statistics are the average of both male and female and per one hundred thousand population

Source: The national epidemiological study on cancer in 1997-2001 by the National Institute of Cancer

From the comparative analysis of tumor and cancer outpatients in Rayong during 1997 – 2005, it shows the high increase from 444.3 persons per hundred thousand of population in 1997 to 1,263 in 2005, or more than three times increase within eight years. This trend is also the same in the case of outpatient of born-handicap and born-chromosome abnormalities (from 48.2 in 1997 to be 163.8 persons per one hundred thousand of population in 2005).

Apart from the illness of local people, who live nearby the Mab Ta Phut Industrial Estate, the health survey report of workers in the Industrial Estate made by the Provincial Health Office is also confirmed that many workers in the plants with toxic chemical raw materials have unusual health indicators, for instances;

- TP Petrochemical Plant having 89 workers with unusual health indicators from 161 workers who are working with toxic chemicals
- Thai Plastic Plant having 88 workers with unusual health indicators from 237 workers who are working with toxic chemicals
- Aromatic Thailand Ltd. Plant having 150 workers with unusual health indicators from 220 workers who are working with toxic chemicals

Moreover, the survey in the Mab Ta Phut area by Department of Social Welfare and Labor Protection in January 2007 also found that, among the 65 plants in the Industrial Estate, 2,461 workers in 20 plants were at risk. There were 483 workers (or 19 percent) with the health problems that need the expert on occupational health.

Mental health

The social transformation arising from industrial development can cause various negative impacts to mental health and the way of life

of local people. The trend of patients with mental health problems in Rayong are increasing. Moreover, the suicide rate in Rayong is about 72.17 per thousand of population, which is among the highest in the country and about 11 times higher than the country average.

Social health

The negative impacts from the industrial development are not only limited to pollution and environmental impacts, but there are many social problems and impacts that are the consequences of the social change to be "an industrial society". The key driver in the case of Mab Ta Phut area are huge number of migrant workers from both other parts of the country and the neighboring countries, specifically Cambodia, Myanmar, and Laos.

Hundreds of thousand migrant workers come to live in the communities, temporary or permanent, without any community preparations, social mechanisms, or suitable management systems. Approximately, only 40 percents of the population in Mab Ta Phut are local people. Accordingly, there are various problems in the communities, as the following.

- Heavily populated and slum area without enough infrastructure and social services causing many problems e.g. sanitation, waste water, traffic jam, road accidents, etc.
- Communicable diseases from migrant workers
- Many workers come to stay only for a short period so it is hard for community management and development.
- Problems on social integrity due to less social relation and cooperation

Furthermore, economic pressures force people to change their occupation and lifestyle in order to earn more money. Some people turn into unlawful activities. Thief and crime rate in Rayong has been increased. Pubs, bars, motels, and prostitutes are more

popular and widespread. Some sexual communicable diseases in Rayong e.g. Gonorrhea is 30.10 per thousand populations, which is the third rank of the country and 4 times higher than the country average. The new HIV/AIDS patients in Rayong is 15.8 persons per one hundred thousand population, which is the first rank of the country and more than five times higher than the country average.[iv]

Child and youth problems

Table 3 reveals that there situation of child and youth in Rayong is very serious and many problems are at the critical level. More specifically in the industrial area such as Mab Ta Phut, a main cause of child and youth problems is 'Camp-site Children', who are the children of migrant workers and live in worker's camps. They have to constantly move with their parent to new places so they have to change from one school to another very often. Their school-record is normally poor and some leaves the school and turn to drugs and thief. This group of children is increased following the expansion of the Industrial Estate.

Table 3: Some selected indicators of child and youth situation in Rayong province and the country average

Indicators	Rayong	Country average
Child and youth try to commit suicide (per one hundred thousand population)	299.61	33.98
Child and youth with HIV	21.46	9.82
Percent of handicapped child and youth who have the education opportunity	48.28	75.18
Percent of child and youth who have experience on sexual relation (Vocational school students)	48.96	27.74
Child and youth between 15 – 19 years old who give birth	4,743.70	1,932.64
Percent of child and youth who go to temple, church, or mosque	26.01	45.62

Source: UNDP, Thailand Human Development Report 2007.

Intellectual and Spiritual health

It is clear that the intellectual and spiritual health of Mab Ta Phut and Rayong people is affected by the development. The community values have been replaced by the individual materialist consumerism. Temple is not anymore the center of the community. Kindness and sympathy to community fellows and other people is not common anymore. Also, the indigenous knowledge of Rayong people on agriculture and fishery is no more useful to the new generation. Modern technology imported from other countries is more attractive to the young people, either mobile phone in their daily life or the huge machine in industrial factories.

4. The Rayong Paradox

Does the industrial development in Rayong during the past twenty five years bring about an economic prosperity and better quality of life to local people? The answer might be "yes" if we consider only the economic indicator of Gross Provincial Product (GPP) per capita, which is the highest in the country.

However, many other economic indicators reflected that local people did not gain economic benefits from such industrial development process as expected. Household income, rate of household with debts, proportion of poor people and rate of unemployment in Rayong is all higher than, for example, the ones in Nakhon Pathom where its GPP per capital, compared to Rayong, is lower almost six times (Table 4).

Furthermore, the income distribution is more unequal. The comparative of Gini co-efficiency[7] between these two provinces is also heading to the same direction. Gini co-efficiency in Rayong increased from 0.376 in 1996 to 0.455 in 2002. Meanwhile, this figure in Nakhon Pathom decreased from 0.393 to 0.351.

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[7] A measure of income distribution inequality, the higher the Gini co-effiency, the more unequal income distribution

Table 4: Comparative development indicators of Rayong, Nakhon Pathom and Thailand

Indicators	Rayong	Nakhon Pathom	Thailand
Gross provincial product in 2004 (bath/capita/year)	691,093	121,381	101,304
Household income (bath/month)	21,083	20,478	14,778
Rate of household with debts (percent)	66.0	65.2	66.4
Proportion of poor people (percent)	5.6	2.36	11.25
Rate of unemployment (percent)	1.8	0.5	1.3

Source: UNDP, Thailand Human Development Report 2007.

Next question is what happened with such development process. The change in economic structure from "Three Pillars Economy" with the balance of the three main economic sectors to "One Pillar Economy" focusing on the industrial growth helps us to understand this phenomenon.

Before the development of eastern seaboard in 1981, Rayong had the balanced economic structure among three modes of production. The proportion of service sector was about 36 per cent of GPP, while agricultural and industrial sectors occupied 35 and 29 per cent respectively. However, "Three Pillars Economy" was ignored after Thai government headed toward pro-industrial development in Rayong due to the advantage of location close to Bangkok, industrial seaport and resources. Rayong's today is radically changed. Industrial sector has been rapidly expanded and now occupies 79 per cent of GPP. While service and agriculture sectors contribute to GPP only 18 and 3 respectively. In other words,

"Three Pillar Economy" was finally replaced by "One Pillar Economy" (Figure 4).

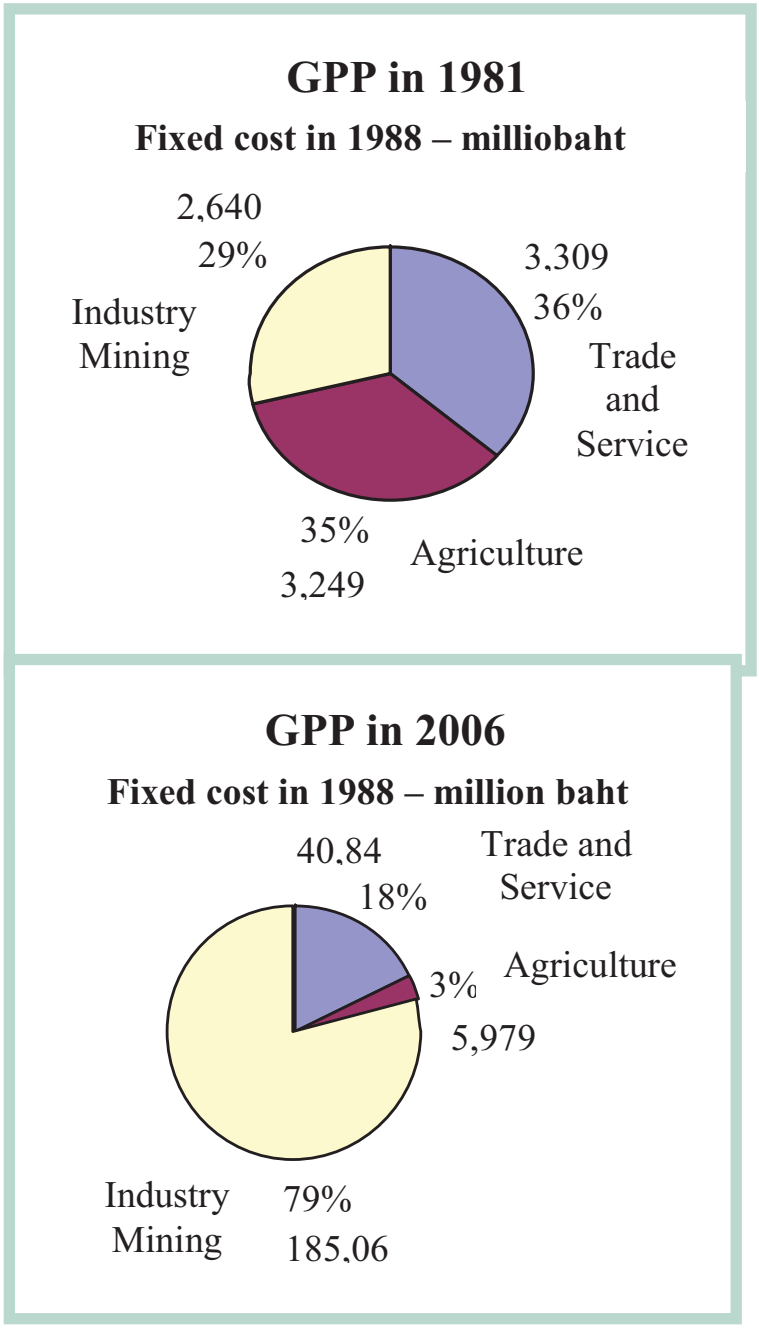


Figure 4: Comparative GPP Structure of Rayong in 1981 and 2006

Although "One Pillar Economy" boosts the economic growth in this province, Rayong takes a higher risk of economic failure due to high dependency on industrial mode of production which is vulnerable to many uncontrolled international and domestic factors. In contrast, "Three Pillar Economy" provides the economic safety net for Rayong development. The other modes could sustain the provincial economic growth and well-being of local people even though one of them is not in function.

Key industries in Rayong, shown in Table 5, with high dependency on import content is another reason explaining why one pillar economy in Rayong fails to provide better economic condition for local people. For example, import contents in petrochemical industries reach 50 per cent of product values. If these industries produce 100 baht, half of them would be paid for imported resources. Only 50 baht is left for domestic economy, and even less for Rayong.

Table 5: Proportion of import content of key industries in Rayong

Industries	**Proportion of Import content (Percent)**
1. Oil refining industries	50.7
2. Chemical industries	39.6
3. Automobile and auto parts	66.6
4. Electric and accessories	64.2
5. Metal and steel products	40.7
6. Plastic industries	25.8
7. Wood and furniture	30.5
8. Rubber products	22.1

Table 5: (cont.) Proportion of import content of key industries in Rayong

Industries	Proportion of Import content (Percent)
9. Canned seafood	23.4
10. Rubber	8.4

Source: National Economic and Social Development Board, 2005

In addition, the benefits from one pillar economy have not been sufficiently allocated to improve their quality of life deteriorated by industrial society. Under low social investment particularly in some important fields such as education, health, social welfare, housing and community, religion, culture and recreation (Table 6), Rayong is unavoidably facing many serious social problems. The rate of new HIV/AIDS patients, rate of households affected by pollution, number of crimes in Rayong and the rate of orphan/children affected by HIV are worsen than the national average and Nakhon Pathom's (Table 7).

Unquestionably, the beautiful figure of GPP in Rayong is an illusion. In reality, local people are the victims of such development. This situation leads to the following question -- Is it a time for people in Rayong to ask for the alternatives of development path entailing the balance of economic prosperity and social well-being? The effort to answer this question will be explain in the next heading.

Table 6: Comparative social investment GPP of Rayong, and Nakhon Pathom and Thailand in 2006

Index	**Operating expenses**			**Investment by government**		
	Rayong	Nakhon Pathom	Thailand	Rayong	Nakhon Pathom	Thailand
Education	2,495	3,543	3,005	33	46	97
Health	1,323	954	837	4	5	10
Social welfare	90	112	100	32	1	10
Housing and community	48	48	64	0	0	22
Religion, culture and recreation	37	30	46	0	5	2
Total Social investment	**3,993**	**4,687**	**4,052**	**69**	**57**	**141**

Source: National Economic and Social Development Board

Table 7: Some selected social development indicators of Rayong, Nakhon Pathom and Thailand

Indicators	Rayong	Nakhon Pathom	Thailand
Rate of New HIV/AIDS patients (per 100,000 population)	15.8	0.6	3.3
Rate of households affected by pollution (per cent)	8.2	4.2	4.7
Rate of orphans, abandoned children, children affected by HIV (per 1,000 population)	2.3	0.5	2.5
Number of crimes (per 100,000 population)	27	24	16
Number of arrested drug dealers (per 100,000 population)	318	236	170
Rate of illiteracy (per cent)	4.1	3.5	5.4

Source: UNDP, Thailand Human Development Report 2007.

5. The Health Impact Assessment and Health Assembly

It is clear that the problems and impacts of the industrial development are not only limited to pollution and environmental degradation. But the impacts on natural resources, social, and health aspect are also serious. The need for HIA in this case is not another study to analyze and provide more details of the impacts

and problems. What is needed is the alternatives of the development direction to be the solutions to the 'Business-as-Usual' industrial development future. More over, social empowerment is a key to develop and support the alternatives, and deliberative policy process is crucial for turning the alternatives to the solutions.

Therefore, the HIA in this case is being conducted to support the Health Assembly process. As previously explained in part two, the Health Assembly is aim to utilize the knowledge and intellect for solving the problems as well as to empower local stakeholders and communities to participate meaningfully in the public policy process.

Firstly, to help conceptualize numerous impacts and problems, two mapping have been created through field trips, interviews, and discussions with various stakeholders in Rayong, including local people, community organizations, NGOs, academics, local administrative organizations, governmental officials, etc.

All information and data related to all aspects of threats is put on a map of Rayong. This map is called 'Health Threats Map' and it includes various pollution, hazardous waste facility, illegal waste dumping sites, chemical accident cases, seashore erosion area, industrial estates, large power plants, and socially risky area (high density of bars and motels).

In parallel, all information and data related to local resources and efforts to protect and promote health is put on another map of Rayong. This map is called 'Hopes for Healthy Rayong Map', which include environmental movement, cultural conservation groups, youth groups, community forests, sustainable agriculture network, local fisherman groups, renewable energy plants, national parks, and natural sites for tourists.

Apart from the two mappings, the study on Rayong Paradox is the effort to strongly question the discourse on economic growth will lead to good quality of life. The economic structure, distribution of benefits, and social investment in Rayong are analyzed. The two mappings and Rayong Paradox were presented and discussed in the first forum of the Health Assembly on 9th October 2007.

Based on the issues and the conclusion from the first forum, different Development Scenarios should be an important part for developing the Development Alternatives. The 'business-as-usual' scenario should show the clear picture of Rayong in the next ten years if the industrial development is fully implemented as planned. Also, the other 'alternative' scenarios will be developed with extensive participation of local stakeholders and communities. At least, the core components that make different alternative scenario will consist of the following.

- Different economic development, economic structure, and distribution of benefits
- Different natural resources demands and management system
- Frameworks for future industrial development
- Different social investment and social development
- Child and youth development

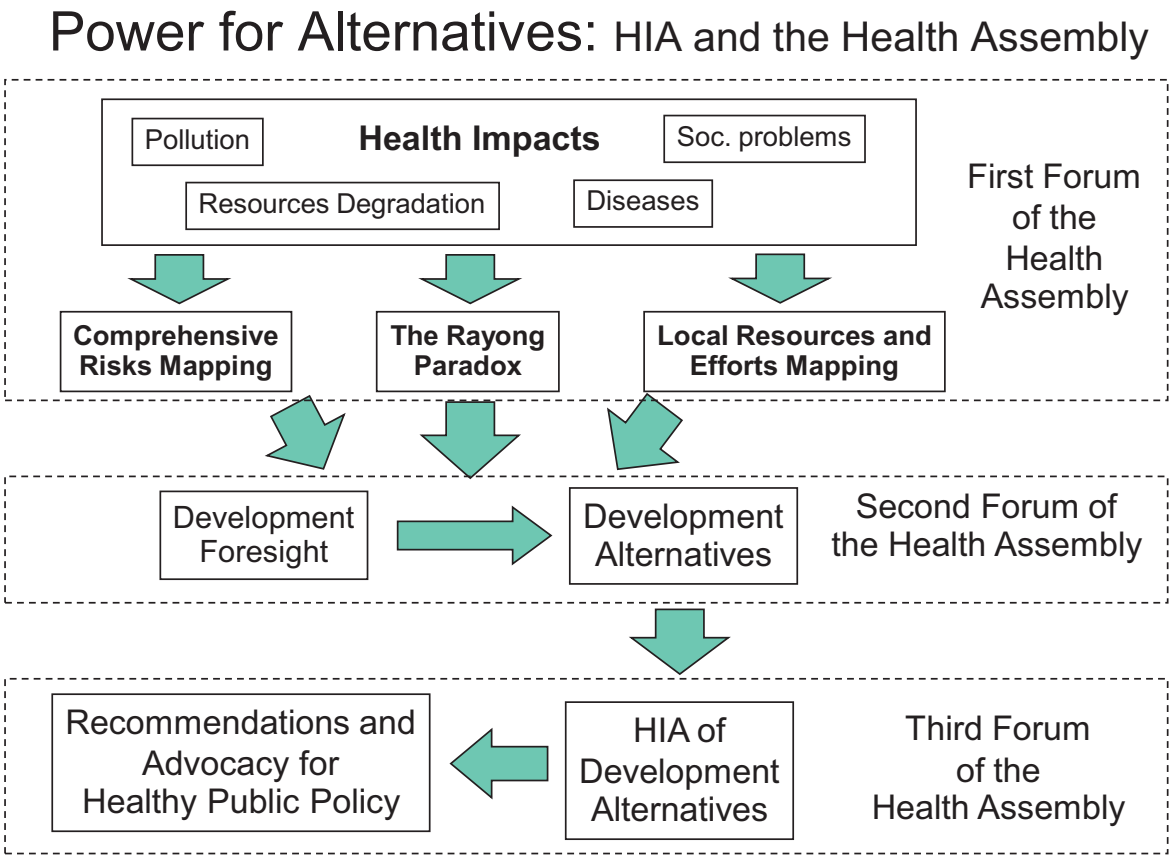
All of these components and different Development Scenarios will be synthesized as the Development Alternatives, which will be presented and discussed in the second forum of the Health Assembly in January 2008, as well as through other public communication channels, such as local newspapers, public radio, community radio, and the internet.

After that, the health impacts will be assessed in the 'business-as-usual' scenario as well as in each Development Alternative. According to the National Health Act, health is defined as holistic

health; therefore, the HIA has to cover pollution, environmental, economic, social, intellectual and spiritual aspect. Furthermore, public participation is necessary as the right to participate in the HIA is affirmed by the law.

The HIA together with the recommendations for healthy public policy will be presented and discussed in the third forum of the Health Assembly, planned to be held in April 2008. Finally, the HIA and the recommendations will be presented to the National Health Commission, the National Health Assembly, and other related organizations, particularly NGOs, local groups, and local administrative organizations. The idea is shown in figure 5.

Figure 5: The HIA and the Health Assembly on the industrial development in Mab Ta Phut and Rayong province



Source: By the author

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HIA in Health Assembly:
Case study of Health Hazards Prevention from Mining Policy, Thailand [1].

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[1] This paper was presented at the 27th Annual Conference of International Association for Impact Assessment (IAIA), 2-9 June 2007, Seoul Korea

[2] National Health Commission Office (NHC)

[3] Kasetsart University and Healthy Public Policy Foundation

1. Introduction

Since mining development was addressed in the First National Economic and Social Development Plan in 1961-1965, it has been developed to benefit the business sector through job creation and economic growth. However, the Thai government was not concerned with community rights, which led to a lack of participation and caused impacts on health, the environment and national resources. Now, people affected by mining development, such as those in areas with coal mines, rock mines, gold mines, and potash mines have joined with partners from the academic and governmental sectors to set up a health assembly. Their aim is to review the mining policy and set up a policy related to the 10th National Economic and Social Development Plan, which emphasizes a sufficiency economy. Health Impact Assessment (HIA) is an important tool for stakeholders in deliberating the impacts in a holistic fashion. The health assembly uses HIA for situation analysis, scoping and mining impact assessment, synthesis of health impacts from mining activities, and economic assessment in order to improve the related laws and to empower the local community. Therefore, the role of HIA in the health assembly is not only a tool for predicting impacts at the project level but also for preventing health hazards from mining policy by use of a participatory, healthy public policy process, leading to healthy lives and a happy society.

2. Minerals and Mines in Thailand

Minerals are non-renewable resources because they are formed by long geologic processes. In ancient times Thailand was called “Suvarnabhumi”, which means the “golden land”, because it has rich mineral deposits. Thailand began mining in the Sukhothai (B.C.1238-1438) and Ayutthaya periods (B.C.1350 – 1767). The ancient people began with gold and tin mining for the bronze industry and later mined iron ore for weapon and pottery as well as some precious stones. They also built several bronze Buddha images and used the sandstone, laterite and bricks for the construction of buildings.

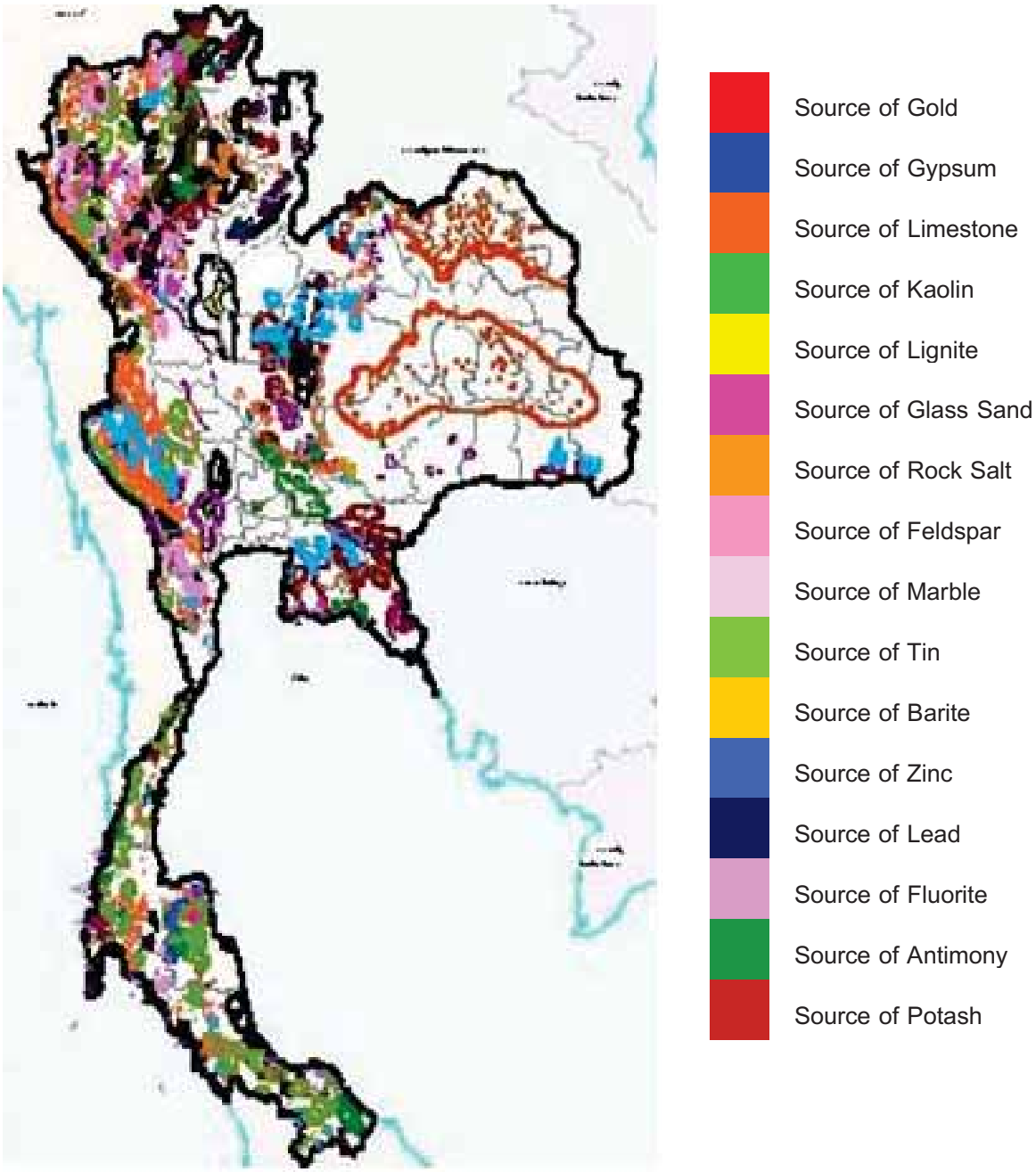


Figure 1: Map of mineral resources in Thailand

At present, mineral exploration has become more complicated and requires more knowledge, higher technology and larger investments. Mining has become a large multi–national industrial venture. Unfortunately, mining also creates negative impacts on environmental and community health.

The Department of Primary Industries and Mines, Ministry of Industry is the main organization for managing, organizing, and promoting mineral deposit development. Presently, Thai mining products for export are antimony, fluorite, gypsum, tin and tungsten. Lignite, ball clay, glass, Sand, iron ore, kaolin, limestone, marble, granite, manganese, phosphate, rock salt, shale, and zinc are produced for domestic markets and downstream processing.

3. Mining policy

Thailand's mining policy has been addressed since the First National Economic and Social Development Plan (NESDP) and has been implemented in 3 phases. Phase one of the policy was implemented during the 1st – 5th NESDP (1961 – 1986) which promoted tin mining. Phase two of the policy was implemented during the 6th – 8th NESDP (1987 -2001) which changed the focus to downstream industrial processes and attempted to improve the structure of mining industries. Phase three of the policy was implemented in the 9th - 10th NESDP (2002 – present) and tries to maintain balance between national resources exploitation and environmental health. The aims of the current phase are environmental conservation and rehabilitation and economically competitive development under effective national resource utilization. Currently, Thailand's major minerals include fluoride, gypsum, lead, lignite, natural gas, rubber, tantalum, tin, and tungsten. The tin mining industry has declined sharply since 1985, and Thailand has gradually become a net importer of tin. As of 2003, the main mineral export was gypsum. Thailand is the world's second largest exporter of gypsum, after Canada, even though government policy limits gypsum exports to prevent price

dumping. In September 2003, in order to encourage foreign investment in mining, the government deregulated severe restrictions on mining by foreign companies and reduced mineral royalties payable to the state.

Thailand's mineral resources are owned by the state. Mineral exploration and development are governed by the Mineral Act of 1967, the Fourth Mineral Royalty Act of 1966, and the Tin Control Act of 1977. The Mineral Act of 1967, which was amended in 1973, 1979, and 1991, controls onshore and offshore exploration, mineral production, mineral trading, ore dressing, transport, and export of minerals except petroleum. The Minerals Act of 1967 was amended again in 2002 to bring the Act in line with modern international practices for underground mining that permit mining at depths of greater than 100 meters(m) below the surface without requiring the specific consent of the holder of the surface right.

4. Mine Impacts: Health Inequity and Human Rights Abuse

If Gross Domestic Product (GDP) is a main development indicator, mining maybe one of the best alternatives for making a wealthy country, but if Gross National Happiness (GNH) is used, the conclusion may be the inverse because mining also leads to severe health hazards.

The National Human Rights Commission of Thailand (NHRC) has received many complaints about mine impacts, such as the case of lead mine in KanchanaBuri province, potash mine in Udon Thani province, rock mine in Phitsanulok and Rayong provinces, and the

Gold mines in Loei and Phichit provinces (See Figure 2). The impacts include environmental degradation, land appropriation, national resource depletion, local economy stagnation, and violence.

4.1 Lead Mine Contamination in Lower Klity Village, KanchanaBuri province

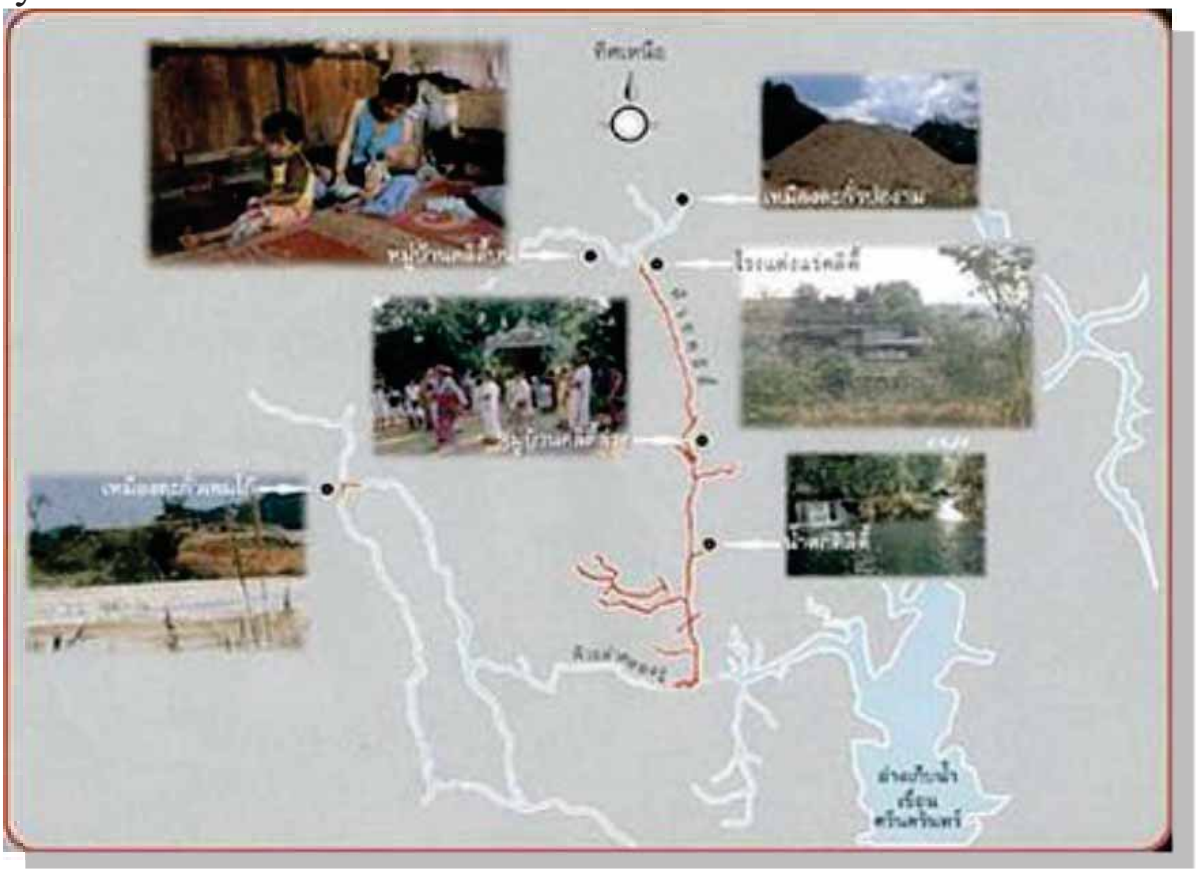
From 1993 - 1998 lead contaminated the Klity stream. Villagers, particularly women and children in Lower Klity village, downstream from the Klity mine and lead separation plant, have suffered from acute lead poisoning from drinking, fishing and washing in the stream. Nearly 100 cattle have died and the villagers cannot drink the water from the stream because it makes them sick. Some forest rangers in Thung Yai believe that wildlife also suffers as they have seen deer and mousedeer die in the same way as the cattle.

In 1995, the Mineral Resources Department found that lead contamination in and around the mining areas was very high and 10,000 tons of lead had settled in the bottom of Klity stream.

Picture 1: Lead mine impacts on Lower Klity Villagers (http://www.karencenter.com)

The amount of lead in the sediment of Klity stream, downstream from the mine, was 165,720 to 552,380 parts per million (ppm). Thailand's safety standard is 200 ppm. The Pollution Control Department said lead in the bloodstream of 39 children in the Klity village was found to be nearly twice the level sufficient to cause permanent poisoning. Since 70 percent of lead-contaminated water can enter the food chain, water from the Klity stream is not only undrinkable; it cannot even be used to water plants. The accumulation of lead in the human body, even at close-to-zero

amounts, can, in the long run, damage brain cells and the nerve system.



Picture 2: Klity stream
(http://www.sarakadee.com)

In 1998, the government ordered the closure of the Klity mine and its ore cleaning plant and fined the company about US$47. In April 1998, the company gave about US$23,000 to the villagers in compensation, an amount activists and victims dismiss as inadequate and an evasion of responsibility.

4.2 Zinc Mine in Tak Province

Mining leases to the Padaeng zinc deposit were granted by the Thai government in 1972 to the Thai Zinc Company. Zinc ore had been mined for several years before the government granted Padaeng Industry a 25-year concession to mine zinc ore on a 250-rai (equivalent to 40-hectare) area in Mae Sot district, Tak province. A large deposit of zinc silicate was found. Consequently, a zinc mine named "Padaeng Mine" based on an open ladder structure was opened in 1984

Picture 3: Padaeng Zinc Mine (http://www.Padaeng.com)

Cadmium contamination was detected in Mae Tao, Prathat Padaeng and Mae Ku Sub-districts in Tak province in early 2004 by foreign scientists from the International Water Management Institute (IWMI), which found that several hundred villagers in the sub-districts had "rather high" and "high" levels of cadmium in their blood, suspected to have come from eating cadmium-contaminated rice.

Picture 4: Source of Cadmium Contamination.
(http://www.ldinet.org)

The Department of Disease Control (DDC) staff and Mea Sot Hospital team initiated a rapid survey to assess the exposure situation among the 100,000 residents in the affected municipality. They started a research project to assess the effect of cadmium on kidneys, the major target organ of the metal. It is expected that 10 years of surveillance is needed to reduce health risks among the 800 people who had high urinary cadmium level (> 5 µg/g creatinine) and were at risk of having cadmium-induced renal failure.

State agencies, including the Pollution Control, Disease Control, and Mineral Resources departments, inspected the area and concluded that the cadmium contamination occurred naturally as

the area was located near cadmium and zinc deposits. However, after two years of investigation, the NHRC insisted that contamination was caused by Padaeng Industries' mining operation, not by natural sources as alleged.

4.3 Potash Mine in Udon Thani Province

In 1981 it was discovered that Udon Thani Province, in the northeastern region of Thailand, had high quality potash deposits (Sylvie ore), with the reserve volume more than 300 million tons. The company plans to mine a thin layer of potash salt located 350 meters below the surface. It is expected to produce 6,000 tons of potash ore per day (2 million tons/year) through ore separation, precipitating and fuming processes respectively. It is expected that 5 millions of the remnant potash salts will be carried back underground. This process will take around 22 years in total. There is significant opposition to the project by local communities who fear widespread salt contamination of agricultural land and groundwater. People are worried about how the mine which will affect their community, families, and especially their children. In addition, they are concerned that their agricultural livelihood will be destroyed. This project was widely protested by local people who were not able to participate in the early proceedings. The protesters raised many environmental and health concerns about potash mining such as the remnant salt, salt dust and land subsidence. This situation unavoidably entailed conflict between the beneficiaries of the mines and the local people.

Picture 5: The Impacts of Potash Underground Mines

Picture 6: Villagers Protest Potash Mine in Udon Thani Province

4.4 Stone crushing mills in Maehongson province

Villagers in Mae La Noy district, Maehongson province filed a complaint to the National Human Rights Commission of Thailand demanding the end of the stone crushing mills. Thirty years ago, the company had a mining concession for a fluorite mine and changed to stone crushing mills in 1999. The impacts caused suffering for the villagers. Impacts included:

1. Stone dust contaminated in the major stream and dam used by the villagers, causing shallow water.
2. Historically, villagers used water from the mountains, but when stone crushing was in operation, the flow of underground water changed. The villagers were cut off from their traditional water supply.
3. Crushing made noise pollution and also air pollution from stone transportation.
4. The data of Mae La Noy hospital showed increased rates of respiratory diseases.
5. Social impacts from migrant laborers included theft, drug abuse, epidemics, and pollution.

Picture 7: The Impacts of Stone Crushing Mills in Thailand

Mining activities not only cause miners and villagers to fall ill, but also create difficulties in sustaining the local way of life. Community stress and conflict arise when trying to control the limited source of clean water and natural resources. Violence and human rights abuses can ensue. From 1999 – 2005, six local leaders who protested against mining, especially stone crushing mills, were killed. Mine protest leaders face ongoing threats to this day. Conflicts between villagers and companies divide communities between those for and against mining. In severe cases, this can lead to the destruction of family relationships, as seen in the potash mine project in Udon Thani province.

Picture 8: Violence and Human Rights Abuse from Mining Policy

In 2004, The National Human Rights Commission of Thailand published a mine problem report. This report concluded that:

1. Since mining development was addressed in the First National Economic and Social Development Plan in 1961-1965, it has been developed to benefit the business sector and GDP stimulation.
2. The government was not concerned with community rights due to the lack of public participation, causing impacts on health, the environment and national resources.

3. Mining industries cause several problems which affect holistic health, the environment, and human rights.
4. Stone crushing mills are the most severe problem as they contaminate water resources and destroy local spirits. Moreover, primary authorities cannot solve problems or ensure that they will be solved.
5. Although other mines may have less impact compared with the rock mine activity, they can have long-term impacts which are more difficult to resolve.
6. The usual technology and mitigation measures do not work properly because of technical problems, limited knowledge, human errors, and relaxed legal enforcement by the authorities.

5. Health Assembly: The way Towards Healthy Public Policy

In the past, public policies in Thailand were usually formulated by the government or technocrats. Most of the policies are top-down in nature. Various sectors, especially civil society, did not get involved in the policy process, but lack of civilian participation is one of the main causes of negative policy impacts on the public.

The "Health Assembly" is the process in which the public and related State agencies exchange their knowledge and learn from each other intellectually and cordially through organizing a systematic forum with public participation, leading to the determination of public policy for health or public healthiness (section 3, National health act B.C.2550, Thailand).

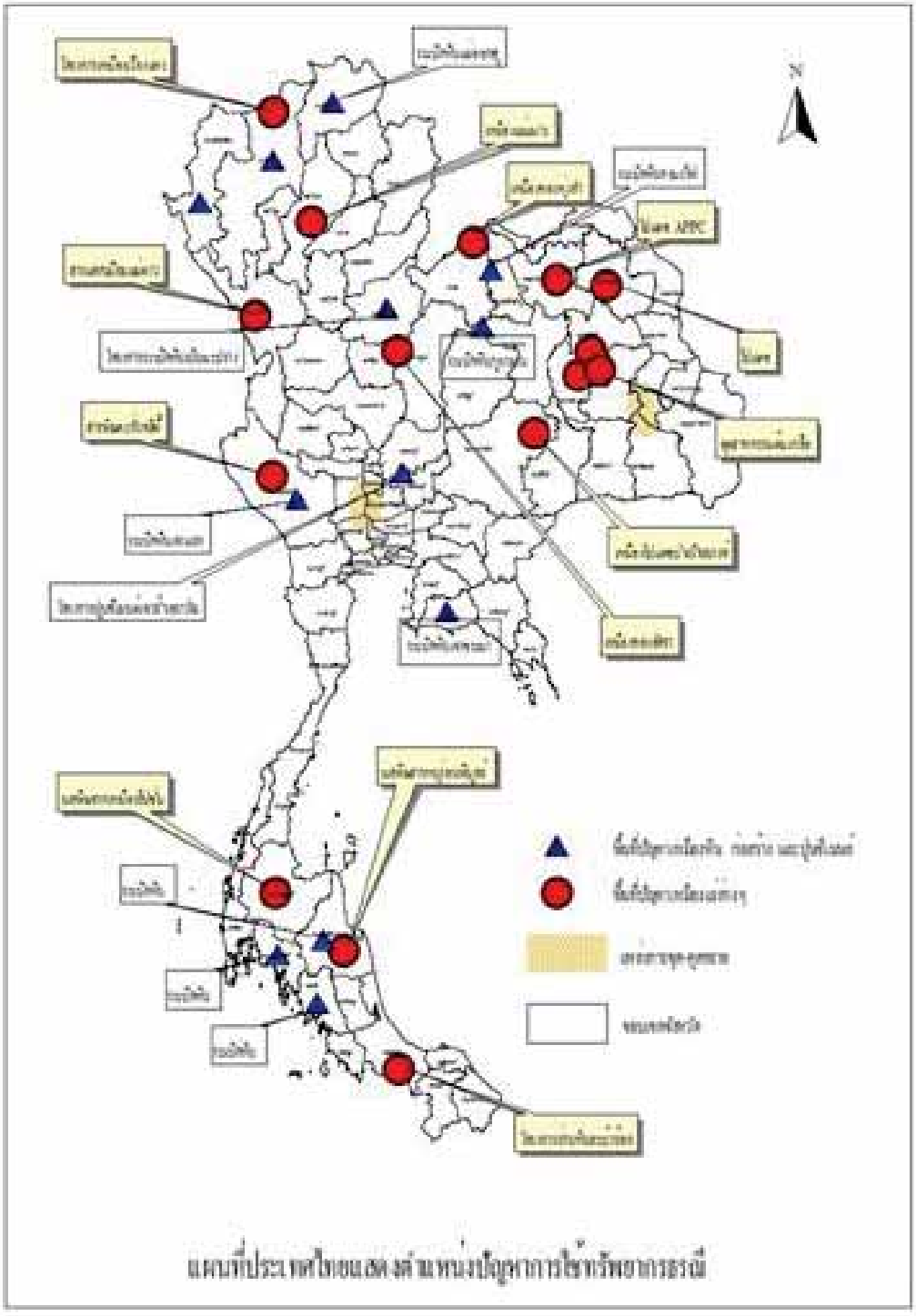


Figure 2: Map of Mining Projects with Conflict in Thailand

Based on the concept of "the triangle moves the mountain" (Fig. 3), a well-known approach in Thailand, the mountain is seen as a big and very difficult problem, often unmovable, while the triangle consists of the creation of relevant knowledge through research, social movements or social learning, and political involvement. The creation of relevant knowledge is vital but inadequate by itself. So, it must interact with social movements through social learning process. Similarly, without relevant knowledge, social movements cannot gather momentum or may even deviate. Knowledge derived from research must be relayed in a way that it can empower the general public. Politicians prodded by political involvement complete the triangle in that, though they may be shunned by academics, they often control the purse strings as well as the power to change laws. Without political involvement the structure is not complete and without knowledge, social activity and political involvement will not come into play.

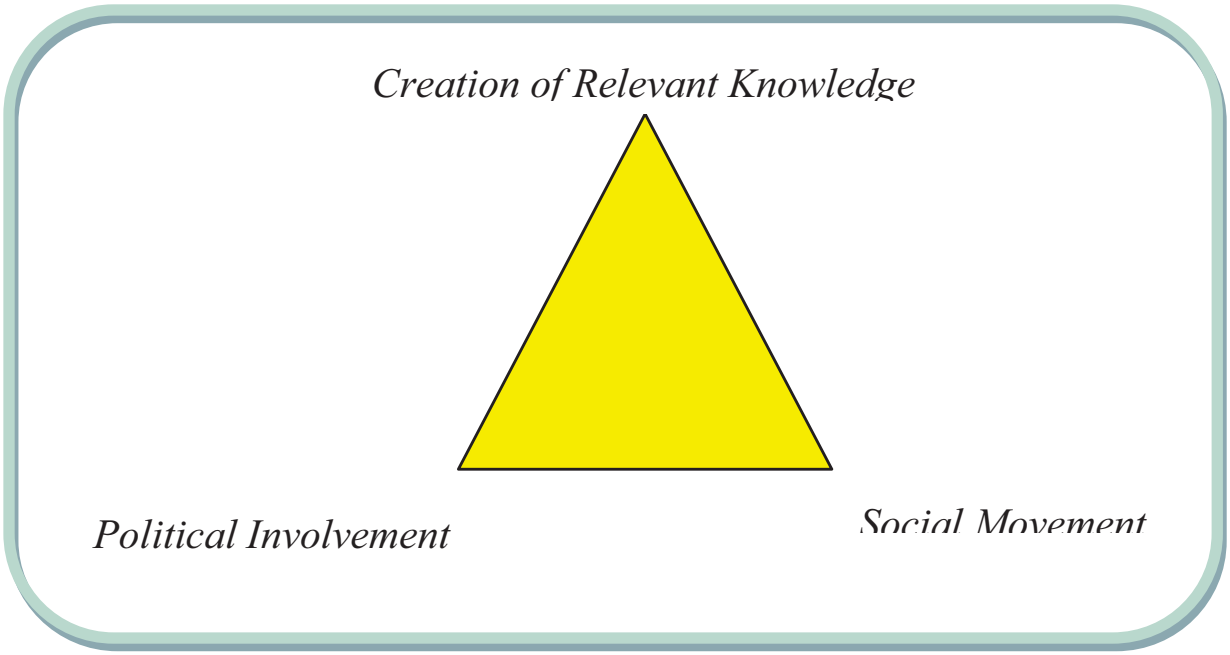


Figure 3: The Triangle Moves the Mountain

In 2006, people affected from the mining development such as those from the area of lignite mines, stone crushing mills, gold mines, and potash mines joined with partners from the academic sector, governmental sector, and NGOs to contribute to the health assembly.

The aim of this movement is to review the mining policy and set up the policy relating to the 10th National Economic and Social Development Plan in which the philosophy of sufficient economy for healthy life and social well being is emphasized. The process of health assembly in preventing negative impacts from mining is shown in the figure 4.

6. HIA: An Important Tool to Empower the Health Assembly

The Thai government has paid more attention to GDP than community happiness. They believe that if the economy is good, Thai people will have a good life. In reality, though mining is good for GDP, many communities were affected by mine activities and cannot sustain their way of life. Mining causes air pollution, water degradation, agricultural land contamination, and also social conflict. Some communities suffer from the loss of their agricultural land and clean water sources, some are ill because of chemical toxins, and some people lose their lives because of fighting against mining. Therefore, it is important to review mining policy through the HIA process because both wealth and health should be taken into consideration.

The HIA begins with an overview of mining impacts both in Thailand and other countries. This includes mine policy, evidence

based on health impacts, the latest National Economic and Social Development Plan (NESD) and related acts and concepts of resource curse. This paper was part of the input for the mining workshop, 7 – 9 September 2006 in Bangkok.

All of stakeholders of mine policy were invited to join in the mining workshop. This was the first chance to deliberate mine impacts in a holistic dimension. Participants discussed impacts on human health, ecology, the environment, community rights, land use, local economy, community failure and the unfair mineral act. Finally, they committed to setup a Thailand mining network for mining watch. They also had a plan for collaboration and movement which included (1) setup health assembly for mine policy revision, (2) prepare academic report including HIA, resource curse and land used problems, (3) revise the mineral act, and (4) empower communities through training in baseline data collection, monitoring, and lawyer assistantship.

On 9 January 2007, the 1st platform of mining health assembly took place. The topic was "Mining Impacts: the View of Health and the Economy" There were 40 participants from ministry of public health, ministry of industry, villagers who were affected, NGOs, academics, National Economic and Social Advisory council (NESAC) and The National Human Rights Commission of Thailand (NHRC) who joined this forum and commented on the review papers.

After that, HIA team visited mining sites and affected communities surrounding the mines for participatory data collection. The HIA result will be presented in the mining health assembly platform for public review and to the National Health Commission and Ministerial Cabinet.

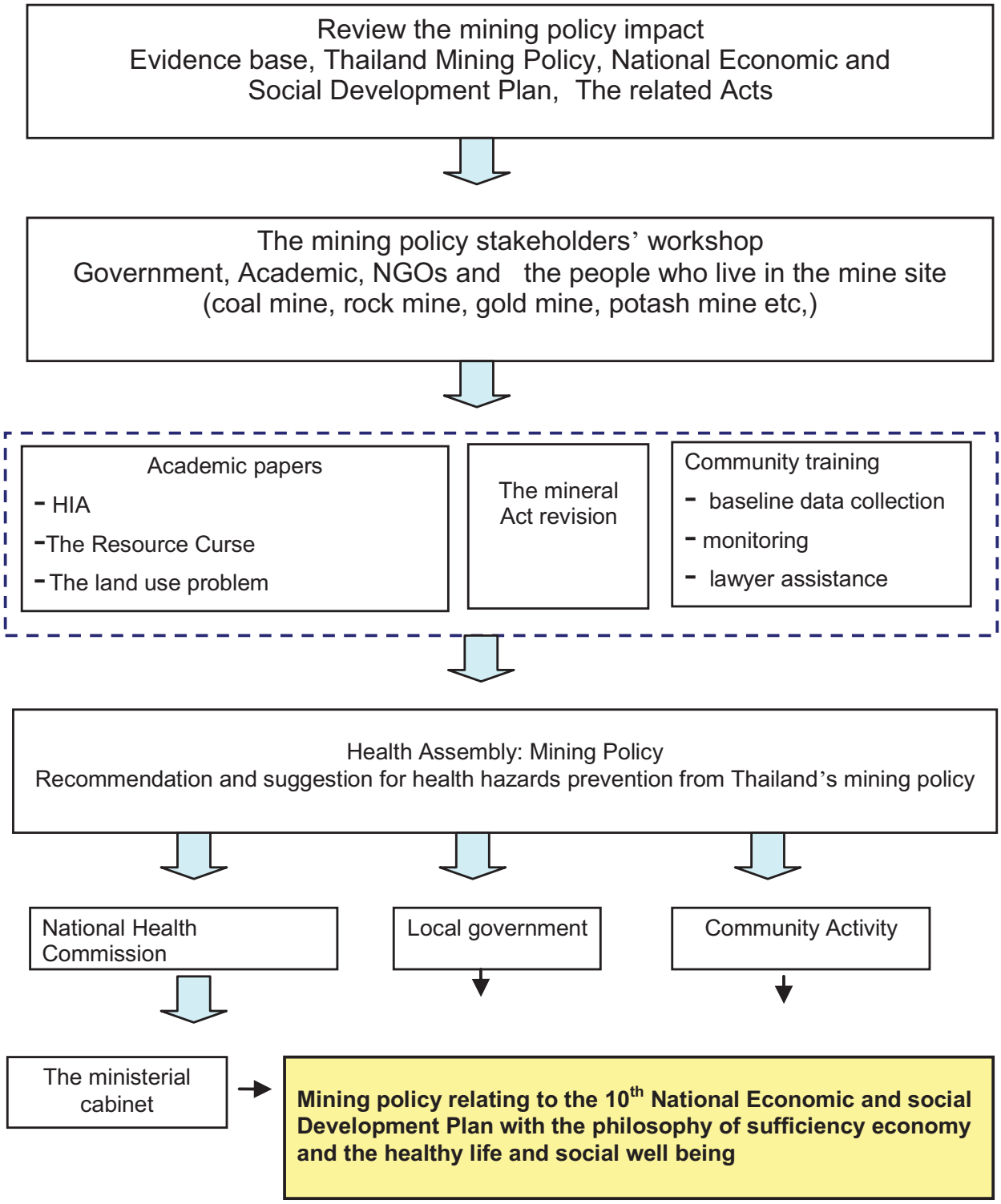


Figure 4: The process of mining health assembly

The HIA in this case has three roles. The first role is to find suggestions for mine policy revision. The second is community empowerment to apply HIA for health equity in other situations. The last role is to apply the lessons learnt as a guideline for other health assemblies.

Health Assemblies use HIA for situation analysis, scoping and mining impact assessment, synthesizing health impact from mine activity for HIA community guidelines, economic assessment, improvements of law, and community training for baseline data collection, monitoring and lawyer assistants. HIA is a crucial tool because it collects and builds on knowledge from all stakeholders and a public review to support the health assembly. The HIA role in the health assembly is not only a tool for prediction level but also for prevention of health hazards from through participatory healthy public policy process which leads to a healthy life and happy society.

7. The Resource Curse and the Genuine Saving: *Case of Gold Mining in Thailand*

Theoretically, economies with abundant mineral resources should gain advantage in economic development. However, evidence around the world shows the opposite. Normally, countries with high dependency in mining activities become slow movers in terms of economic growth.

Concurrently, the notion of sustainable development urges economists to pay more attention in long-term effects rather than short-term economic growth. As a result of this notion, economists

suggest that, instead of focusing on GDP growth, we should look at long-term savings which includes natural and human resources.

With this concept, the genuine savings rate has been introduced to measure the change in capital stocks, including natural, human, physical, and financial capital. Figure 5 shows that, paradoxically, the countries with high dependency in mining have much lower genuine savings rates. This means that the income from mining cannot lead to the accumulation of capital in the long-term. Therefore, the benefits from mining are relatively short-term and cannot lead to sustainable development of the economy in the long run. This refers to the concept of "resource curse", in which an economy cannot turn its short-term economic windfall into long-term economic development.

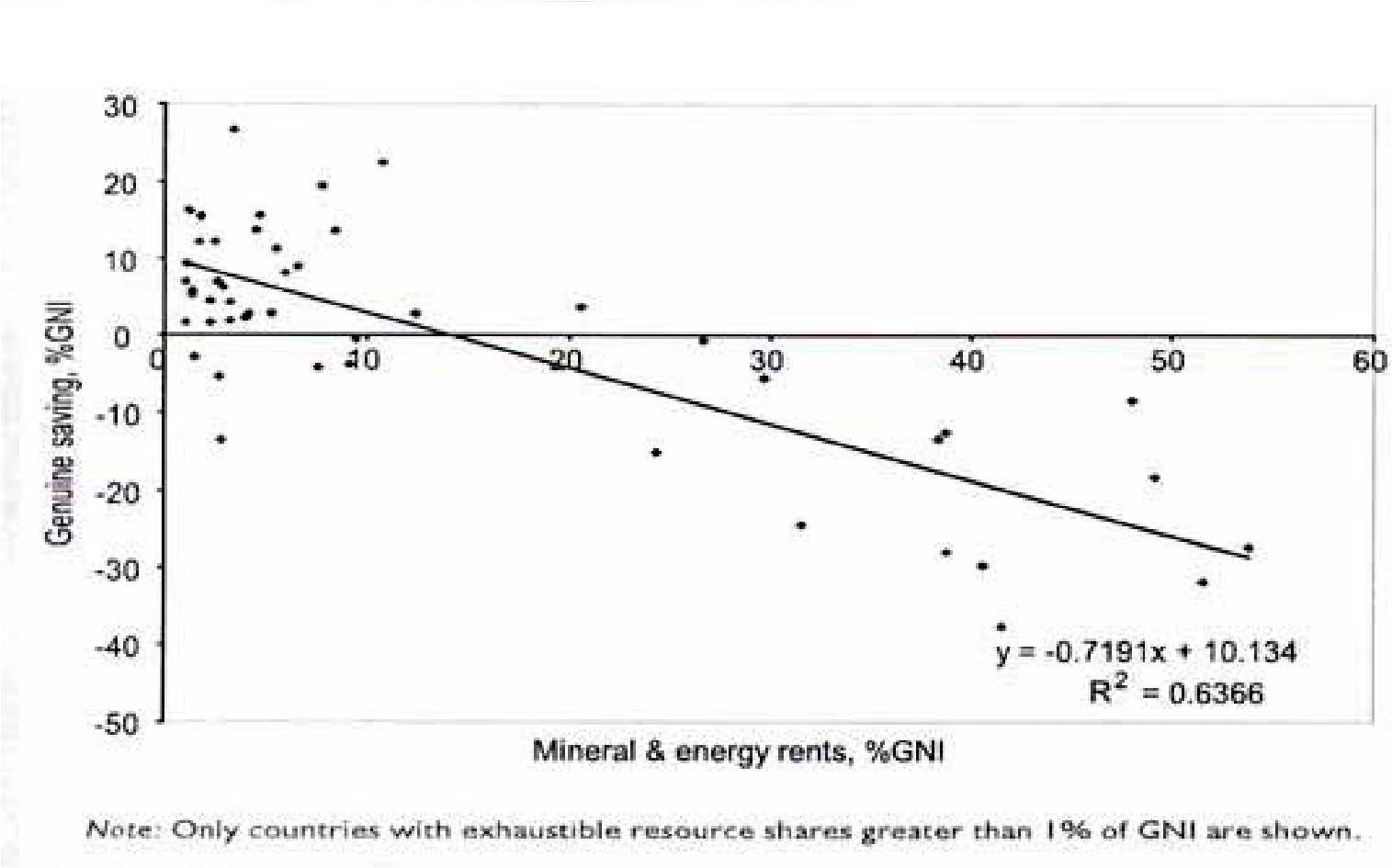
In Thailand, the concept of genuine savings rate has been applied to analyze the contribution of gold mining in Pichit province. This study is a part of the health assembly's attempts to assess the impact of mining policy in different perspectives with the aim of deeper understanding.

The result from the Pichit gold mining case shows that total gold value produced and exported from this mine within four years is 8,243 million Thai Baht (THB). According to the concession, this gold value belongs to Akara mining company from Australia. The damage in terms of health and environment is equal to 682 million THB and the depreciation of capital is around 357 million THB. The GDP contribution in Thailand is only around 3,542 million THB. Of this, only 1,291 million THB will be saved in the Thai economy. Therefore, in sum, the genuine saving in Thailand is only 681.9 million THB.

In other words, the Thai economy can only keep 8.27% of the total depleted resource value (8,243 million THB) for its long-term

economic development. This figure shows that, from a sustainable development viewpoint, Thailand gets a very small return on its investment in this resource. Moreover, if we compare the genuine saving rate to the profit share of Akara mining (around 3,045 million THB), we find that this mining project does not yield satisfactory results in terms of sustainable economic development.

The result of this study was presented to the forum for the health assembly on January 9th, 2007. The participants found that the assumption that mining always creates national wealth should not be taken it for granted anymore. The economic rationale of mining policy and of each mining project should be seriously reviewed. The participants from Ministry of Industry also agree that the profit sharing of the gold mining project should be reconsidered, based on the principle of fairness and national sustainable development.



Note: Only countries with exhaustible resource shares greater than 1% of GNI are shown.

Figure 5: Genuine Saving vs. Exhaustible Resource Share, 2000

8. HIA in Progress

After the 1st platform of the mining health assembly, mining networks wanted to conduct HIAs in many cases such as the gold mine in Loei province, a lignite mine and power plant in Lumphang province, stone crushing mills in Tung province and also a salt farm in Nakhonratchasima province. Each case had a different approach to setting up their HIA. For example:

8.1 Gold mine in Loei province

Tungkum's gold mining project at Loei in northeast Thailand is a full scale operation. Overall concession holdings currently total about 93.1 sq km. Current measured and inferred resources total 3.46 million tons averaging 4.38 g/t gold, which is mainly invisible and refractory. The ore is gossanous, surface and near surface oxide material extending down to at least the 200 m level and ranges from 5 to 70 m in width. In places, ore zones are open laterally and transition into primary gold bearing sulfide ore zones. Surveys, including drilling, in the primary mineralized zones and other nearby oxide mineralized zones strongly suggest an overall gold resource potential of about 1 million ounces.

Picture 9: The Site of Tungkum's Gold Mine in Loei

Picture 10: The Cyanide Pond of Tungkum's Gold Mine

Being at or near surface, the ore is well suited for open-pit and relatively inexpensive mining. The processing plant utilizes the carbon-in-leach (CIL) methodology and is designed to process up to about 1200 tons per day.

Picture 11: Stream and Rice Field Surrounding the Tungkum's Gold Mine

In 2006, water monitoring by the regional environment office 9, Udon Thani, found high levels of cyanide contamination in a stream near the mine site. The Loei civil society, a member of Thailand's mining network, needed HIA for participatory problem solving. On 21 – 23 March 2007, the ministry of public health organized an HIA workshop for network capacity building. In this workshop Loei civil society set up a gold mine HIA. The gold mine HIA is ongoing.

8.2 Salt farm in Nakhonratchasima province

Nakhonrachasima province is in northeast of Thailand and has well known, high quality salt resources. This province has a lot of salt farms near rice farms. Problems in this case arise when saline from salt farms is drained to rice farms and agricultural land; leading to salinization of the soil, plant death and community conflict. Salt not only contaminated agricultural land but also contaminated stream and ground water resources. This salty water salty was unusable and led to risk of kidney failure if villagers used for it for drinking.

Picture 12: Salt Farm in Northeast Region of Thailand

Picture 13: Saline from Salt Farm Drained to Rice Fields

Noon Thai, a district in Nokhonrachasima province, faced these salt farm problems for a long time. They have joined the mining network and want to do an HIA to find an alternative. This HIA project had funding from King Prajadhipok's institute. The project is in process.

Picture 14: Workers on the Salt Farm

9. Conclusion

The evidence base has proved that mining creates a hazard for health both directly and indirectly. Problem solving is usually done at the project level. Most villagers have had to fight alone.

Good governance is an important global principle, but in the case of mining policy, corruption exists. Lack of transparency that prevents the public from having access to information, lack of public participation, accountability, and justice are all examples of corruptions found in mining policy.

Now is the time to set up systematic problem solving for mining policy. An effective system must include genuine stakeholder participation, multidisciplinary impact assessment, good governance and respect for one another.

Knowledge related to mining problem solving is complicated in terms of mining techniques and impacts, and toxicological diseases

and illness, which can be difficult to understand. HIA is a crucial learning process for persuading communities, the government, companies, NGOs and academic sectors to share and learn together.

Health Impact Assessment is an important tool for making the health assembly powerful. HIA provides an opportunity for all sectors and stakeholders to deliberate on the holistic dimension, and the impacts on physical, mental, social and intellectual health. The process of the health assembly includes community empowerment, mineral act revision, and also mining policy revision in order to be in line with the 10th NESDP's philosophy of sufficiency economy for healthy life and social well-being. Finally, mining can lead to both wealth and health if we can find and maintain a balance.

10. Challenges

10.1 Currently, evidence and research on mining in other countries has clearly pointed out that mining is dangerous and causes severe health hazards. What to do when mining is believed to create wealth while the 10th National Economic and Social Development Plan (NESDP) emphasizes the sufficiency economy for well being? What is the balance point? How to balance it?

10.2 HIA in the health assembly for health hazards prevention from mining policy is a learning process to persuade the stakeholders to deliberate in mining policy. Although HIA is a useful tool to empower health assembly, it is just the beginning of the whole process. The effective process

requires sincere deliberation of all those who are involved.

10.3 Accessibility to mining data and information is still limited to the mining specialists and academic sector. Impacts are known only at the project level. At present, while mining industries are fast-growing, the government has yet no policy for health impact assessment.

10.4 No comparative data between the curative costs of mining impacts such as treatment, environment rehabilitation, drinking water cost etc. and royalty income has been developed so far. The Ministry of Public Health should be a main actor to provide human health data and funds for assessment, but in reality they have no baseline for doing so. When the government has to make a decision on mining, they do not have adequate information to consider and balance the positive and negative impacts.

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HIA in the Orange Plantations and its contribution to Healthy Public Policy in the Agricultural Sector in Thailand

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1. Introduction

The promotion of orange cultivating in three districts namely, Fang, Mae-Ai, and Chaiprakran in Chiang Mai province in the northern Thailand, has become a seriously controversial issue for local communities for more than ten years. Local people have been greatly suffered from the intensive enlargement of large-scale orange plantations in the Fang Watershed, one of the most important natural forest areas in the northern country, because an effective control measure has been regardless.

The villagers in the Fang Watershed area have encountered a number of extremely serious problems, which mainly are consequences of the orange plantations, for instances chemical odor, water contamination, public property invasions, deforestation, illegal migration of foreign labors, social conflicts etc. They tried many times to complain such problems, particularly about the terrible chemical odor, with local authorities as well as relevant provincial officers but their voices were vanishing. There had been no any meaningful resolutions from those authorities. Therefore, they had to cope with such serious problems themselves, while the problems were deeply severe.

By the end of 2002, a local grass root NGO initiated a project on Health Impact Assessment (HIA) in the orange plantations supported by Health Systems Research Institute (HSRI). The project aimed to support the local communities to learn about their health impacts related to the orange plantations. The project was a truly participatory research as the villagers, who have been affected from the plantations, were the majority of the research team. The study was expected to provide evidence-based

information to support the communal learning process in health impact surveillance.

2. Development of the Orange Plantations in the Fang Watershed

Orange has become a new popular commercial fruit crop in the Fang Watershed since 1995 as its price was significantly higher than the prior commercial fruit crops in the area like lychee or longan. Moreover, the old famous orange cultivating areas in Rungsit[2] including other areas in the central region were collapsed due to the problem of soil degradation as well as the sensitive of orange's pests and diseases (Manager Online, 2003a). One main reason for the Rungsit orange crisis was the constant usage of vast amount of agrochemical and pesticides.

Orange cultivating has been firstly moved into the Fang Watershed area since 1957 by an external investor, as the area was suitable in aspect of climate and landscape. In 1982 there had been a successful discovering in a new kind of orange variety, called "Sai Nam Phueng"[3], which was more tasty as well as more costly (Manager Online, 2003b and Jutamart, 2004). Subsequently, there had been many farmers either large-scale (mostly from outside the areas) or small-scale farmers (mostly be local farmers) had shifted their investment towards orange cultivating considerably. The cultivating areas were significantly expanded since then. More

[2] Rungsit is a Bangkok's suburb area. It was highly recognized as the most famous zone for orange cultivating in the country since more than 20 years ago.
[3] "Sai Nam Phueng" means honey

importantly, orange has been promoted by different provincial agencies to be a product champion of the province.

It should be noted here that those all mentioned reasons have led to enormously fast extension of the orange cultivating areas in the Fang Watershed since 1997 (Manager Online, 2003a). At present, it is estimated that the orange cultivating areas in the Fang Watershed are more than 16,000 ha.

FIGURE 1: The Rapid Expansion of the Orange Plantations in the Fang Watershed

The Fang Watershed area comprises of three districts namely, Fang, Mae-Ai, and Chaiprakran, located in Chiang Mai province, the northern Thailand. The area has been highly recognized as one of the most important forest areas in the northern country. It should be noted that several main rivers of the country are originally generated from this area. Most of areas in the Fang Watershed have been reserved as 1A zone[4] according to the land use classification identified by the Ministry of Natural Resources and Environment.

[4] 1A zone refers to the area that is highly restricted for any land uses.

The orange plantations have been promptly expanded in the Fang Watershed area without a systematic control measure from any relevant authorities. Furthermore, as orange is a plant that basically has various kinds of pests and diseases, the plantation owners have to constantly use a lot of agrochemical and pesticides. With respect to this reality, it is found that there has been an intensive using number of various agrochemical and pesticides in the Fang Watershed area for several years. Unquestionably, this has caused many serious problems (for further details, please see 4) to the local communities who live nearby the plantation areas.

FIGURE 2: The Fang River, the Most Important River for Local People in Fang, Mae-Ai, and Chaiprakran Districts.

3. Health Impact Assessment (HIA) of the Orange Plantations: *A Participatory Learning Process of Local People*

The HIA study was conducted by the Institute for Sustainable Agriculture Community (ISAC), a local grass root NGO, by the end of 2002. This study was a participatory learning process for local people due to; some joined the project as the research team; some volunteered for data collection; and some participated in local health forums (for more details see 3.3). However, this study mainly focused on the scoping process of HIA only.

A. Objectives of the Study

1) To investigate socio-economic and population changes in the orange plantation areas in Fang, Mae-Ai, and Chaiprakran districts.
2) To explore local people's health problems related to the orange plantations in Fang, Mae-Ai, and Chaiprakarn districts.
3) To identify the scope of health impact assessment of the orange plantations in Fang, Mae-Ai, and Chaiprakarn districts.

B. The Study Areas

The study areas for this project comprises of 12 villagers which all located in the Fang Watershed area. The main stipulation for the study areas was each village had to occupy orange cultivating areas both in terms of plantations and small-scale crops[5] in order to make a clear-cut conclusion about health impacts of the plantations.

[5] It covers areas less than 1.6 ha

To make a clear comparison how the plantations had affected to those 12 villages, the research team had divided the villages into three groups regarding distances between the villages to the plantations.

Group I: The villages located far from the plantations less than 500 metres.
Group II: The villages located far from the plantations 500 – 3,000 metres.
Group III: The villages located far from the plantations more than 3,000 metres.

C. The Methods

In order to identify the scopes of health impact assessment on the villagers, who were affected from the plantations, a number of methods had been applied in this study as the following details:

1) *Literature reviews* – many related materials and documents concerning socio-economic and population changes in the Fang Watershed areas were reviewed. Furthermore, various sorts of documents related to communal state of health problems were gathered and collected from relevant agencies e.g. Public Health Volunteers at village level, community health care centers, hospitals, and provincial public health office.
2) *Local health forums* – three local health forums had been organized by the research team with the aim to bring together various groups of local people to discuss and share their experiences regarding their communities' socio-economic changes, as well as state of their health problems.
3) *Communal health monitoring* – one study was chosen to conduct community health monitoring. The chosen

community had to continuously pursue and record status of their health changes for one month.

4) *Questionnaires* – approximately 3,300 questionnaires were conducted in the three village groups, by the research team and the local volunteers to learn about overall pictures of the communities e.g. status of the communal health, the changes in bio-physical environment and socio-economic environment of the communities.
5) *Blood testing* – the research team arranged the blood testing services along with the local health forums for those who were interested to check the pesticide residues in their blood stream.
6) *A public scoping seminar* – a seminar with stakeholders was held to present preliminary scoping results and to listen to the opinions of the stakeholders.

FIGURE 3: The Villagers Discussed and Shared Their Experiences about the Changes of the Communal Socio-economy and Their Health Problems in the Local Health Forum

4. The Result of HIA Study

From the literature reviews, the local health forums, and the questionnaires, it is clear that the intensive expansion of the orange plantations in the Fang Watershed causes problems in two main aspects, which are 1) problems related to the change in bio-physical environment and 2) problems related to the change in socio-economic environment.

A. The Changes in bio-physical environment

Chemical Odor

The most obviously serious problem for the local communities in the Fang Watershed area is concerning terrible chemical odor. The main cause of such terrible odor comes mainly from the pesticide uses in the orange plantations. Pesticides are enormously used in the orange plantations as orange is a sensitive plant. In addition, due to the plantations have rapidly extended more than 16,000 ha at the present, as a result there are several local communities that have been surrounded by huge plantation areas. Therefore, it is hard for those communities to avoid pesticide smells, which are sprayed almost every day from different plantation owners. Previously, the plantations were sprayed during daytime but since many affected local people had frequently complained about the chemical problem with several relevant authorities, later the plantation owners have changed to spray pesticide during nighttime, especially about 3 am. Thus, it is impossible for local people to escape to anywhere because it is sleeping time.

From the questionnaires, it is found that 26.4 per cent of the villagers in Group I replied that they smell the chemical odor,

while the percentages of Group II and III are 11.4 and 3.6 per cent respectively. Therefore, the closer the community is surrounded by the orange plantations the stronger the chemical they expose.

The chemical odor does not cause only disturbance or annoyance but also other health impacts e.g. dizziness, difficult breathing, red eyes etc. Even local people tried several times to complain about the terrible chemical odor to the several relevant authorities, but it seemed that their requests were not sincerely addressed.

FIGURE 4: Pesticides are Heavily Sprayed in the Plantations almost Every Single Day

Pesticide Contamination in Water Resources

The contamination of pesticides in groundwater as well as in the communities' freshwater ponds is one of the most serious concerns among local people in the Fang Watershed area. Water qualities around the orange plantation areas have been significantly deteriorated due to over uses of pesticides in large plantation areas with little concerns about its impacts to local people's health or even the environment. Moreover, many pesticide containers are negligently dumped in water sources of the communities.

Consequently, people in many communities cannot drink or use their freshwater ponds as usual. Some people were used to regularly take a bath from their freshwater ponds for bath, after that they found that they encountered with skin rash problem. Furthermore, some also smelled chemical odor from their freshwater ponds. Therefore, some families have to pay much higher cost for buying drinking and using water. However, there are many local people who still use water from their freshwater ponds for household consumption.

From the questionnaires, it is found that approximately 53 per cent of the villagers replied that they still drink water from their freshwater ponds as it saves their expenditure costs. While around 20 percent buy drinking water due to they are not confident to drink water from their freshwater ponds. The rest seek for drinking water from other sources e.g. rainwater and the villagers' water pipe system.

FIGURE 5: Pesticide Containers are Negligently Dumped into the Communities' Water Sources.

Water Shortage

Basically, orange is a plant that needs water supply all year round, while other prior main commercial crops[6] do not. Since the orange plantations are occupied more than 16,000 ha in the Fang Watershed, it certainly needs high volume of water supply, particularly in the dry season where local farmers fate water shortage problem.

The plantations make the water shortage problem in the Fang Watershed more seriously due to the plantation owners have high potential to access to water sources than the local farmers as they have much money and more advanced technologies. In many cases, it is found that the plantation owners make large reservoirs close to the local canals[7] and convey water to store in their reservoirs. As a result, it leads to the change of water drainage direction in the local canals. Consequently, many local farmers are seriously suffered from the water shortage mainly resulted from the mentioned behavior that strongly violate the local rule regarding water sharing. Recently, this problem has given risk to a disputed conflict among local people and the plantation owners.

It is clear from the questionnaires that the water shortage problem is one of the most concerns for local people. It is found that 59.7 per cent of the villagers replied that they have sufficient water supply for all year round, while 40.3 percent replied that they do not have water to use for all year round.

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[6] Previously, the main commercial crops in the Fang Watershed area were garlic, onion, lychee and longan.

[7] It refers to a community-based irrigation system that is mutually operated and maintained by a community aiming to provide water for agricultural purposes.

FIGURE 6: Water has been Highly Used in the Orange Plantations All Year Round. The Amount of Water Supply from Several Local Canals have been Diverted to Serve the Orange Plantations.

Deforestation

A huge number of bamboos from the communities' forests as well as from several national forest reserved zones have been immensely cut down to be used in the plantations as stakes for supporting small orange trees from wind. It is estimated that one orange tree needs bamboo stakes approximately ten stalks, therefore orange in one ha (there are about 375 orange trees in one ha.) needs to use bamboos around 3,750 stalks. Thus total bamboo used in the entire orange plantations of 16,000 ha are at least 60 millions stalks per year. Presently, bamboos in the Fang Watershed area have significantly decreased. Accordingly, many communities have been affected from this phenomenon since bamboo is recognized as a multi-benefit plant for local people, especially as an important source for food security. However, since bamboos in the local areas have been deteriorated leading to bamboo shortage, many plantation owners have to import bamboos from other areas.

Apart from the over uses of bamboo in the forest areas, the illegal invasions of the orange plantations into national forest reserved zones are also a serious problem in the Fang Watershed area, as shown in the contrast figures of the orange cultivating area. The official figure in 2002 was only 5,343.36 ha, while local people

confirm that the actual areas should be at least 16,000 ha. It is estimated that the illegal invasion areas are certainly more than 1,600 ha at present.

FIGURE 7: A Vast Number of Bamboos are Used in the Orange Plantations as Stakes for Supporting Orange Trees

B. The Changes in Socio-economic Environment

The Conflict over Water Resources Management

Due to most of local people in the Fang Watershed area are small-scale farmers hence their concern about the water shortage problem has become the most critical issue for them. The conflict over water resources management between the villagers and the plantation owners has been seriously arisen all over the area as a number of plantation owners has violently diverted water from the

local canals to use in their plantations. Importantly, several large plantations are located at upland areas that basically are upstream of the local canals. This advantage is benefit for them as it is easier to convey water from the local canals to store in their private reservoirs. Accordingly, many local people who live at the downstream always face the water shortage problem.

One of the most respectful monks in the Fang area said that in the beginning, the plantation owners politely asked local people for the approval of water allocation from the local canals to store in their areas. They promised that they would distribute the reserved water to local people, but after that they never have followed their commitment. This has made the adverse impact to local people who have lost their water sources. Currently, the water conflict in the Fang Watershed area is more serious problem (Manager Online, 2002c).

The Change in Food Security

Before the intensive expansion of the orange plantations, local people in the Fang Watershed area had various kinds of natural food for their consumption e.g. bamboo shoot. However, in the present day the natural food varieties are significantly decreased since the large areas of the communities' forests, which are the major sources of the natural food, as well as other kinds of forest areas have been destroyed. The main cause of the forest area reduction comes from the invasions of the orange plantations into the forest areas. Furthermore, local people who live in the villages that are close to the plantations do not dare to eat the natural food as usual, as they are afraid it may have pesticide contamination.

Public Property Invasion

Apart from the communities' forests invasion, local people confirm that the plantation owners have also extended their incursions into other communities' public properties for instance, the deserted temple area of Nong Bua Ngam Village, the community street of Sansai Clongnoi Village, etc.

Concerning the case of community street, the plantation's owner (s) formerly bought many lands until that both sides of the community street are belong to them. After that, they illegally took over the street by expanding their plantation across the street. This is a serious problem for the villagers, as they have no other ways to access their own community. Thus, it has caused critical conflict between the villagers and the plantation's owner.

Illegal Migration of Foreign Labor

Many plantation owners prefer to engage foreign labors particularly the Burmese labors to work in their plantations, as their wages are considerably lower than the local labors. The plantation owners always hire these foreign labors to spray pesticides in their plantations. However, when these foreign labors spray the pesticides they hardly wear any protective gears as they have a little knowledge about the negative impacts of the pesticides, as well as they think it is not dangerous at all to their health.

The over uses of pesticides in the plantations with the careless concern, it makes the pesticide problems in the plantations are more seriously critical. Whenever these labors cannot work for the plantations because of their health are deteriorated resulting from the heavy pesticide application, the plantation owners will lay off them and then will hire another to work instead. There are surplus

labor supplies as the province is close to the country borders, therefore it is not a big problem to hire other foreign labors.

However, most of these foreign labors are illegal migrations, thus it is difficult for the officers to regulate them. Moreover, some of them are disease carriers to local people, and some cause the serious conflicts with the villagers, particularly related to the problems of the pesticide application in the plantations.

The Social Conflicts

The most seriously controversial problem resulted from the orange plantations is the social conflicts among local people themselves. At the beginning of the struggle, around 4-5 years ago, many local people who were affected from the plantations gathered together and tried to mutually cope with the plantations' problems themselves as their compliant to the authorities were not seriously responded. However, even they tried several ways to address the plantations' problems, but the problems seemed to be deeply severe. Several villagers were hopeless and dispirited, some felt stress, while some were very angry to the plantations'owners. The relationship in many communities declined since local people began to quarrel and disagree to each other. The social conflicts were intensified either between the villagers themselves or between the villagers and other groups such as the plantation owners, the foreign labors, and the authorities.

Currently, the conflicts among local people are deeply severe since the mass media, particularly the local and national newspapers, have continually reported the problems and impacts of the orange plantations in the Chiang Mai province until the government attended to seriously take action to address the plantations' problems. Unfortunately, the orange's price significantly fell down during that time. Local people who have invested in orange

cultivating totally believe that the reduction of the orange's price because of the reports of the orange's impacts. Therefore, they have been very angry and unsatisfied at the villagers who were the HIA research team as they think that because of these people gave negative information about the orange to outsiders. Some villagers who were the struggle leaders cannot be able to live in the community no longer as they encounter with serious pressure from their neighborhoods as well as from their relatives. The kinship between these two groups in the communities is collapsed.

C. The Link to Overall Health Impacts

The previous topic illustrated how the orange plantations potentially affect to the changes of the communities' environments both the bio-physical and the socio-economic environments. The changes of these two environments closely link to health determinants, which ultimately reflect to human health. It can be concluded that any changes in health determinants correlatively relate to health impacts. Therefore, the overall health[8] impacts of local people in the Fang Watershed relating to the orange plantations are described as below.

[8] Health in this content refers to holistic understand to 'health' which consists of four main aspects namely, physical health, mental health, social health and spiritual health.

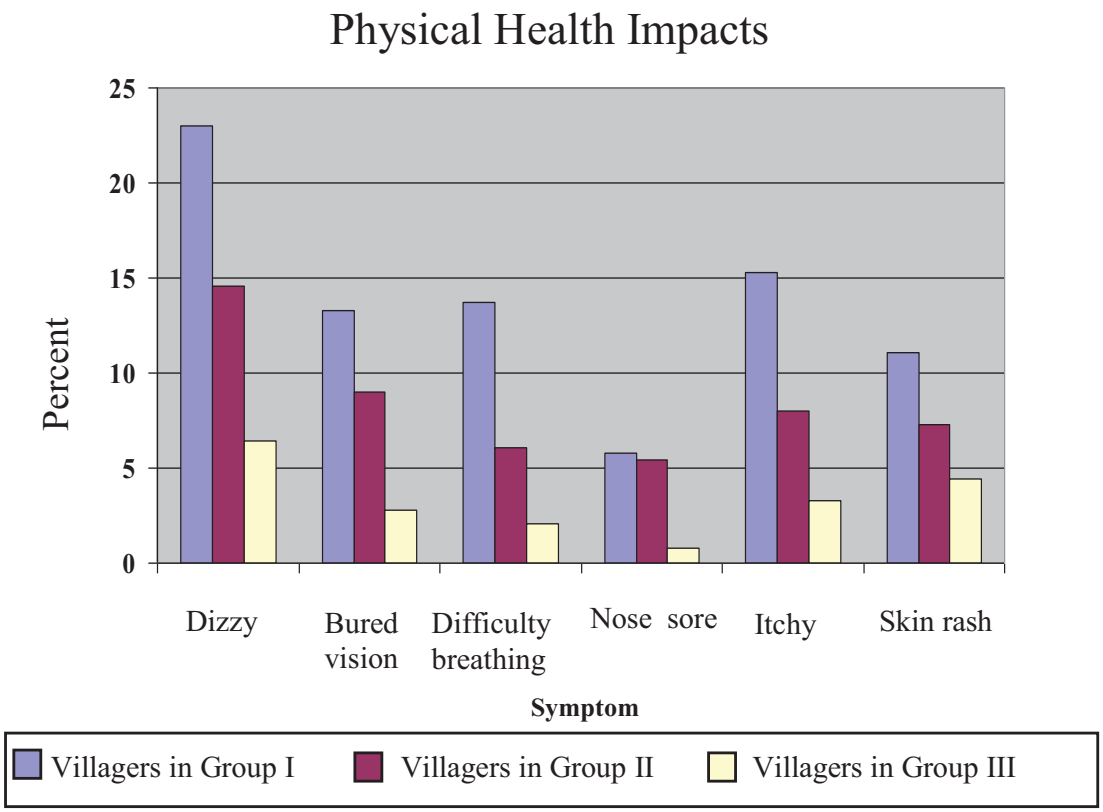

FIGURE 8: The Physical Health Impacts on the Three Village Groups.

Physical Health Impacts

From the questionnaires, it was found that the physical health impacts on local people, which closely relate to common symptoms of the pesticide exposure identified by Helen Murphy (FAO), were dizzy, burred vision, difficulty breathing, nose sore, itchy, skin rash, etc. These health impacts were probably consequences from the change in the bio-physical environment namely, the chemical odor and the pesticide contamination in their freshwater ponds. It should be noted that these symptoms were normally found in children more than adults. The summary of the

physical health impacts of local people in the three village groups are illustrated in the following chart:

FIGURE 9: The Physical Health Impacts on Local People in the Fang Watershed

Mental Health Impacts

The research team and the volunteer villagers mutually defined the meaning of 'mental health' as mental sickness that covers aggressive and furious, including having some stress behaviors e.g. shooting a gun to pesticide instruments and shooting a gun into sky. These mental health impacts were presumably resulted from the changes in the bio-physical and socio-economic environments such as chemical odor, pesticide contamination in water resources, water shortage, water conflicts and the change in food security. It should be noted here that these mental health impacts are the accumulated problems that are hard to exactly identify their certain causes as they can be potentially resulted from other factors besides the orange plantation problems. However, from the questionnaires it was found that local people, who live in the villages close to the plantations, trend to have mental sickness problems more than one who live far the orange plantations. The

following chart illustrates the mental health impacts on local people in three village groups.

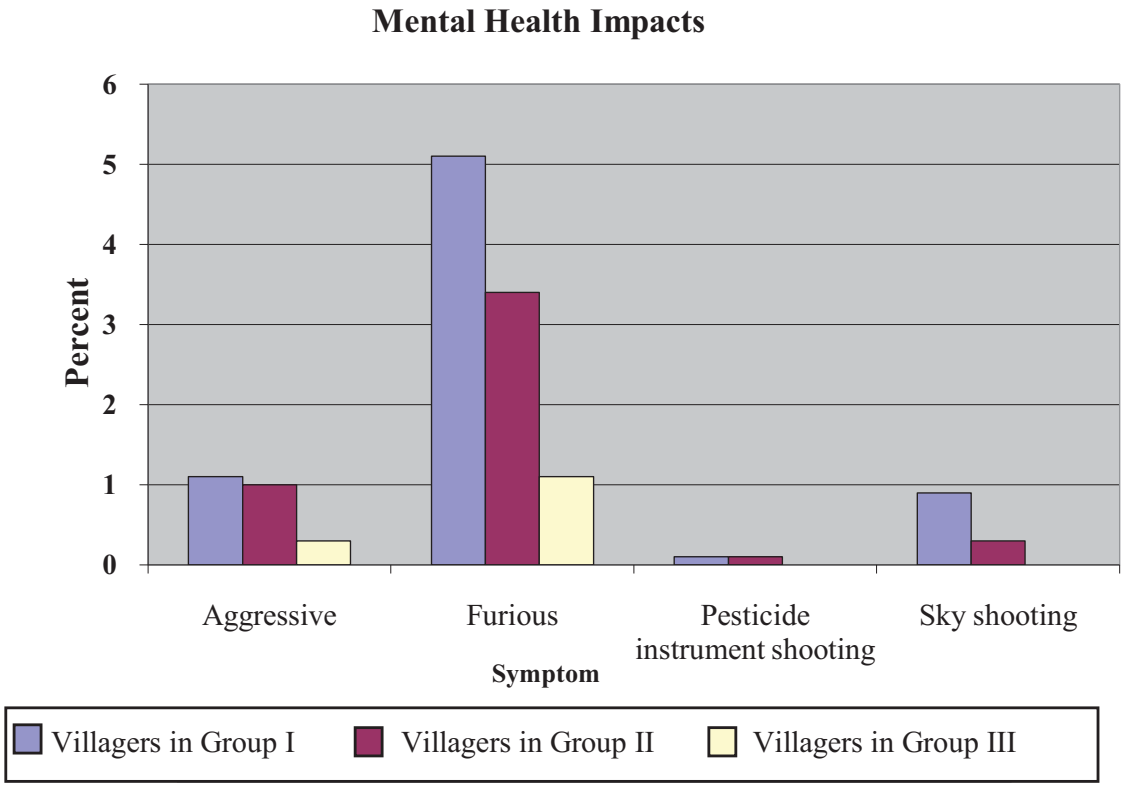

FIGURE 10: The Mental Health Impacts on the Three Village Group

Social Health Impacts

In this study, social health impact was defined as an ability of a person to properly live with other people in a society or community. From the questionnaires, it was found that the social health impacts as for examples dissents, quarrels and conflicts within the communities. These impacts mostly were consequences from the changes in the socio-economic environment e.g. the water conflicts, the communities' street invasion, the conflicts between the foreign labors and the social conflicts within the communities. The comparison of the social health impacts in the three villages groups is shown below.

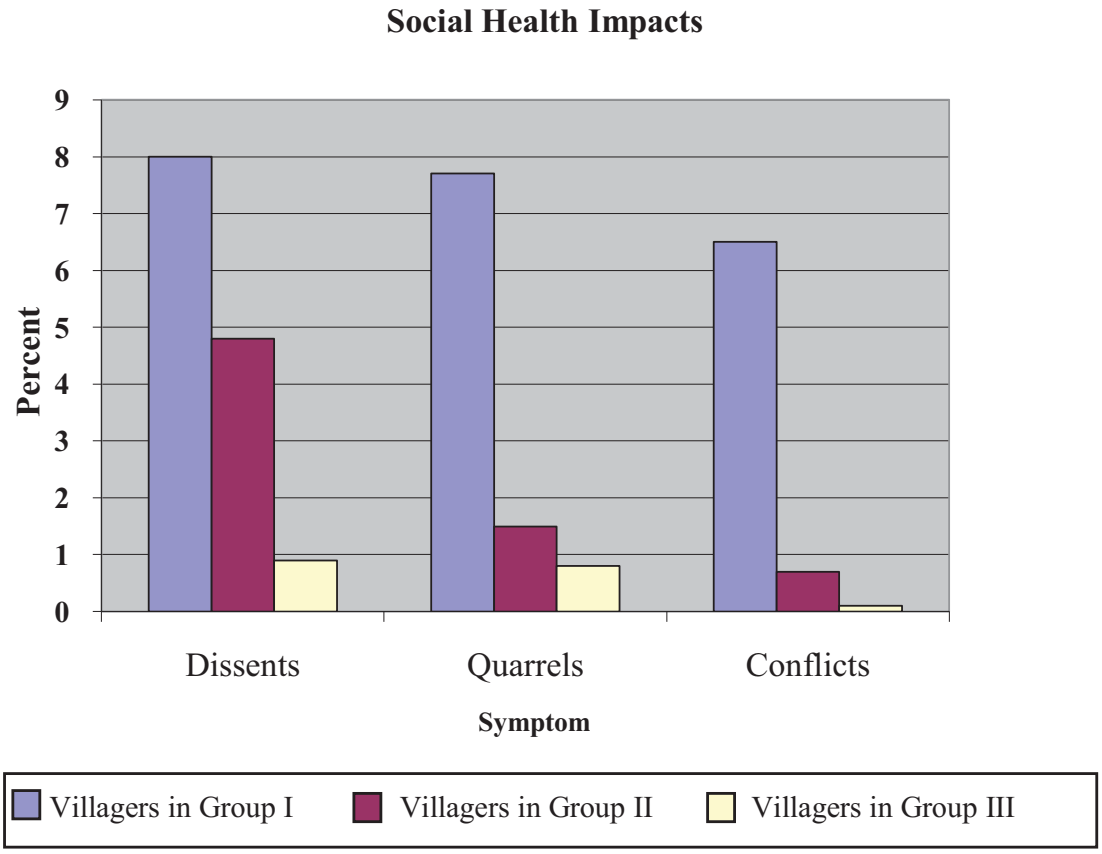

FIGURE 11: The Social Health Impacts on the Three Village Groups

Spiritual Health Impacts

The meaning of 'spiritual health impact' was mutually defined by the research team and the volunteer villagers as abandon of local people from their home communities, particularly one who live near the orange plantations. The key reason for the leaving was because of they would like go away from the plantation problems, especially concerning the terrible chemical odor and the pesticide contamination in their freshwater ponds. However, it should be noted that the problem about loss of the kinship within the communities is also one of the most serious spiritual health impacts at the present time.

The following figure is illustrated the summary the overall health impact of the orange plantations on the local communities in the Fang Watershed area.

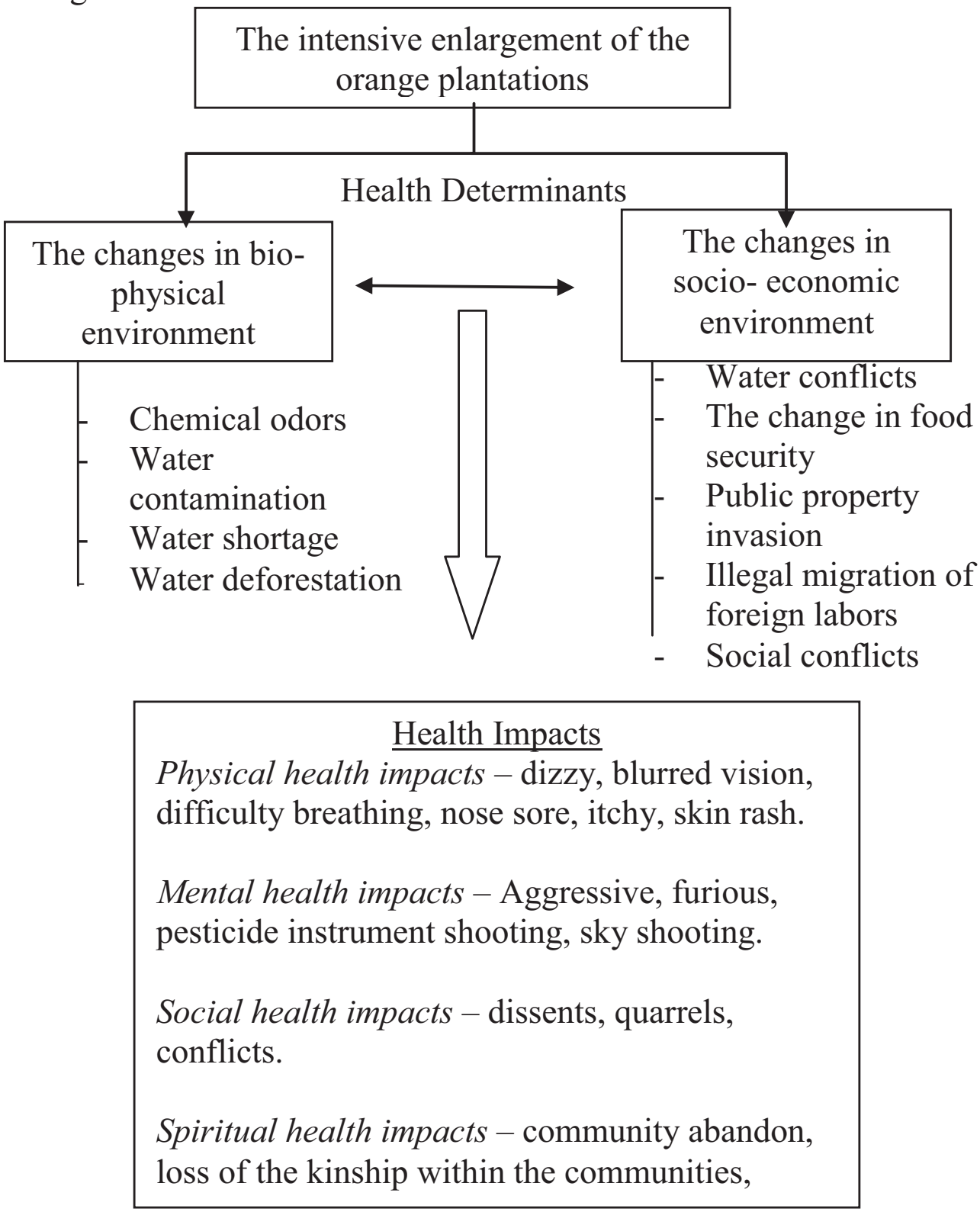

FIGURE 12: Summary the Overall Health Impacts of the Orange Plantations.

5. The HIA Study and the Move to Public Policy Process

5.1 The Struggle of Local People

From the result of the HIA study, it is clearly found that local communities in the Fang Watershed area have been seriously affected from the intensive expansion of the orange plantation areas for several years. Even local people tried many times to complain their sufferings for more than five years to local authorities, provincial officers as well as to the Prime Minister in the year 2001 (Manager Online, 2003b), but the problems were not seriously addressed.

Why their requests were not meaningfully responded from the authorities? Local people knew well that because each plantation owner is a powerful person in the local areas, some are the members of the provincial or sub-district administrative offices, and some is the mayor, etc. Importantly, most of them have close connections with politicians or the local bureaucrats. To cope with the plantation problems it was not easy for them. In order to strengthen their power themselves, therefore the villagers from many local communities gathered together and established the informal networking called the 'Fang Watershed Conservative Group' (Manager Online, 2003b). However, the plantation problems still could not be solved.

More recent, the plantation problems have become a hot public issue in the country as a number of mass media, particularly newspapers, have continually reported problems and impacts of the orange plantations in Fang Watershed. During that time, the preliminary result of the HIA study was referred in the article

"Poisoned Orange in the Fang Watershed" that was unceasingly reported for three days in a national newspaper. Then later, this article got the praiseful award from the Thai Journalist Association in the field of 'Environment Conservation' news in the occasion of the Journalist Day for the year 2003 (Manager Online, 2004d).

5.2 The Move to Public Policy Process

Since the releases of the orange plantation problems in the Fang Watershed were continuously communicated to the public, many people began to debate about the Fang orange case, as well as other related issues such as impacts of pesticides on health. Eventually, in September 9, 2003 the issue of the orange plantations in Chiang Mai was raised to discuss in the Cabinet meeting. After that the Cabinet mandated the Ministry of Natural Resources and Environment (MoNRE) to take responsibility in solving the orange plantation problems in Chiang Mai province.

The MoNRE Minister appointed the provincial public health office to work as the focal point for the solving process. Six working groups were set to study on specific issues with the time limitation for six months. The working groups worked for solving problems in the following issues:

1) The health impacts
2) The environmental impacts
3) The illegal land use problems
4) The utility of high land or forest reserved areas management
5) The illegal foreign labors
6) The socio-economic, culture and livelihood impacts

To address the issue of health impacts of the orange plantations, the Public Health Act 1992 under the enforcement of the Ministry of Public Health, was seen as the key important legal enforcement

mechanisms. The working group was assigned to work in order to force orange plantations as a 'risky activity to human health' according to the Public Health Act (Chomchaun, 2003). The affected local people hopefully expected that the law could be enforced to solve their health problems. The working group worked hard to investigate the impacts of the orange plantations on local people's health.

It should be noted that an obvious obstacle for the working group was the limitation of knowledge building as it mainly was based on scientific knowledge regardless communities' wisdom and their health concerns, as well as the limitation of working period, budget including resources persons. During the end period of the working process the Minister of Public Health proposed in the Cabinet meeting that to solve health impacts related to the pesticide problems it was better to use the Hazardous Substances Act 1992 instead the Public Health Act. The working process of forcing orange plantations as a risky activity seemed to decline since then. Until now the problems of health impact on local people still cannot be definitely solved.

Unfortunately, in February 2004 the existing MoNRE Minister has been mandated to quit the position due to the political condition. The situation seems to be more adverse; the issue of the orange plantations has become out of concern for the new MoNRE Minister. Thus, the whole solving process seems to be ceased at the moment.

During the period of the solving process, another serious problem related to the Fang orange has been arisen (as mentioned to some extent in the topic 'social conflicts' in 4.2). The economic problem (the decline of the orange price) has become the most concerned for local people in the Fang Watershed; particularly for people who have invested in orange orchards, rather than the health

impact problems. It seems that now most of local people are unhappy with the solving process as well as the negative public communication by several newspapers.

The most importantly, the villagers who joined the HIA research team, as well as the key leaders who support the solving process is seriously affected resulting from the decline of orange price. They are accused by most of local people to be evil for the communities as they induce the outsider researchers and gave the negative information to the journalists. As a result, some accused villagers have to permanently leave their communities as they are threatened by some powerful persons. Furthermore their neighborhoods as well as their cousins no longer want to talk with them. Now this problem has become the very serious conflict in the communities rather than the orange plantation problems.

6. Lessons Learnt

1) HIA Methodology and the Learning Process of Local Communities

The most significance of the HIA study, not the result of the study, but it was the collective learning process of local people, particularly in knowledge building. They learned what does it means by 'holistic health', as well as mutually defined the meaning of 'mental health', 'social health' and 'spiritual health' according to their understanding. They participated in designing of the study method, data investigation, data collection, including data processing. Moreover, they shared their experiences about the changes in bio-physical and socio-economic environments in their communities, as well as they learned how to use the body map to

identify impacts of the orange plantations on their health. The HIA process facilitated them to learn about health impact surveillance.

It should be noted that before the HIA study started, there was no any significant data regarding the orange plantations and their impacts to human health and environment. The research team and local people tried to gather all relevant data themselves, several times they were denied from the authorities in data inquiring. Therefore, the HIA study was seen as the solely explicit effort of local people in knowledge building regarding the orange plantations and the link to their health impacts. It should be noted that there was no other key stakeholders e.g. plantation owners, local academics, health officers, etc participated in this study even the study team tried to involve them at the beginning of the study but they denied to join the HIA process. It can be said that the HIA study was a truly communal participatory research. However, the result of the study was criticized by academics that it was only local concern, not based on scientific knowledge as well as it was not reliable and validity. This reflects the difference of 'health paradigm' among academics and local people. What really needs to address this problem is a collective learning process to mediate between them in order to work together for healthier community based on sound evidence.

2) Health Concern VS. Economic Concern

At the beginning period of the struggle, most of local people in the Fang Watershed much concerned about the impacts from the orange plantations on their health, particularly their children's health. However, when the situation is changed (the decline of orange price) most of them have turned to be interested in the economic issue solely. The health concern has been dropped from their minds. Consequently, it has given rise to the seriously adverse social impacts within the communities, the collapse of

good relationship among themselves. Furthermore, other critical problems especially the deterioration of the ecosystem in the Fang Watershed are ignored by local people. The alike situation may happen in other intensive agricultural areas in other provinces if the related authorities do not closely pay attention to regulate at the beginning stage before any complicated problems arise.

3) *Public Communication*

From this case it is clearly found that the mass media have highly influence to urge the government to take action in solving the orange plantation problems, as well as to communicate with public. On the one hand, their role is significant for forcing the public policy process in the agricultural sector to achieve 'healthier agriculture practice' particularly regarding the pesticide application issue. On the other hand, their role can probably lead to negative impacts especially in the case that the written news is bias or vague. From the Fang orange case, it is found that the mass media particularly the newspapers have highly influence to the misunderstanding of local people in the Fang Watershed. Most of local people believe that because of the bad news about the 'poisoned orange' (consider the product as the problem) were continuously reported to consumer, the orange price is therefore declined. Inspire of the most serious concern for local people are the problem of 'the production processes' of the orange plantations. However, it is found that several reporters wrote the vague news about the Fang orange. This makes confusions to the public as well as to local people; consequently it leads to adverse impacts to the local communities. Under this circumstance, it really needs different groups of independent scholar or academic to pay roles for balancing the situation. This may be done in various ways e.g. making academic articles based on sound evidence to communicate with public; arranging academic forums or round table meetings to discuss and debate about the orange plantation

issue. Therefore, academic supports from different groups of stakeholders are needed to forcing Healthy Public Policy (HPP) process in the agricultural sector.

4) The Uncertain of the Political Process

The uncertainty of the political process is also seen as one of the obstacles in solving the orange plantations in the Fang Watershed. Many efforts from the working groups have been paused since the new MoNRE Minister appointed. The solving process seems to be stop since then. The political process is significant for this case since they possess high power, authority, as well as all necessary resources e.g. human resources and budgets.

5) The Contribution of HIA to Healthy Public Policy Process in the Agricultural Sector

Even the result of the HIA study cannot directly be used to solve the orange plantation problems as well as to influence the policy makers. It does not mean the public policy process regarding this issue is totally ceased. In return, there are several key movements regarding pesticide issue are occurring in the society. The issues of pesticide impacts are frequently raised to debate and discuss in Health Assemblies[9] and the Fang case is always mentioned as an example. Furthermore, there is an attempt to push 'plantations business' to be considered in the EIA system reform because of the lessons learnt from the Fang Orange case, as one example. Even the HIA study was done but at the moment several efforts for forcing Healthy Public Policy (HPP) in the agricultural sector are going on in the Thai society.

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[9] The Health Assemblies have been recognised as one of the key mechanism for public policy process for the civil society to achieve their healthier society or community.

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Part III
HIA for Local Empowerment

Local Empowerment through Health Impact Assessment:

Case study of potash mining project in Udon Thani province, Thailand[1]

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1. Abstract

In 1981, large deposits of some 300 million tons of high quality potash were discovered in Udon Thani. In 2003, the Asia Pacific Potash Corporation (APPC) launched a $US645 million mining project in the areas of 25 km2. Without local participation, this project has faced with strong opposition by local people. Later on a group of activists and academics conducted an Health Impact Assessment [HIA] of potash mining with the aim to provide the space and process for deliberative learning among all stakeholders on positive and negative impacts. A number of HIA forums were held at the community level, allowing various groups to share knowledge and values and at the same time empowering them. Local people have been encouraged to link environmental and health impacts in a broader framework. They could explain the linkage between the mining activity and its impacts on the society. HIA not only provides clear information but also an opportunity to learn how to present their local wisdom systematically, in the same way academic and specialists do. HIA becomes the entry point for local people in pursuing their right on the development of healthy public policy which requires their active participation. Presently, local people in Udon Thani are working on the direction of city development under the principle of sustainable development.

Keywords: Empowerment, Deliberative, Potash Mining,

2. Udon Thani potash mine project

Udon Thani Province in the northeastern of Thailand is found to have the high quality potash deposits (Sylvie ore) since 1981, with the reserved volume of more than 300 million tons. The Asia Pacific Potash Corporation (APPC: Transnational Company from Canada) has planned to invest around $US 645 millions on the mine. A 170-hectare plot of land was purchased for the construction of the plant which houses the processing line and tailing storage. However, the project's total mining area is vast, about 2,500 ha beneath the residential areas, farmland, a national highway and railway. APPC submitted [was granted with?] a Mining License on May 29, 2003 to run the underground mining in the areas of 24,500 square kilometers covering forty villages where 30,000 people live.

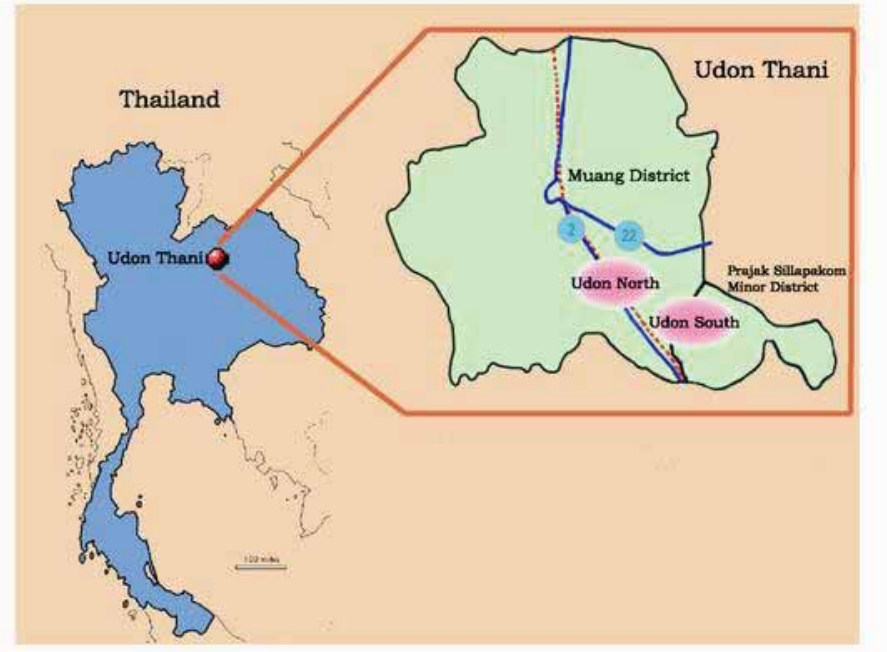


Figure 1 : Map of Location of Udon Thani Province, Thailand (www.appc.co.th/project_bg.htm)

The company plans to mine a thin layer of potash salt located 350 meters below the surface. It is expected to produce 6,000 tons of potash ore per day (2.0 million tons/year) through ore separation, precipitating and fuming processes respectively. It is anticipated that some 5 million of the remnants of potash salts will be carried back underground and take around 22 years to finish. More than 90 per cent of the potash product will mainly be exported to fertilizer manufactures, the rest will be used as materials for detergent, soap, glass, synthetic rubber, ceramic and weapon industries.

2.1 Mining and Processing

The Udon Thani Potash Mine will be a conventional underground mine using the room and pillar method of mining to recover sylvinite ore from the variable depths of 300 to 380 meters. Once the potash ore is taken out of the mine, it will be sent to the processing plant.

The first step of processing is to remove saleable potash from the salt and clay in the ore. After the ore is crushed into small particles (3 to 5 mm in diameter) it undergoes a cleaning process that resembles the work of a washing machine.

The potash particles are first rinsed with water to wash off the clay. Chemicals are then added and the mixture is placed in large tanks.

Air is pumped into the tanks forming bubbles that rise to the surface of the tank. The added chemicals will enable the “cleaned” potash particles to cling to the air bubbles and rise to the surface where they can be removed. This is known as a “Flotation Process”.

This salt waste is then sent through a drying process to remove water. The dried clay and salt mixture is transported to a tailings pile for storage while the water is released to a brine pond where it can be reused in the process.

The fine particles of potash that float to the surface of the "cleaning" tank are pressed into sheets then crushed and screened to sizes suitable for blending with other fertilizer materials. Potash dust is dissolved, then crystallized into a saleable product

2.2 Tailings Management

Tailings, the waste of potash processing, is predominantly NaCl, or commonly known as salt. The tailings produced during the processing of potash ore will be pumped from the concentrator to store above the ground in a HDPE-lined containment area. These tailings will be transported underground to backfill in the mine-out areas in the sixth year of operation.

2.3 Salt Water Management

Salt water will be produced during the processing of potash ore from the following source: Processing of potash ore; Site runoff in and around surface operations; Runoff from the tailings pile; and water that is siphoned from the mine itself. Brine, or water saturated with salt, will be generated during the process of separating potash and tailings. Rainfall runoff from the tailings pile will also produce brine. The brine will be stored in a brine pond before entering an evaporation circuit or recycled in potash processing.

2.4 Transportation

At full production 2 mtpa, about 85% of the final product will be transported by rail to a deepwater port, where it will be shipped to international markets. Potash to be sold within Thailand will be transported by truck to the existing blending facilities

3. Local communities Concern

The project has triggered opposition from local communities out of fear for widespread land subsidence, salt contamination of agricultural land and groundwater. People are worried about the impact of mine which will affect their community and the family especially their children. In addition, their local livelihood based on agricultural system will be destroyed. It seems that their concerns become more serious after the committees on EIA approval found 26 mistakes in the EIA report. For example, there are no studies on the health impact caused by the pile of remnants of potash ore and salt as well as by the contamination of potash salt, chemicals used for the ore production process in the groundwater and the agricultural areas.

Figure 2: Nonmakmo, the area of Potash mine project

Figure 3: Nongnatal, public lake next to the project

Figure 5: There are cattles around of Nongnatan Lake

Figure 4: Local people working in the rice field around the potash

It is obvious that wide protest is a result of lack of local participation in the early process. The protesters have raised many environmental and health concerns caused by potash mining such as the remnant salt, salt dust and land subsidence.

Figure 6 -7: The protesters

This situation unavoidably entailed local conflict between the beneficiaries and local people whose their livelihood is at risk.

Figure 8: Udon Thani environment Conservative Group

Figure 9: Right Protection Group

4. Comprehensive HIA

HIA in Thailand is quite new, but it has increasingly gained public interest. Reviews of international experience and pilot HIA projects have been commissioned by the Health Systems Resesrch Institute (HSRI). A group of academicians from various disciplines from 6-7 universities nationwide were invited to participate in the development of HIA in Thailand. Networks of HIA research groups were formed with the additional recruitment of research staff to facilitate HIA research projects.

Udon thani potash mine became a public issue and the idea of HIA has started since 29 Jan 2003 after a seminar on "Udon Thani Potash Project : Problem and Solution" at Chulalongkorn University, Bangkok. In this forum Dr Pattapong Kessomboon and Dr Decharat Sukkumnoed pointed out positive and negative impacts of Udon Thani Potash Mine. Positive impacts include job opportunities for local people while employment will thus stimulate local economic growth. The negative impact may be caused by 1) environmental change, such as land collapse, salt dust, air pollution, underground water contamination; 2) local sanitation change, such as an increase in waste and waste water; and 3) social changes that result from the transformation into industrial society with an influx of migrant labourers that will possibly give rise to social conflicts. Under such circumstances, some health risks are identified including respiratory tract infection, urinary tract infection, accident, AIDS. However, the EIA report of this project failed to assess health impacts. What was mentioned in the report was general health-related information in

Udon Thani Province, such as the number of hospitals, health officers, some health statistics.

The HIA working group from HSRI has joined the Udon Thani working group to organize a public seminar on "Potash Mining Project and the Application of Health Impact Assessment Process in Thailand" on 17-18 May 2003 in Udon Thani.

Some 500 participants attended the event which included panel discussions by acedemics, APPC and members of the National Human Rights Committee. There were also small-group brainstorming sessions in which participants voiced their health concerns. This forum successfully brought "Health Values" to the debates about development.

Figure 10 – 11: The forum on 17-18 May 2003 in Udon Thani.

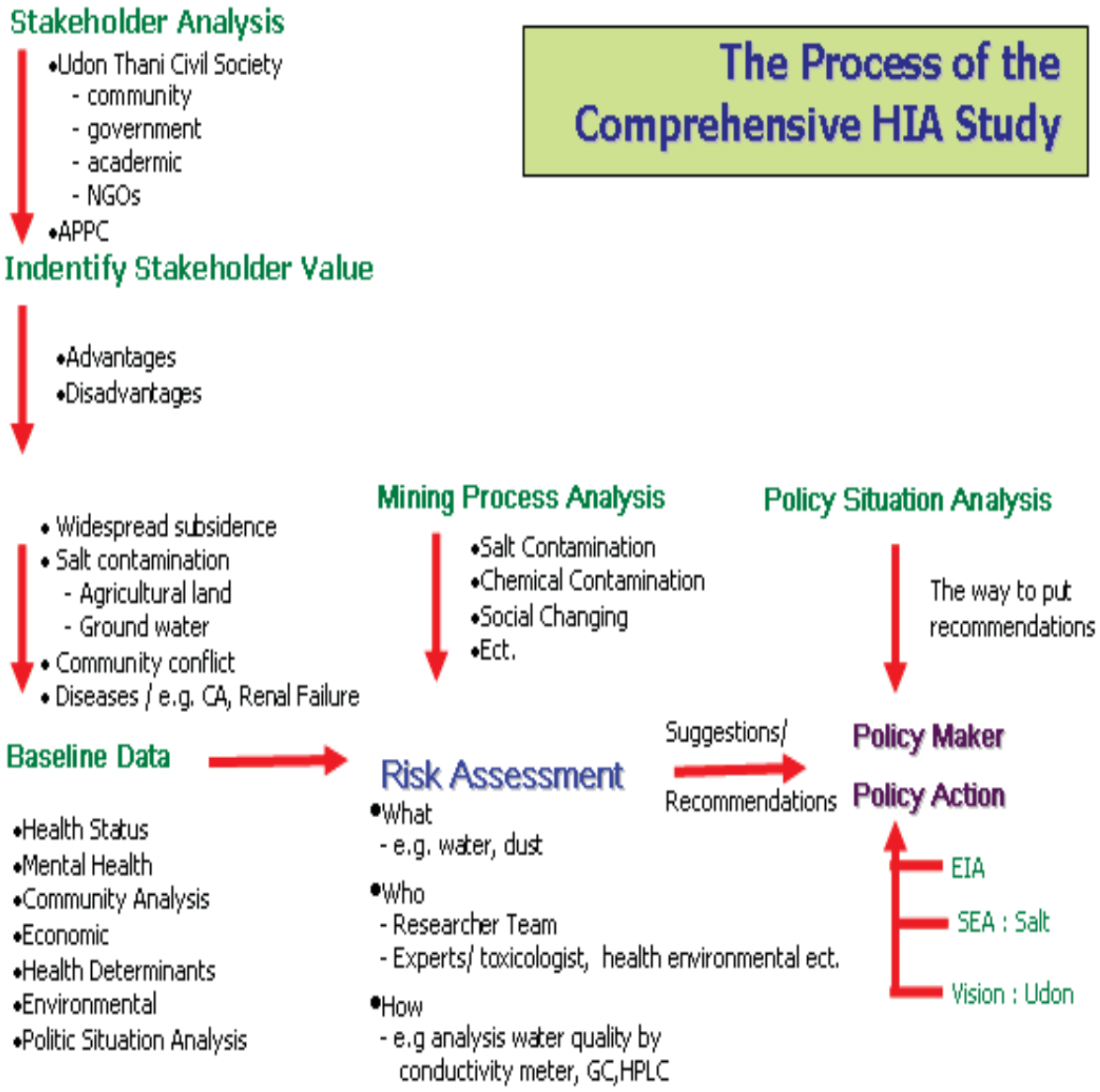
After the forum, a series of seminars and public hearings in communities both in the rural and urban areas were regularly

organized. The communities and the Udon Thani working group (Udon Thani Rajabhat University, Boromarajonani College of nursing Udon Thani and local environmental conservation group) applied the focus group technique to study the determinants of health. It was found that the health-related values were broadened and covered not only physical health but also the well being, good quality of life, fertility of natural resources, local cohesion, spirituality, and sympathy and sufficient economy.

Figure 12 – 13: Focus group in the local community for "Determinant of health"

Unlike the mining company which basically adhered to reductive thinking in addressing health issues, the local group handles the issues in holistic manners including physical, mental, social and spiritual aspects involving all stakeholders. Therefore, HIA process is defined not only as a tool to assess the health impact but also a learning process of the local community to understand the relationships between health and other sectors (in transdisciplinary approach). Finally, they can design their own ways (related to the potash mining) based on shared information and values leading to a healthy society in Udon Thani Province.

5. HIA Process



6. Local Empowerment

HIA is a core value and core activities that encourages people from various sectors, such as government sector, academic sector, NGOs and local community,, to work together in order to search for facts or information about the potash mining and predict the impact on people health that may possibly occur. In order to attain the goal, groups of volunteer were particularly assigned to conduct activities. A co-ordination team held a forum with the aim to provide the space and process for deliberative discussion among stakeholders on both positive and negative impacts of potash mining. Knowledge, information and values were collected from various groups and then would be used as an input for options and collective decision making process.

Forum at the community level was applied to empower local people on the impact assessment. The results from local forum indicated that the people in local community have learned about the holistic health including physical, mental, social, and spiritual. The forum brighten up their thinking about the impact of potash mining in many dimensions. Furthermore, the participants from various sectors of Udon Thani province have a chance to get involved in every process of HIA. They have learned together about the meaning of holistic health, investigation of the health determinant, identification of the project's values, collected the baseline data, and risk assessment. From this process, the participants learned not only about HIA, but they also link their learning to other problems in the society. Moreover, they could use tacit knowledge and local wisdom to explain these phenomenon, predict the impact, and link each dimension of these impacts. The

following are anticipated possible consequences to potash mining:

1. Health risk that is associated with the development of the potash mine. Potential health problems include physical and psychological conditions, stress, suicide and crime-related injuries and deaths, which result from social changes and conflict within communities.
2. Health impacts arising from a loss of livelihood and degraded environment are also critically evaluated Furthermore, the spread of sexually transmitted diseases, particularly HIV/AIDS, in the community are of serious concern.
3. A labour force of over 800 workers, many temporary, coming from other provinces and abroad will have a major influence on prostitution in nearby urban centers such as Udon Thani. In addition, there is no risk assessment for health impacts arising from accidents.
4. The capacity of the community and local health services to cope with such potential health impacts is highly doubted given the lack of baseline health data. Moreover, there is no health monitoring process nor plans to evaluate and eliminate risk. The extent of health impact assessment carried out in this potash mining proposal is limited to the figures of hospital and patient in Udon Thani only.
5. Moreover, the problem of water scarcity may get more serious in the area and it remains unclear about the source of water supply for the project which will consume huge amount of water each month. Also, there is risk of land collapse because of underground mining.
6. In term of social impact, the magnitude of financial investment surrounding the mining project will cause

> further socioeconomic changes in the Udon Thani town. This may affect patterns of employment, migration, housing, transportation, private investment, and tourism.

Many sectors of Udon Thani province involved in the HIA process of potash mining are expanded these learning experiences into their work. For example, in the academic sector, a group of lecturers from Udon Thani Rajabhat University used benefits from these learning experiences into their teaching and developed a new curriculum about Health Impact Assessment and Healthy Public Policy. Besides, the Udon Thani Provincial Health Office has discussed this issues and prepared important information which will affect decision making about Strategic Health Planning and Public Health Policy. Regional Environmental Office has a plan about water quality surveillance in the lake, river and canal surrounding the project.

The most important matter is that this learning process has empowered the civil society Udon Thani. It could say that HIA process is an entry point for local people to have a discussion about other problems in their province and about the projects or public policies that have an effect on their life. At present, they have tried to encourage more people in wider community to get involved in the process of developing Udon Thani public policy. Therefore, local empowerment through Health Impact Assessment not only empowers people in local area around the potash mining project, but it also empowers people from every sector of Udon

Thani civil society to join HIA process.

7. Conclusion

Over the past two years that HIA has been in place, with deliberative and learning process, local people have been encouraged to link the eco-culture, environmental and health impacts in broader aspects. By now, local people are able to explain the linkage of mining process and its potential impacts on the environment such as watershed ecology.

HIA provides not only clear information on the impact of potash mining, but also an opportunity fot people to learn on how to present their tacit knowledge and local wisdom systematically as other academic and technocrats do.

Although HIA process firstly focuses on the impact of the potash mining, it does not stop there. Instead, it becomes the entry point for local people in pursuing their right on the development of healthy public policy which requires their active participation. At present, local people in Udon Thani province have raised a question on the direction of city development as they are asking for the healthy city under the principle of sufficiency economy and sustainable development.

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Learning for Our Beloved River :

HIA Applications in Tha Chin River Basin Management

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[1] We Love Tha Chin River Society, Thailand

1. Introduction to Tha Chin River Basin

Thailand 's rapid development over the past decades has contributed not only to economic growth but also environmental crises. Many parts of the country have encountered serious pollution problems and environmental degradation. Various rivers, including Tha Chin River in the Central Plains, have faced with chronic water pollution.

Tha Chin River is 325 kilometers long and runs through four provinces in the central part of Thailand, namely Chainat, Supan Buri, Nakhonpathom, and Samut Sakhon. Tha Chin River can be compared to the artery of Nakhonpathom province. The part that runs through Nakhonpathom province is called Nakhonchaisri River. It is 97 kilometers long and covers the area of three districts, which are Bang Len, Nakhonchaisri, and Sampran districts.

This area is dubbed as the land of sweet pomelo and white rice. There are branches of many narrow and wide canals along the two banks of Nakhonchaisri River which connect to one another like a web. Moreover, this river is closely attached to the way of life of Nakhonpathom people because the province is the land of agriculture. There are many produces such as rice, pomelo, grape, rose apple, guava, mango, coconut and orchid that are very well known.

Figure 1: Nakornpathom is a fertile land with numerous agricultural products that has been well-known for very long time.

Nakhonpathom province -- once called "Nakhonchaisri city" -- is a prosperous land. In ancient times this land was the center of ancient kingdom called Dvaravati, which existed some 2,000 years ago. Thanks to foreign trade, Dvaravati became the most prosperous state in the Chao Praya River basin during the 12 th - 16 th Buddhist Century. Archeological evidences discovered at the ancient sites show the integration of local culture with external influence, which consequently became the unique identity of Dvaravati's culture. The development of Buddhism in the Dvaravati paved the way for the strong establishment of Buddhist state which is the root of national development until today.

In 1710, western merchants, especially Portuguese and Dutch, came for trading and expanded their influence over Southeast Asia. They wanted to buy more sugar and rice. Due to the fact that Nakhonchaisri city was a very fertile land, the more intensive plantation of rice and sugar-cane was thus imposed to Tha Chin River Basin. The communities were enlarged, and the canel improvement was done to facilitate the new settlements and the

transportation system. Therefore, the ways of production in Nakhonchaisri city were transformed to serve international trade.

As this process was evolved for over hundred years, local people have adopted new trade paradigms and developed their own knowledge and expertise in production as well as the skills to apply new technologies according to the changes in both domestic and foreign markets. It helped prepare the local people for the more accelerated pace of national development under the National Economic and Social Development Plan in the century after.

Figure 2: Nakornpathom was the most prosperous state in the Chao Praya River Basin during the 12th - 16th Buddhist Century.

♣ *The Age of Intensive Development and the Fate of the Local*

During the15 years of the implementation of the First to the Third National Economic and Social Development Plans, there was the

massive change in terms of economic infrastructure, including the construction of the first bridge across Tha Chin River, which is called Phokaeo Bridge. The Third Plan (1972-1976) stipulated the promotion of foreign investment in Thailand. This period witnessed the establishment of agricultural, labor-intensive industries in the rural area, providing employment opportunities to local people and new markets for agricultural produces. Therefore, when the Third Plan ended in 1976, the area along Tha Chin River, from Nakhonchaisri district to those located downstream, had been transformed to an industrialized zone. One of the impacts from this was the polluted water, especially in the community and factory areas where the wastes were dumped into the river and canals.

When the Fourth Plan was implemented in 1977, the lower part of Tha Chin River, from Sampran district to the downstream, was in a sorry state with low water quality. This was eventually spread to the upstream and other canals. The conflict over the allocation of water resources between the farmers and households on one side and the industries on the other erupted. However, the Government was unable to resolve this problem which led to several violent confrontations. In early 1988, 500 villagers in Klongyai Sub-district, Sampran district siege a dyeing factory that drained waste water into Bang Pra canal. It heavily polluted the water in the canal, causing trouble to local people who could not use it for agricultural activities. Angry local people assaulted government officials who protected the factory. A number of local people injured during a violent crash which came to an end without solution to the pollution. The factory has continued draining polluted water into the Tha Chin River until now (2004).

At the beginning of 1994, when most part of the country encountered water shortage, Tha Chin River faced another pollution crisis as a sugar factory in Supan Buri province and pig farms in Nakhonpathom province released a large amount of

polluted water to Tha Chin River. In 1994, the spread of water hyacinth (Java weed) dealt a big blow to part of Tha Chin River in Nakhonpathom province as the plant blocked sunlight from the water and obstructed water transportation. That left people on the banks Tha Chin River desperate just as not a single state organizations picked up the issue.

For thirty years, Tha Chin River was designated as an industrial zone under the development strategy. It seemed like this river was going to be the lowest of its fate without any help from the government.

♣ *HRH Princess Maha Chakri Sirindhorn: the royal inspiration*

The television news on 20th September 1994 showed HRH Princess Maha Sirindhorn's visit to Sansab canal in Chachoengsao province by boat for the distance of 72 kilometers. The royal trip tremendously delighted local people who lived near Sansab canal who turned up in force to welcome the princess. The Cabinet later designated 20th September of every year as the day of Thai canal conservation.

Apparently, the Thai public appreciated the princess' traveling at that time. The gathering of local people to do activities for their canal provided a new hope to the people in Tha Chin River basin. Four years later, Nakhonpathom's people joined hands to tackle Java weed problem and extended their activities further to protect Tha Chin River and its branches. The activities have continued until today.

2. We Love Tha Chin River Society Nakhonpathom: the love of a river

In 1997, there were a seminar with an excursion trip to the sources of waste and treatment in order to raise public awareness on environmental pollutions. In 1998, the seminar was reorganized and it was found that the people living along the river as well as the factories, temples, schools, communities and markets on the river banks had their share in water pollution problem as the river literally became a dump site for garbage and chemical toxins. The seminar resulted in the call for the establishment of people's organization for tangible environmental conservation without waiting for government support. Mr. Prasob Chan-Inngam invited important persons from the public and the private sectors and the monks to collaborate on the setting up of a society named "We Love Tha Chin River Society Nakhonpathom" on 7th September 1998. The office of this society is located at Nakprasit School in Sampran district and is also joined by Pratepkunaporn (Pradhammasenanee), chair of the provincial Sangha office and the abbots from 41 riverine temples. The motto of We Love Tha Chin River Society Nakhonpathom is "Connecting the people, conserving Tha Chin River".

♣ The Roles of We Love Tha Chin River Society Nakhonpathom in solving the Tha Chin River crisis in 2000

During 13th – 18th April, a big flood hit a vast area of rice fields, totaling 132,000 rai, in Supan Buri province. The flood water then overflew into the already polluted water of Nakhonchaisri district

and Sampran district which reached Samut Sakhon province. The board of We Love Tha Chin River Society Nakhonpathom attempted to solve this crisis on 26th -28th April by asking the Department of Irrigation to release clean water from Phopraya and Thasan Bangpla water gates at 200 cubic meters per second to dilute the polluted water. For three days, the water quality in Tha Chin River improved.

However, in that time the polluted water immensely damaged the ecosystems of Tha Chin River with the massive loss of aquatic resources. The damage was worth around 120 million baht. Afterward, from 29th April – 11th May 2000, We Love Tha Chin River Society Nakhonpathom worked with the mass media, Mr. Padermchai Sasomsab M.P., and the governors of Chainat province, Supan Buri province, Nakhonpathom province and Samut Sakhon province to find the ways to solve this problem. During the struggle, We Love Tha Chin River Society Nakhonpathom has 1,785 more members. The role of We Love Tha Chin River Society Nakhonpathom was more recognized. We have the members who have the same goal and the society concentrates on expanding network for the restoration of Tha Chin River.

Figure 3: Water quality crisis in Tha Chin River in 2000

3. We Love Tha Chin River Society Nakhonpathom and Health Impact Assessment

As a result of the trend in public health system reform which was promoted by the Health System Reform Office (HSRO) and Health Systems Research Institute (HSRI), a "Research and Development Program on Health Impact Assessment" was founded in March 2001. The aim is to integrate academic, social, and political collaborations between all parties in the health network for

developing health impact assessment system. Afterwards, this program was renamed as "Research and Development Program on Healthy Public Policy and Health Impact Assessment (HPP-HIA)" in 2003.

Then, HPP-HIA has expanded the policy network to push forward for healthy public policy by using HIA as an important tool.

The issues of agronomy, industry, energy, water management, urban and transportation development, and resource base management are especially addressed. "We Love Tha Chin River Society Nakhonpathom" was invited to join the network and was granted funding for a research on "The people of Tha Chin River Basin: A story of people who wish to manage the water themselves".

The participation with HSRO and HSRI was driven by key issues surrounding Tha Chin River's problem as follows:

1) The water quality in Nakhonpathom's Tha Chin River has been the lowest of all rivers in Thailand since 1983.

2) The problem of public policy impacts on Nakhonpathom people's health, that is, the Department of Irrigation's proposal for two dam construction projects in Tha Chin River at Bang Len district of Nakhonpathom province and Muang district of Samut Sakhon province respectively.

3) The mobilization by We Love Tha Chin River Society Nakhonpathom for health-supportive public policy on the community's participatory water management by using HIA as a tool.

In 2001, We Love Tha Chin River Society Nakhonpathom joined the activities with HSRO in a public hearing in Nakhonpathom

province on the National Health Bill. This was a good chance for them to learn about public policy and HIA through the process of HSRO. Furthermore, We Love Tha Chin River Society Nakhonpathom used the health assembly as the channel to present the public policy process in the case of the Department of Irrigation's two dams projects. HIA was used as a tool for building a learning process in the community as well as for the making of healthy public policy, both in the cases of the dam construction and the water management by the local administrative organization of Bang Rakam Sub-district, which will be discussed later in this chapter.

In 2002, the Department of Irrigation proposed to build 2 dams over Tha Chin River in Bank Rakam Sub-district, Banglen District, Nakhonpathom province and in Thasa-I Sub-district, Muang District, Samut Sakhon province. The projects' total cost was about 10,000 million Baht and the reason was given as follows :

"Since 6-7 years ago and up until now (1995-2002), Tha Chin River has been one of the important rivers in the central plains, but there are some problems happened in this river such as the contamination of seawater, the water quality of Tha Chin River, frequent floods…etc. After the study in terms of irrigation and the environment, we proposed the dam construction project on Tha Chin River to solve these problems. "

In order to cope with such problem, We Love Tha Chin River Society Nakhonpathom applied Health Impact Assessment, which will be explained into the six steps, as the following.

3.1 Screening

The dam proposal of the Department of Irrigation demonstrated how a public policy could cause adverse impacts on the livelihood

of people in the Tha Chin River Basin. Therefore, We Love Tha Chin River Society Nakhonpathom held a meeting between the board of directors, the leaders and interested people to consider the documents for organizing the referendum on the dam construction project which was managed by the team of Consulting Engineering and Management Limited Company.

The board of We Love Tha Chin River Society Nakhonpathom and the networks of 8 canals decided to turn this crisis into an opportunity for the local people to learn and be aware of the threat to the river. Furthermore, HIA was applied as a tool for building the learning process in the community. In this case, HIA was designed as Prospective HIA in an urgent process in which the result of this impact assessment would come out in time before the decision was made on the proposal.

3.2 Public Scoping

After analyzing the documents, there was the most critical problem that might happen if the dam construction project was done, that is "the water pollution will affect the quality of life of the people who live in Tha Chin River basin (Nakhonpathom province and Samut Sakon province)".

Afterward, the board of We Love Tha Chin River Society Nakhonpathom and the leaders of networks and communities went to observe the completed, similar dam construction project at Chachoengsao province.

In this case, they found out that the dam did not function well and instead caused so many problems that the cost to solve them exceeded the dam construction cost. Moreover, Mr.Sakda Tongprasit from We love Bang Pakong River Club who did a

research about the impact from the dam construction in Bang Pakong River was invited to give the knowledge to the members of We Love Tha Chin River Society Nakhonpathom.

We Love Tha Chin River Society Nakhonpathom agreed to address the issue about the changing way of life of the local people in Tha Chin River basin (Nakhonpathom-Samut Sakon provinces) and the adverse impacts on the eco-system and scenery.

Tha Chin River possesses both spiritual and economic values. The Gross Provincial Product of Nakhonpathom province is approximately 40,000 million baht each year, and the fishery industry in Samut Sakhon province is also worth several million baht. The dams; if built, would substantially change the ecosystem, and might make water pollution worse. Alto threatened were the floating market traders, rice farmers, orchards, orchid farms, inland fishery, more than 40 schools and temples located on the river banks, of which life support system will be at risk.

3.3 Assessing

Then the Society's members managed to lobby for the information and prepared the documents. After that, stakeholders' meetings were organized alternately in important areas (Bang Rakam and Bang Len Sub-districts), with a plan to provide information to affected communities. Furthermore, people in Samut Sakhon province and We Love Tha Chin River Society Samut Sakhon and Nakhonpathom held several meetings, including the planning for organizing referendum in Nakhonpathom province.

3.4 Public Review

On 21st May 2002, We Love Tha Chin River Society Nakhonpathom held a conference at Buddhamonton's auditorium,

Nakhonpathom province, to listen to the voices of all stakeholders and relevant agencies. They shared together the facts, opinions, and choices in terms of action and concern.

The theme of this conference, attended by 4,000 people, was "Advantage and Disadvantage of the dam construction in Tha Chin Rive." The majority of them disagreed to the proposal out of concern for adverse impacts on their occupations and ways of life. The polluted water with pungent smell has physically and mentally affected the people who live near Tha Chin River. Also a large amount of accumulated toxic substances in Tha Chin River had effects on the ecosystems of Tha Chin River and the people's health. To make it worse, this dam construction project can transform Tha Chin River into a large polluted water cistern with 90 kilometers in length.

As the projects were proposed on large agricultural area, the dam would hold the water during floods, thus making the condition worse. Hence the board of the society decided to make a press release on the result of the referendum, to be disseminated in the next referendum which was to be organized by the Department of Irrigation. On 21st May 2002, the Conference participants included the shop owners in the floating markets of Nakhonpathom province, the monks from the 43 temples located near Tha Chin River. The issue also drew media attention as the event appeared in Matichon Newspaper the day after.

Moreover, We Love Tha Chin River Society Nakhonpathom produced the documents to inform the people, including:

1. The Sobbing of Bang Pakong Dam
2. The Fate of Tha Chin River
3. The Press Release of We Love Tha Chin River Society Nakhonpathom

3.5 Influencing

On15 th July 2002, the Department of Irrigation organized the referendum for listening to the opinions of the society on the draft reports, which were separately made by We Love Tha Chin River Society Nakhonpathom and by the Department of Irrigation. Some 6,000 people attended the event at Buddhamonton's auditorium.

Dr. Teera Satabuth was appointed by the Minister of Agriculture and Co-operatives as chair of this referendum. He made the following conclusion of the result from the referendum, which would be presented to the Minister of Agriculture and Co-operatives:

1. The committee of the referendum agreed to the problems that happened to Tha Chin River as studied by the Department of Irrigation in 4 aspects, which are the contamination of seawater, frequent floods, water scarcity and the water pollution. Moreover, the proponents and opponents of the dam construction project agreed that these problems should be addressed.

2. The opinion of the committee is, however, that the Department of Irrigation should propose some alternatives in solving the problems, apart from the dam construction.

3. Although the Department of Irrigation insisted that the dam construction can solve the flood problem and the contamination of seawater, but the result of the research in terms of the solution for water pollution was not clear.

Furthermore, the study of the ecosystems in Tha Chin River is not well-detailed, especially in terms of creatures in brackish water, which were very important to the fishery. That is one important reason why the people disagreed to this project.

4. The proposal of the Department of Irrigation was still unclear and did not cover all important issues. So, the opponents use this point to argue against this project. The proposal should include the solution of Bang Pakong Dam, in order to ensure the stakeholders that if the dam was to be built in Tha Chin River, the problem that was similar to Bang Pakong River could be avoided.

3.6 Monitoring and Evaluation

We Love Tha Chin River Society Nakhonpathom and other 33 organizations submitted an open letter to the Prime minister, the Minister of Agriculture and Co-operatives, the governor of Nakhonpathom province, the Chairman of Natural Resource and Environment Committee under the House of the Representatives, the chairman of the Public Participation Commission in the Senate and to the chairman of the National Human Rights Commission, explaining the reasons why they opposed the project.
The submission of the letter opposing the dam construction project in Tha Chin River and the conclusion from the referendum have resulted in the following actions:

1. The National Economic and Social Advisory Council, chaired by Mr. Anand Panyarashun, held a meeting on 12th September 2002 to consider the dam construction project in Tha Chin River and suggested that the government should suspend this project, regarding Tha Chin River's severe condition, compared with other rivers nationwide. The polluted water, damaged ecosystems and frequent flood never have been cured by the public and private sectors or by the people. The official recommendation of NESAC was also submitted to the Prime Minister.

2. The chairman of the Natural Resource and Environmental Committee under the House of the Representatives invited the board members of We Love Tha Chin River Society

Nakhonpathom, including Mr. Prasob Chaninngarm, Assistant Professor Densiri Tongnoppakun and Mr. Chaisak Chittateerawattana to join a working group on the impact study of the dam construction which was conducted 3 times.

The outcomes of applying HIA as a tool for building a learning process for the community, are as follows:

1. The people who participated in the referendum cherished and became more aware of the values of Tha Chin River. Furthermore, they willingly joined in the restoration of Tha Chin River with We Love Tha Chin River Society Nakhonpathom.

2. This was the first time in Thailand that the referendum held by the civil society was successful in influencing the Government's decision.
3. We Love Tha Chin River Society Nakhonpathom has learnt and gained experiences on how to use HIA as a tool for making a learning process in the community and has applied HIA to other activities such as the water management project of Bang Rakam and the gas-fuelled electricity project of Lampaya Sub-district.

4. We Love Tha Chin River Society Nakhonpathom participated in the national effort to include Health Impact Assessment in the national healthy bill till it was successfully taken into effect.

4. The Case Study of Health Impact Assessment: *Water Management by the Local Administrative Organization of Bang Rakam Sub-district, Nakhonpathom province*

The Local Administrative Organization of Bang Rakam Sub-district is located in the south of Bang Len District, which is 17 kilometers distant from Bang Len district; its area is about 30 km^2 (18,000 rai). This land is a plain. The Tha Chin River runs through and separated this land into two sides of the banks: the east and the west. Most of the area is the green and fertile land. Moreover, this area was divided into 15 villages for the administration. There are 1,242 households with 4,549 citizens.

In 1999, Savittachat Canal faced many problems such as water pollution, the fast growth of java weed, canal sedimentation with many kinds of grass. Furthermore, water in the canal is so polluted that it is no longer fit for consumption and in certain areas people cannot use it even for agricultural activities. Mr. Somchai Chan-Inngam, the village headman raised the problem with the villagers, convincing them of the water's poor quality and the impact on their livelihood. It was agreed that the villagers should help themselves without waiting for the government to solve these problems. They eventually mapped out an action plan as follows:

- ***The 1st period***

On 5th December 1999, the villagers gathered in a clean-up campaign to pick java weeds and remove wastes up from Savittachat Canal.

Figure 4: Collective efforts of communities to recover the Savittachat Canal

- ***The 2nd period***

To create a long-term plan by setting up "We Love Savittachat Canal society" for canal conservation. The villagers from each household agreed to donate 200 baht for canal clean-up activities. The money is paid to volunteers who look after the canal. Eligible volunteers were people in the village who lived along Savittachat Canal. Moreover, there was an agreement that they would not use herbicide as the activities were monitored by the villagers.

- ***The 3rd period***

There were supporting and the public relations for the community to stop using the chemicals and dumping wastes into the water. In addition, it encouraged farmers to use EM (Effective Microorganism) liquids instead of chemicals as farm chemicals also cause water pollution.

Afterwards, We Love Savittachat Canal society joined We Love Tha Chin River Society Nakhonpathom and the government in calling for other community leaders to restore their canals.

Therefore, there was the gathering of the people in other communities who came to learn from Savittachat canal.

Despite some problems, the "Savittachat Canal Model" was applied to other 9 canals namely, Kwaai, Bang Kamoi, Tarang, Pooyai Samran , Rangmadan, Bang Rakam, Chaipan, Bang Born and Rangkae canals.

The villagers who lived by these canals can use clean water for their everyday activities. When the water was clean, the aquatic animals increased.

The Local Administrative Organization of Bang Rakam Sub-district realized the importance of public participation in conserving canals. Therefore, they decided to set aside the annual budget of 20,000 baht for each of these canals. The success of Savittachat canal network led to participatory process in canal conservation in other 26 canals in Bang Rakam Sub-district. Mr. Somchai Chan-Inngam held a meeting for the network members and re-named this network as "We Love Canals of Bang Rakam Sub-district society" and the Local Administrative Organization of Bang Rakam Sub-district distributed the budget for development activities for the canals.
The process of the canal development under "We Love Savittachat Canal society" was expanded as "We Love Canal of Bang Rakam Sub-district society". The people of Bang Rakam have addressed the issues, contributing to the improvement of canals, finding ways to solve the water pollution. Moreover, these attempts are also for the learning and public policy making processes of Bang Rakam Sub-district.

Afterwards, the Office of Natural Resource and the Environment of Nakhonpathom province supported Bang Rakam Sub-district, and the Environment Office Region 5 also joined the project.

Nowadays, the Sub-district Administrative Organizations from every part of Thailand come to observe and learn at the Local Administrative Organization of Bang Rakam Sub-district.

In addition, the Local Administrative Organization of Bang Rakam Sub-district has decided to address land use policy and designated the area as an organic agricultural zone. They replaced farm chemicals with organic fertilizer and EM substance. Moreover, they also built the organic fertilizer factory with an aim to minimise the release and contamination of toxic substance in the Tha Chin River and canals.

Figure 5: Canals in Bang Rakam Sub-district at present

HIA in the Orange Plantations and its contribution to Healthy Public Policy in the Agricultural Sector in Thailand

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1. Introduction

The promotion of orange cultivating in three districts namely, Fang, Mae-Ai, and Chaiprakran in Chiang Mai province in the northern Thailand, has become a seriously controversial issue for local communities for more than ten years. Local people have been greatly suffered from the intensive enlargement of large-scale orange plantations in the Fang Watershed, one of the most important natural forest areas in the northern country, because an effective control measure has been regardless.

The villagers in the Fang Watershed area have encountered a number of extremely serious problems, which mainly are consequences of the orange plantations, for instances chemical odor, water contamination, public property invasions, deforestation, illegal migration of foreign labors, social conflicts etc. They tried many times to complain such problems, particularly about the terrible chemical odor, with local authorities as well as relevant provincial officers but their voices were vanishing. There had been no any meaningful resolutions from those authorities. Therefore, they had to cope with such serious problems themselves, while the problems were deeply severe.

By the end of 2002, a local grass root NGO initiated a project on Health Impact Assessment (HIA) in the orange plantations supported by Health Systems Research Institute (HSRI). The project aimed to support the local communities to learn about their health impacts related to the orange plantations. The project was a truly participatory research as the villagers, who have been affected from the plantations, were the majority of the research team. The study was expected to provide evidence-based

information to support the communal learning process in health impact surveillance.

2. Development of the Orange Plantations in the Fang Watershed

Orange has become a new popular commercial fruit crop in the Fang Watershed since 1995 as its price was significantly higher than the prior commercial fruit crops in the area like lychee or longan. Moreover, the old famous orange cultivating areas in Rungsit[2] including other areas in the central region were collapsed due to the problem of soil degradation as well as the sensitive of orange's pests and diseases (Manager Online, 2003a). One main reason for the Rungsit orange crisis was the constant usage of vast amount of agrochemical and pesticides.

Orange cultivating has been firstly moved into the Fang Watershed area since 1957 by an external investor, as the area was suitable in aspect of climate and landscape. In 1982 there had been a successful discovering in a new kind of orange variety, called "Sai Nam Phueng"[3], which was more tasty as well as more costly (Manager Online, 2003b and Jutamart, 2004). Subsequently, there had been many farmers either large-scale (mostly from outside the areas) or small-scale farmers (mostly be local farmers) had shifted their investment towards orange cultivating considerably. The cultivating areas were significantly expanded since then. More

[2] Rungsit is a Bangkok's suburb area. It was highly recognized as the most famous zone for orange cultivating in the country since more than 20 years ago.
[3] "Sai Nam Phueng" means honey

importantly, orange has been promoted by different provincial agencies to be a product champion of the province.

It should be noted here that those all mentioned reasons have led to enormously fast extension of the orange cultivating areas in the Fang Watershed since 1997 (Manager Online, 2003a). At present, it is estimated that the orange cultivating areas in the Fang Watershed are more than 16,000 ha.

FIGURE 1: The Rapid Expansion of the Orange Plantations in the Fang Watershed

The Fang Watershed area comprises of three districts namely, Fang, Mae-Ai, and Chaiprakran, located in Chiang Mai province, the northern Thailand. The area has been highly recognized as one of the most important forest areas in the northern country. It should be noted that several main rivers of the country are originally generated from this area. Most of areas in the Fang Watershed have been reserved as 1A zone[4] according to the land use classification identified by the Ministry of Natural Resources and Environment.

[4] 1A zone refers to the area that is highly restricted for any land uses.

The orange plantations have been promptly expanded in the Fang Watershed area without a systematic control measure from any relevant authorities. Furthermore, as orange is a plant that basically has various kinds of pests and diseases, the plantation owners have to constantly use a lot of agrochemical and pesticides. With respect to this reality, it is found that there has been an intensive using number of various agrochemical and pesticides in the Fang Watershed area for several years. Unquestionably, this has caused many serious problems (for further details, please see 4) to the local communities who live nearby the plantation areas.

FIGURE 2: The Fang River, the Most Important River for Local People in Fang, Mae-Ai, and Chaiprakran Districts.

3. Health Impact Assessment (HIA) of the Orange Plantations: *A Participatory Learning Process of Local People*

The HIA study was conducted by the Institute for Sustainable Agriculture Community (ISAC), a local grass root NGO, by the end of 2002. This study was a participatory learning process for local people due to; some joined the project as the research team; some volunteered for data collection; and some participated in local health forums (for more details see 3.3). However, this study mainly focused on the scoping process of HIA only.

A. Objectives of the Study

1) To investigate socio-economic and population changes in the orange plantation areas in Fang, Mae-Ai, and Chaiprakran districts.
2) To explore local people's health problems related to the orange plantations in Fang, Mae-Ai, and Chaiprakarn districts.
3) To identify the scope of health impact assessment of the orange plantations in Fang, Mae-Ai, and Chaiprakarn districts.

B. The Study Areas

The study areas for this project comprises of 12 villagers which all located in the Fang Watershed area. The main stipulation for the study areas was each village had to occupy orange cultivating areas both in terms of plantations and small-scale crops[5] in order to make a clear-cut conclusion about health impacts of the plantations.

[5] It covers areas less than 1.6 ha

To make a clear comparison how the plantations had affected to those 12 villages, the research team had divided the villages into three groups regarding distances between the villages to the plantations.

Group I: The villages located far from the plantations less than 500 metres.
Group II: The villages located far from the plantations 500 – 3,000 metres.
Group III: The villages located far from the plantations more than 3,000 metres.

C. The Methods

In order to identify the scopes of health impact assessment on the villagers, who were affected from the plantations, a number of methods had been applied in this study as the following details:

1) *Literature reviews* – many related materials and documents concerning socio-economic and population changes in the Fang Watershed areas were reviewed. Furthermore, various sorts of documents related to communal state of health problems were gathered and collected from relevant agencies e.g. Public Health Volunteers at village level, community health care centers, hospitals, and provincial public health office.
2) *Local health forums* – three local health forums had been organized by the research team with the aim to bring together various groups of local people to discuss and share their experiences regarding their communities' socio-economic changes, as well as state of their health problems.
3) *Communal health monitoring* – one study was chosen to conduct community health monitoring. The chosen

community had to continuously pursue and record status of their health changes for one month.

4) *Questionnaires* – approximately 3,300 questionnaires were conducted in the three village groups, by the research team and the local volunteers to learn about overall pictures of the communities e.g. status of the communal health, the changes in bio-physical environment and socio-economic environment of the communities.
5) *Blood testing* – the research team arranged the blood testing services along with the local health forums for those who were interested to check the pesticide residues in their blood stream.
6) *A public scoping seminar* – a seminar with stakeholders was held to present preliminary scoping results and to listen to the opinions of the stakeholders.

FIGURE 3: The Villagers Discussed and Shared Their Experiences about the Changes of the Communal Socio-economy and Their Health Problems in the Local Health Forum

4. The Result of HIA Study

From the literature reviews, the local health forums, and the questionnaires, it is clear that the intensive expansion of the orange plantations in the Fang Watershed causes problems in two main aspects, which are 1) problems related to the change in bio-physical environment and 2) problems related to the change in socio-economic environment.

A. The Changes in bio-physical environment

Chemical Odor

The most obviously serious problem for the local communities in the Fang Watershed area is concerning terrible chemical odor. The main cause of such terrible odor comes mainly from the pesticide uses in the orange plantations. Pesticides are enormously used in the orange plantations as orange is a sensitive plant. In addition, due to the plantations have rapidly extended more than 16,000 ha at the present, as a result there are several local communities that have been surrounded by huge plantation areas. Therefore, it is hard for those communities to avoid pesticide smells, which are sprayed almost every day from different plantation owners. Previously, the plantations were sprayed during daytime but since many affected local people had frequently complained about the chemical problem with several relevant authorities, later the plantation owners have changed to spray pesticide during nighttime, especially about 3 am. Thus, it is impossible for local people to escape to anywhere because it is sleeping time.

From the questionnaires, it is found that 26.4 per cent of the villagers in Group I replied that they smell the chemical odor,

while the percentages of Group II and III are 11.4 and 3.6 per cent respectively. Therefore, the closer the community is surrounded by the orange plantations the stronger the chemical they expose.

The chemical odor does not cause only disturbance or annoyance but also other health impacts e.g. dizziness, difficult breathing, red eyes etc. Even local people tried several times to complain about the terrible chemical odor to the several relevant authorities, but it seemed that their requests were not sincerely addressed.

FIGURE 4: Pesticides are Heavily Sprayed in the Plantations almost Every Single Day

Pesticide Contamination in Water Resources

The contamination of pesticides in groundwater as well as in the communities' freshwater ponds is one of the most serious concerns among local people in the Fang Watershed area. Water qualities around the orange plantation areas have been significantly deteriorated due to over uses of pesticides in large plantation areas with little concerns about its impacts to local people's health or even the environment. Moreover, many pesticide containers are negligently dumped in water sources of the communities.

Consequently, people in many communities cannot drink or use their freshwater ponds as usual. Some people were used to regularly take a bath from their freshwater ponds for bath, after that they found that they encountered with skin rash problem. Furthermore, some also smelled chemical odor from their freshwater ponds. Therefore, some families have to pay much higher cost for buying drinking and using water. However, there are many local people who still use water from their freshwater ponds for household consumption.

From the questionnaires, it is found that approximately 53 per cent of the villagers replied that they still drink water from their freshwater ponds as it saves their expenditure costs. While around 20 percent buy drinking water due to they are not confident to drink water from their freshwater ponds. The rest seek for drinking water from other sources e.g. rainwater and the villagers' water pipe system.

FIGURE 5: Pesticide Containers are Negligently Dumped into the Communities' Water Sources.

Water Shortage

Basically, orange is a plant that needs water supply all year round, while other prior main commercial crops[6] do not. Since the orange plantations are occupied more than 16,000 ha in the Fang Watershed, it certainly needs high volume of water supply, particularly in the dry season where local farmers fate water shortage problem.

The plantations make the water shortage problem in the Fang Watershed more seriously due to the plantation owners have high potential to access to water sources than the local farmers as they have much money and more advanced technologies. In many cases, it is found that the plantation owners make large reservoirs close to the local canals[7] and convey water to store in their reservoirs. As a result, it leads to the change of water drainage direction in the local canals. Consequently, many local farmers are seriously suffered from the water shortage mainly resulted from the mentioned behavior that strongly violate the local rule regarding water sharing. Recently, this problem has given risk to a disputed conflict among local people and the plantation owners.

It is clear from the questionnaires that the water shortage problem is one of the most concerns for local people. It is found that 59.7 per cent of the villagers replied that they have sufficient water supply for all year round, while 40.3 percent replied that they do not have water to use for all year round.

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[6] Previously, the main commercial crops in the Fang Watershed area were garlic, onion, lychee and longan.

[7] It refers to a community-based irrigation system that is mutually operated and maintained by a community aiming to provide water for agricultural purposes.

FIGURE 6: Water has been Highly Used in the Orange Plantations All Year Round. The Amount of Water Supply from Several Local Canals have been Diverted to Serve the Orange Plantations.

Deforestation

A huge number of bamboos from the communities' forests as well as from several national forest reserved zones have been immensely cut down to be used in the plantations as stakes for supporting small orange trees from wind. It is estimated that one orange tree needs bamboo stakes approximately ten stalks, therefore orange in one ha (there are about 375 orange trees in one ha.) needs to use bamboos around 3,750 stalks. Thus total bamboo used in the entire orange plantations of 16,000 ha are at least 60 millions stalks per year. Presently, bamboos in the Fang Watershed area have significantly decreased. Accordingly, many communities have been affected from this phenomenon since bamboo is recognized as a multi-benefit plant for local people, especially as an important source for food security. However, since bamboos in the local areas have been deteriorated leading to bamboo shortage, many plantation owners have to import bamboos from other areas.

Apart from the over uses of bamboo in the forest areas, the illegal invasions of the orange plantations into national forest reserved zones are also a serious problem in the Fang Watershed area, as shown in the contrast figures of the orange cultivating area. The official figure in 2002 was only 5,343.36 ha, while local people

confirm that the actual areas should be at least 16,000 ha. It is estimated that the illegal invasion areas are certainly more than 1,600 ha at present.

FIGURE 7: A Vast Number of Bamboos are Used in the Orange Plantations as Stakes for Supporting Orange Trees

B. The Changes in Socio-economic Environment

The Conflict over Water Resources Management

Due to most of local people in the Fang Watershed area are small-scale farmers hence their concern about the water shortage problem has become the most critical issue for them. The conflict over water resources management between the villagers and the plantation owners has been seriously arisen all over the area as a number of plantation owners has violently diverted water from the

local canals to use in their plantations. Importantly, several large plantations are located at upland areas that basically are upstream of the local canals. This advantage is benefit for them as it is easier to convey water from the local canals to store in their private reservoirs. Accordingly, many local people who live at the downstream always face the water shortage problem.

One of the most respectful monks in the Fang area said that in the beginning, the plantation owners politely asked local people for the approval of water allocation from the local canals to store in their areas. They promised that they would distribute the reserved water to local people, but after that they never have followed their commitment. This has made the adverse impact to local people who have lost their water sources. Currently, the water conflict in the Fang Watershed area is more serious problem (Manager Online, 2002c).

The Change in Food Security

Before the intensive expansion of the orange plantations, local people in the Fang Watershed area had various kinds of natural food for their consumption e.g. bamboo shoot. However, in the present day the natural food varieties are significantly decreased since the large areas of the communities' forests, which are the major sources of the natural food, as well as other kinds of forest areas have been destroyed. The main cause of the forest area reduction comes from the invasions of the orange plantations into the forest areas. Furthermore, local people who live in the villages that are close to the plantations do not dare to eat the natural food as usual, as they are afraid it may have pesticide contamination.

Public Property Invasion

Apart from the communities' forests invasion, local people confirm that the plantation owners have also extended their incursions into other communities' public properties for instance, the deserted temple area of Nong Bua Ngam Village, the community street of Sansai Clongnoi Village, etc.

Concerning the case of community street, the plantation's owner (s) formerly bought many lands until that both sides of the community street are belong to them. After that, they illegally took over the street by expanding their plantation across the street. This is a serious problem for the villagers, as they have no other ways to access their own community. Thus, it has caused critical conflict between the villagers and the plantation's owner.

Illegal Migration of Foreign Labor

Many plantation owners prefer to engage foreign labors particularly the Burmese labors to work in their plantations, as their wages are considerably lower than the local labors. The plantation owners always hire these foreign labors to spray pesticides in their plantations. However, when these foreign labors spray the pesticides they hardly wear any protective gears as they have a little knowledge about the negative impacts of the pesticides, as well as they think it is not dangerous at all to their health.

The over uses of pesticides in the plantations with the careless concern, it makes the pesticide problems in the plantations are more seriously critical. Whenever these labors cannot work for the plantations because of their health are deteriorated resulting from the heavy pesticide application, the plantation owners will lay off them and then will hire another to work instead. There are surplus

labor supplies as the province is close to the country borders, therefore it is not a big problem to hire other foreign labors.

However, most of these foreign labors are illegal migrations, thus it is difficult for the officers to regulate them. Moreover, some of them are disease carriers to local people, and some cause the serious conflicts with the villagers, particularly related to the problems of the pesticide application in the plantations.

The Social Conflicts

The most seriously controversial problem resulted from the orange plantations is the social conflicts among local people themselves. At the beginning of the struggle, around 4-5 years ago, many local people who were affected from the plantations gathered together and tried to mutually cope with the plantations' problems themselves as their compliant to the authorities were not seriously responded. However, even they tried several ways to address the plantations' problems, but the problems seemed to be deeply severe. Several villagers were hopeless and dispirited, some felt stress, while some were very angry to the plantations'owners. The relationship in many communities declined since local people began to quarrel and disagree to each other. The social conflicts were intensified either between the villagers themselves or between the villagers and other groups such as the plantation owners, the foreign labors, and the authorities.

Currently, the conflicts among local people are deeply severe since the mass media, particularly the local and national newspapers, have continually reported the problems and impacts of the orange plantations in the Chiang Mai province until the government attended to seriously take action to address the plantations' problems. Unfortunately, the orange's price significantly fell down during that time. Local people who have invested in orange

cultivating totally believe that the reduction of the orange's price because of the reports of the orange's impacts. Therefore, they have been very angry and unsatisfied at the villagers who were the HIA research team as they think that because of these people gave negative information about the orange to outsiders. Some villagers who were the struggle leaders cannot be able to live in the community no longer as they encounter with serious pressure from their neighborhoods as well as from their relatives. The kinship between these two groups in the communities is collapsed.

C. The Link to Overall Health Impacts

The previous topic illustrated how the orange plantations potentially affect to the changes of the communities' environments both the bio-physical and the socio-economic environments. The changes of these two environments closely link to health determinants, which ultimately reflect to human health. It can be concluded that any changes in health determinants correlatively relate to health impacts. Therefore, the overall health[8] impacts of local people in the Fang Watershed relating to the orange plantations are described as below.

[8] Health in this content refers to holistic understand to 'health' which consists of four main aspects namely, physical health, mental health, social health and spiritual health.

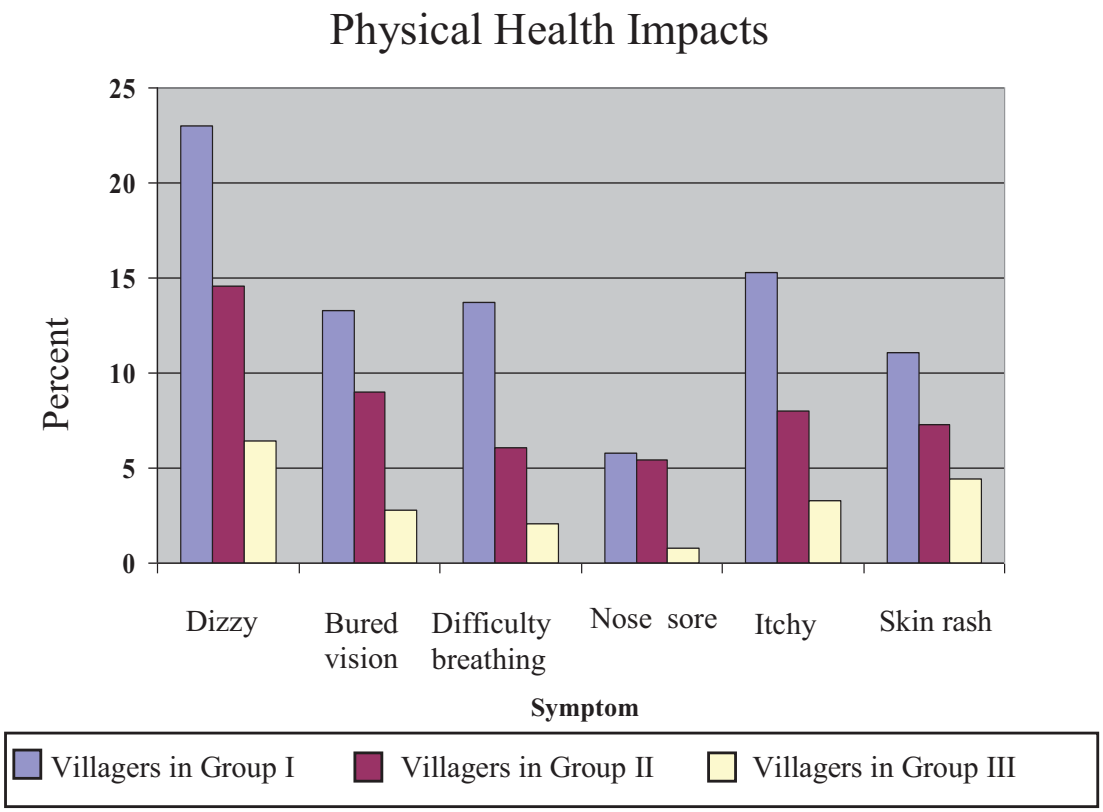

FIGURE 8: The Physical Health Impacts on the Three Village Groups.

Physical Health Impacts

From the questionnaires, it was found that the physical health impacts on local people, which closely relate to common symptoms of the pesticide exposure identified by Helen Murphy (FAO), were dizzy, burred vision, difficulty breathing, nose sore, itchy, skin rash, etc. These health impacts were probably consequences from the change in the bio-physical environment namely, the chemical odor and the pesticide contamination in their freshwater ponds. It should be noted that these symptoms were normally found in children more than adults. The summary of the

physical health impacts of local people in the three village groups are illustrated in the following chart:

FIGURE 9: The Physical Health Impacts on Local People in the Fang Watershed

Mental Health Impacts

The research team and the volunteer villagers mutually defined the meaning of 'mental health' as mental sickness that covers aggressive and furious, including having some stress behaviors e.g. shooting a gun to pesticide instruments and shooting a gun into sky. These mental health impacts were presumably resulted from the changes in the bio-physical and socio-economic environments such as chemical odor, pesticide contamination in water resources, water shortage, water conflicts and the change in food security. It should be noted here that these mental health impacts are the accumulated problems that are hard to exactly identify their certain causes as they can be potentially resulted from other factors besides the orange plantation problems. However, from the questionnaires it was found that local people, who live in the villages close to the plantations, trend to have mental sickness problems more than one who live far the orange plantations. The

following chart illustrates the mental health impacts on local people in three village groups.

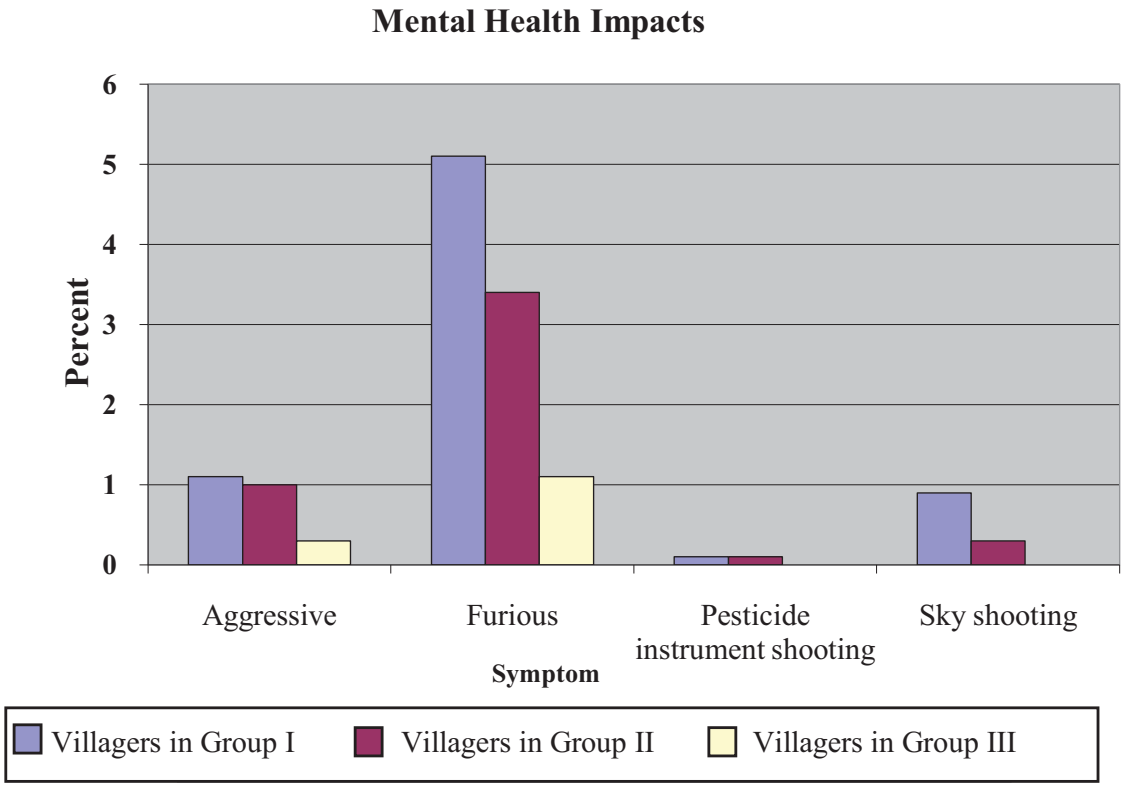

FIGURE 10: The Mental Health Impacts on the Three Village Group

Social Health Impacts

In this study, social health impact was defined as an ability of a person to properly live with other people in a society or community. From the questionnaires, it was found that the social health impacts as for examples dissents, quarrels and conflicts within the communities. These impacts mostly were consequences from the changes in the socio-economic environment e.g. the water conflicts, the communities' street invasion, the conflicts between the foreign labors and the social conflicts within the communities. The comparison of the social health impacts in the three villages groups is shown below.

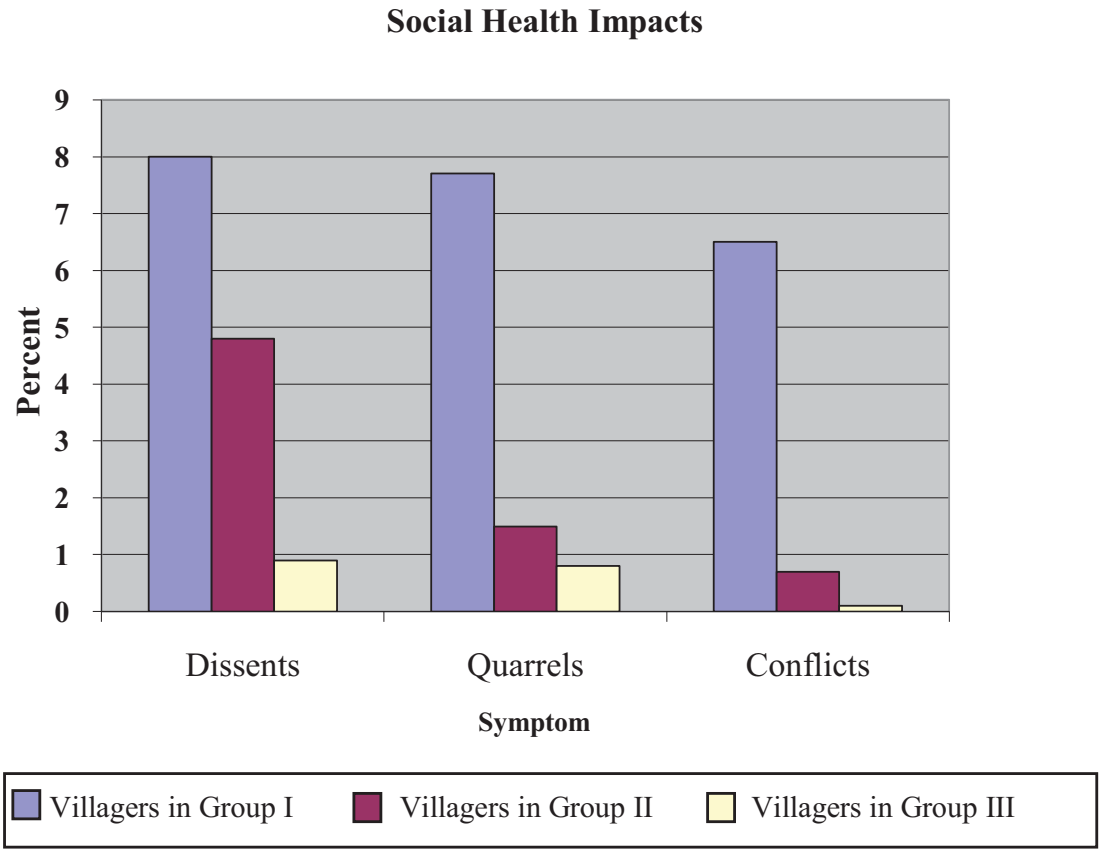

FIGURE 11: The Social Health Impacts on the Three Village Groups

Spiritual Health Impacts

The meaning of 'spiritual health impact' was mutually defined by the research team and the volunteer villagers as abandon of local people from their home communities, particularly one who live near the orange plantations. The key reason for the leaving was because of they would like go away from the plantation problems, especially concerning the terrible chemical odor and the pesticide contamination in their freshwater ponds. However, it should be noted that the problem about loss of the kinship within the communities is also one of the most serious spiritual health impacts at the present time.

The following figure is illustrated the summary the overall health impact of the orange plantations on the local communities in the Fang Watershed area.

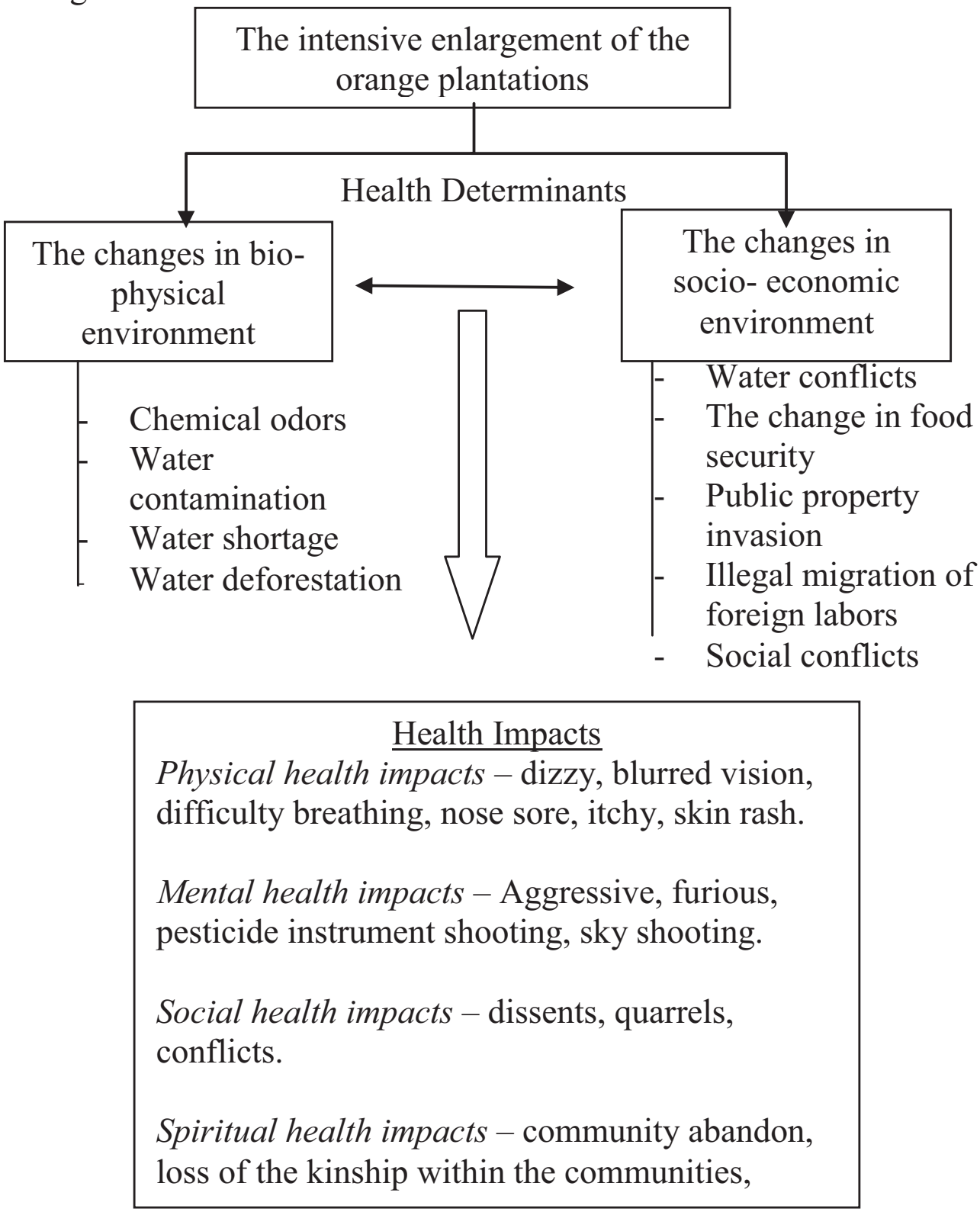

FIGURE 12: Summary the Overall Health Impacts of the Orange Plantations.

5. The HIA Study and the Move to Public Policy Process

5.1 The Struggle of Local People

From the result of the HIA study, it is clearly found that local communities in the Fang Watershed area have been seriously affected from the intensive expansion of the orange plantation areas for several years. Even local people tried many times to complain their sufferings for more than five years to local authorities, provincial officers as well as to the Prime Minister in the year 2001 (Manager Online, 2003b), but the problems were not seriously addressed.

Why their requests were not meaningfully responded from the authorities? Local people knew well that because each plantation owner is a powerful person in the local areas, some are the members of the provincial or sub-district administrative offices, and some is the mayor, etc. Importantly, most of them have close connections with politicians or the local bureaucrats. To cope with the plantation problems it was not easy for them. In order to strengthen their power themselves, therefore the villagers from many local communities gathered together and established the informal networking called the 'Fang Watershed Conservative Group' (Manager Online, 2003b). However, the plantation problems still could not be solved.

More recent, the plantation problems have become a hot public issue in the country as a number of mass media, particularly newspapers, have continually reported problems and impacts of the orange plantations in Fang Watershed. During that time, the preliminary result of the HIA study was referred in the article

"Poisoned Orange in the Fang Watershed" that was unceasingly reported for three days in a national newspaper. Then later, this article got the praiseful award from the Thai Journalist Association in the field of 'Environment Conservation' news in the occasion of the Journalist Day for the year 2003 (Manager Online, 2004d).

5.2 The Move to Public Policy Process

Since the releases of the orange plantation problems in the Fang Watershed were continuously communicated to the public, many people began to debate about the Fang orange case, as well as other related issues such as impacts of pesticides on health. Eventually, in September 9, 2003 the issue of the orange plantations in Chiang Mai was raised to discuss in the Cabinet meeting. After that the Cabinet mandated the Ministry of Natural Resources and Environment (MoNRE) to take responsibility in solving the orange plantation problems in Chiang Mai province.

The MoNRE Minister appointed the provincial public health office to work as the focal point for the solving process. Six working groups were set to study on specific issues with the time limitation for six months. The working groups worked for solving problems in the following issues:

1) The health impacts
2) The environmental impacts
3) The illegal land use problems
4) The utility of high land or forest reserved areas management
5) The illegal foreign labors
6) The socio-economic, culture and livelihood impacts

To address the issue of health impacts of the orange plantations, the Public Health Act 1992 under the enforcement of the Ministry of Public Health, was seen as the key important legal enforcement

mechanisms. The working group was assigned to work in order to force orange plantations as a 'risky activity to human health' according to the Public Health Act (Chomchaun, 2003). The affected local people hopefully expected that the law could be enforced to solve their health problems. The working group worked hard to investigate the impacts of the orange plantations on local people's health.

It should be noted that an obvious obstacle for the working group was the limitation of knowledge building as it mainly was based on scientific knowledge regardless communities' wisdom and their health concerns, as well as the limitation of working period, budget including resources persons. During the end period of the working process the Minister of Public Health proposed in the Cabinet meeting that to solve health impacts related to the pesticide problems it was better to use the Hazardous Substances Act 1992 instead the Public Health Act. The working process of forcing orange plantations as a risky activity seemed to decline since then. Until now the problems of health impact on local people still cannot be definitely solved.

Unfortunately, in February 2004 the existing MoNRE Minister has been mandated to quit the position due to the political condition. The situation seems to be more adverse; the issue of the orange plantations has become out of concern for the new MoNRE Minister. Thus, the whole solving process seems to be ceased at the moment.

During the period of the solving process, another serious problem related to the Fang orange has been arisen (as mentioned to some extent in the topic 'social conflicts' in 4.2). The economic problem (the decline of the orange price) has become the most concerned for local people in the Fang Watershed; particularly for people who have invested in orange orchards, rather than the health

impact problems. It seems that now most of local people are unhappy with the solving process as well as the negative public communication by several newspapers.

The most importantly, the villagers who joined the HIA research team, as well as the key leaders who support the solving process is seriously affected resulting from the decline of orange price. They are accused by most of local people to be evil for the communities as they induce the outsider researchers and gave the negative information to the journalists. As a result, some accused villagers have to permanently leave their communities as they are threatened by some powerful persons. Furthermore their neighborhoods as well as their cousins no longer want to talk with them. Now this problem has become the very serious conflict in the communities rather than the orange plantation problems.

6. Lessons Learnt

1) HIA Methodology and the Learning Process of Local Communities

The most significance of the HIA study, not the result of the study, but it was the collective learning process of local people, particularly in knowledge building. They learned what does it means by 'holistic health', as well as mutually defined the meaning of 'mental health', 'social health' and 'spiritual health' according to their understanding. They participated in designing of the study method, data investigation, data collection, including data processing. Moreover, they shared their experiences about the changes in bio-physical and socio-economic environments in their communities, as well as they learned how to use the body map to

identify impacts of the orange plantations on their health. The HIA process facilitated them to learn about health impact surveillance.

It should be noted that before the HIA study started, there was no any significant data regarding the orange plantations and their impacts to human health and environment. The research team and local people tried to gather all relevant data themselves, several times they were denied from the authorities in data inquiring. Therefore, the HIA study was seen as the solely explicit effort of local people in knowledge building regarding the orange plantations and the link to their health impacts. It should be noted that there was no other key stakeholders e.g. plantation owners, local academics, health officers, etc participated in this study even the study team tried to involve them at the beginning of the study but they denied to join the HIA process. It can be said that the HIA study was a truly communal participatory research. However, the result of the study was criticized by academics that it was only local concern, not based on scientific knowledge as well as it was not reliable and validity. This reflects the difference of 'health paradigm' among academics and local people. What really needs to address this problem is a collective learning process to mediate between them in order to work together for healthier community based on sound evidence.

2) Health Concern VS. Economic Concern

At the beginning period of the struggle, most of local people in the Fang Watershed much concerned about the impacts from the orange plantations on their health, particularly their children's health. However, when the situation is changed (the decline of orange price) most of them have turned to be interested in the economic issue solely. The health concern has been dropped from their minds. Consequently, it has given rise to the seriously adverse social impacts within the communities, the collapse of

good relationship among themselves. Furthermore, other critical problems especially the deterioration of the ecosystem in the Fang Watershed are ignored by local people. The alike situation may happen in other intensive agricultural areas in other provinces if the related authorities do not closely pay attention to regulate at the beginning stage before any complicated problems arise.

3) *Public Communication*

From this case it is clearly found that the mass media have highly influence to urge the government to take action in solving the orange plantation problems, as well as to communicate with public. On the one hand, their role is significant for forcing the public policy process in the agricultural sector to achieve 'healthier agriculture practice' particularly regarding the pesticide application issue. On the other hand, their role can probably lead to negative impacts especially in the case that the written news is bias or vague. From the Fang orange case, it is found that the mass media particularly the newspapers have highly influence to the misunderstanding of local people in the Fang Watershed. Most of local people believe that because of the bad news about the 'poisoned orange' (consider the product as the problem) were continuously reported to consumer, the orange price is therefore declined. Inspire of the most serious concern for local people are the problem of 'the production processes' of the orange plantations. However, it is found that several reporters wrote the vague news about the Fang orange. This makes confusions to the public as well as to local people; consequently it leads to adverse impacts to the local communities. Under this circumstance, it really needs different groups of independent scholar or academic to pay roles for balancing the situation. This may be done in various ways e.g. making academic articles based on sound evidence to communicate with public; arranging academic forums or round table meetings to discuss and debate about the orange plantation

issue. Therefore, academic supports from different groups of stakeholders are needed to forcing Healthy Public Policy (HPP) process in the agricultural sector.

4) The Uncertain of the Political Process

The uncertainty of the political process is also seen as one of the obstacles in solving the orange plantations in the Fang Watershed. Many efforts from the working groups have been paused since the new MoNRE Minister appointed. The solving process seems to be stop since then. The political process is significant for this case since they possess high power, authority, as well as all necessary resources e.g. human resources and budgets.

5) The Contribution of HIA to Healthy Public Policy Process in the Agricultural Sector

Even the result of the HIA study cannot directly be used to solve the orange plantation problems as well as to influence the policy makers. It does not mean the public policy process regarding this issue is totally ceased. In return, there are several key movements regarding pesticide issue are occurring in the society. The issues of pesticide impacts are frequently raised to debate and discuss in Health Assemblies[9] and the Fang case is always mentioned as an example. Furthermore, there is an attempt to push 'plantations business' to be considered in the EIA system reform because of the lessons learnt from the Fang Orange case, as one example. Even the HIA study was done but at the moment several efforts for forcing Healthy Public Policy (HPP) in the agricultural sector are going on in the Thai society.

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[9] The Health Assemblies have been recognised as one of the key mechanism for public policy process for the civil society to achieve their healthier society or community.

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Part III
HIA for Local Empowerment

Local Empowerment through Health Impact Assessment:

Case study of potash mining project in Udon Thani province, Thailand[1]

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1. Abstract

In 1981, large deposits of some 300 million tons of high quality potash were discovered in Udon Thani. In 2003, the Asia Pacific Potash Corporation (APPC) launched a $US645 million mining project in the areas of 25 km2. Without local participation, this project has faced with strong opposition by local people. Later on a group of activists and academics conducted an Health Impact Assessment [HIA] of potash mining with the aim to provide the space and process for deliberative learning among all stakeholders on positive and negative impacts. A number of HIA forums were held at the community level, allowing various groups to share knowledge and values and at the same time empowering them. Local people have been encouraged to link environmental and health impacts in a broader framework. They could explain the linkage between the mining activity and its impacts on the society. HIA not only provides clear information but also an opportunity to learn how to present their local wisdom systematically, in the same way academic and specialists do. HIA becomes the entry point for local people in pursuing their right on the development of healthy public policy which requires their active participation. Presently, local people in Udon Thani are working on the direction of city development under the principle of sustainable development.

Keywords: Empowerment, Deliberative, Potash Mining,

2. Udon Thani potash mine project

Udon Thani Province in the northeastern of Thailand is found to have the high quality potash deposits (Sylvie ore) since 1981, with the reserved volume of more than 300 million tons. The Asia Pacific Potash Corporation (APPC: Transnational Company from Canada) has planned to invest around $US 645 millions on the mine. A 170-hectare plot of land was purchased for the construction of the plant which houses the processing line and tailing storage. However, the project's total mining area is vast, about 2,500 ha beneath the residential areas, farmland, a national highway and railway. APPC submitted [was granted with?] a Mining License on May 29, 2003 to run the underground mining in the areas of 24,500 square kilometers covering forty villages where 30,000 people live.

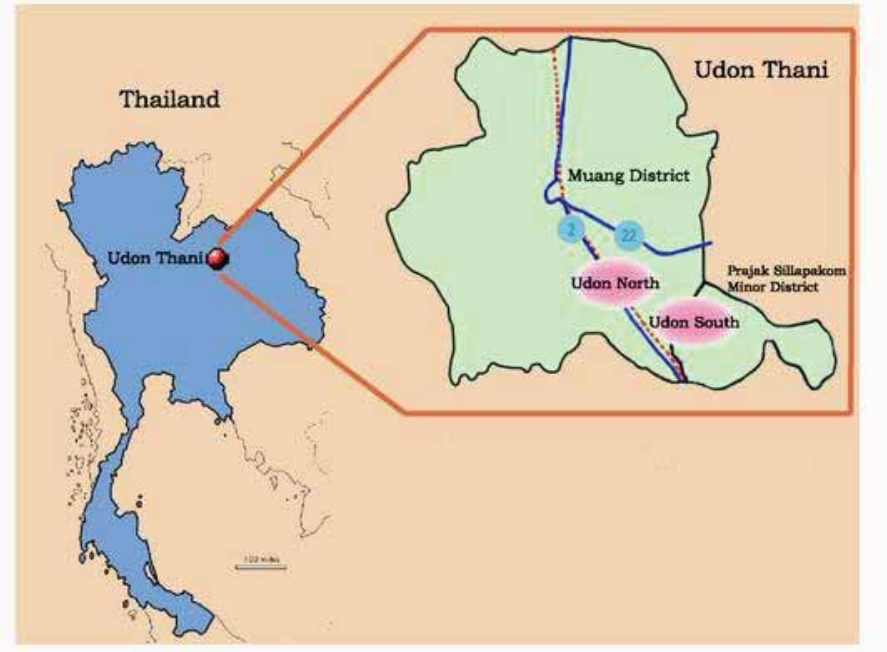


Figure 1 : Map of Location of Udon Thani Province, Thailand (www.appc.co.th/project_bg.htm)

The company plans to mine a thin layer of potash salt located 350 meters below the surface. It is expected to produce 6,000 tons of potash ore per day (2.0 million tons/year) through ore separation, precipitating and fuming processes respectively. It is anticipated that some 5 million of the remnants of potash salts will be carried back underground and take around 22 years to finish. More than 90 per cent of the potash product will mainly be exported to fertilizer manufactures, the rest will be used as materials for detergent, soap, glass, synthetic rubber, ceramic and weapon industries.

2.1 Mining and Processing

The Udon Thani Potash Mine will be a conventional underground mine using the room and pillar method of mining to recover sylvinite ore from the variable depths of 300 to 380 meters. Once the potash ore is taken out of the mine, it will be sent to the processing plant.

The first step of processing is to remove saleable potash from the salt and clay in the ore. After the ore is crushed into small particles (3 to 5 mm in diameter) it undergoes a cleaning process that resembles the work of a washing machine.

The potash particles are first rinsed with water to wash off the clay. Chemicals are then added and the mixture is placed in large tanks.

Air is pumped into the tanks forming bubbles that rise to the surface of the tank. The added chemicals will enable the “cleaned” potash particles to cling to the air bubbles and rise to the surface where they can be removed. This is known as a “Flotation Process”.

This salt waste is then sent through a drying process to remove water. The dried clay and salt mixture is transported to a tailings pile for storage while the water is released to a brine pond where it can be reused in the process.

The fine particles of potash that float to the surface of the "cleaning" tank are pressed into sheets then crushed and screened to sizes suitable for blending with other fertilizer materials. Potash dust is dissolved, then crystallized into a saleable product

2.2 Tailings Management

Tailings, the waste of potash processing, is predominantly NaCl, or commonly known as salt. The tailings produced during the processing of potash ore will be pumped from the concentrator to store above the ground in a HDPE-lined containment area. These tailings will be transported underground to backfill in the mine-out areas in the sixth year of operation.

2.3 Salt Water Management

Salt water will be produced during the processing of potash ore from the following source: Processing of potash ore; Site runoff in and around surface operations; Runoff from the tailings pile; and water that is siphoned from the mine itself. Brine, or water saturated with salt, will be generated during the process of separating potash and tailings. Rainfall runoff from the tailings pile will also produce brine. The brine will be stored in a brine pond before entering an evaporation circuit or recycled in potash processing.

2.4 Transportation

At full production 2 mtpa, about 85% of the final product will be transported by rail to a deepwater port, where it will be shipped to international markets. Potash to be sold within Thailand will be transported by truck to the existing blending facilities

3. Local communities Concern

The project has triggered opposition from local communities out of fear for widespread land subsidence, salt contamination of agricultural land and groundwater. People are worried about the impact of mine which will affect their community and the family especially their children. In addition, their local livelihood based on agricultural system will be destroyed. It seems that their concerns become more serious after the committees on EIA approval found 26 mistakes in the EIA report. For example, there are no studies on the health impact caused by the pile of remnants of potash ore and salt as well as by the contamination of potash salt, chemicals used for the ore production process in the groundwater and the agricultural areas.

Figure 2: Nonmakmo, the area of Potash mine project

Figure 3: Nongnatal, public lake next to the project

Figure 5: There are cattles around of Nongnatan Lake

Figure 4: Local people working in the rice field around the potash

It is obvious that wide protest is a result of lack of local participation in the early process. The protesters have raised many environmental and health concerns caused by potash mining such as the remnant salt, salt dust and land subsidence.

Figure 6 -7: The protesters

This situation unavoidably entailed local conflict between the beneficiaries and local people whose their livelihood is at risk.

Figure 8: Udon Thani environment Conservative Group

Figure 9: Right Protection Group

4. Comprehensive HIA

HIA in Thailand is quite new, but it has increasingly gained public interest. Reviews of international experience and pilot HIA projects have been commissioned by the Health Systems Resesrch Institute (HSRI). A group of academicians from various disciplines from 6-7 universities nationwide were invited to participate in the development of HIA in Thailand. Networks of HIA research groups were formed with the additional recruitment of research staff to facilitate HIA research projects.

Udon thani potash mine became a public issue and the idea of HIA has started since 29 Jan 2003 after a seminar on "Udon Thani Potash Project : Problem and Solution" at Chulalongkorn University, Bangkok. In this forum Dr Pattapong Kessomboon and Dr Decharat Sukkumnoed pointed out positive and negative impacts of Udon Thani Potash Mine. Positive impacts include job opportunities for local people while employment will thus stimulate local economic growth. The negative impact may be caused by 1) environmental change, such as land collapse, salt dust, air pollution, underground water contamination; 2) local sanitation change, such as an increase in waste and waste water; and 3) social changes that result from the transformation into industrial society with an influx of migrant labourers that will possibly give rise to social conflicts. Under such circumstances, some health risks are identified including respiratory tract infection, urinary tract infection, accident, AIDS. However, the EIA report of this project failed to assess health impacts. What was mentioned in the report was general health-related information in

Udon Thani Province, such as the number of hospitals, health officers, some health statistics.

The HIA working group from HSRI has joined the Udon Thani working group to organize a public seminar on "Potash Mining Project and the Application of Health Impact Assessment Process in Thailand" on 17-18 May 2003 in Udon Thani.

Some 500 participants attended the event which included panel discussions by acedemics, APPC and members of the National Human Rights Committee. There were also small-group brainstorming sessions in which participants voiced their health concerns. This forum successfully brought "Health Values" to the debates about development.

Figure 10 – 11: The forum on 17-18 May 2003 in Udon Thani.

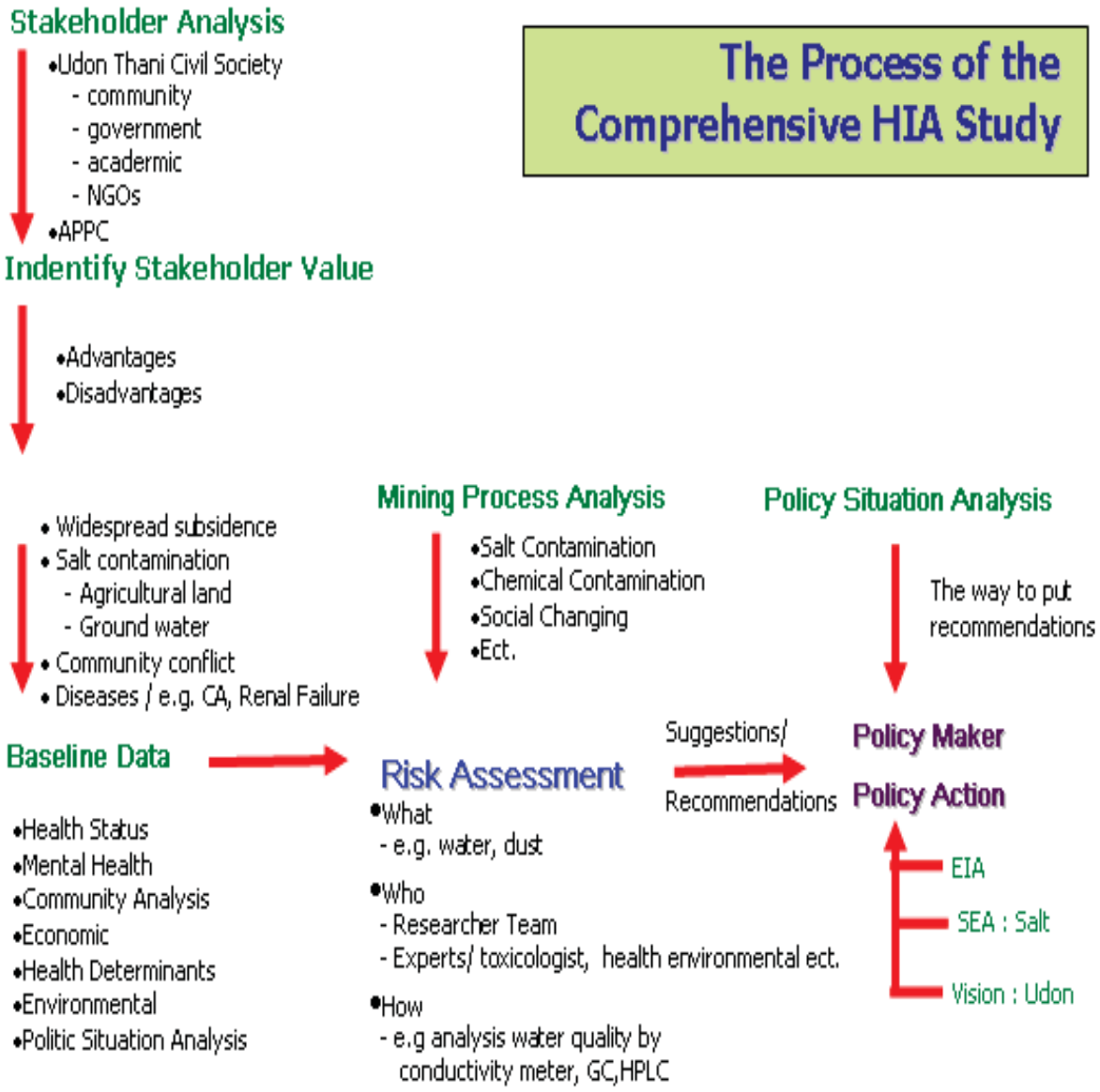
After the forum, a series of seminars and public hearings in communities both in the rural and urban areas were regularly

organized. The communities and the Udon Thani working group (Udon Thani Rajabhat University, Boromarajonani College of nursing Udon Thani and local environmental conservation group) applied the focus group technique to study the determinants of health. It was found that the health-related values were broadened and covered not only physical health but also the well being, good quality of life, fertility of natural resources, local cohesion, spirituality, and sympathy and sufficient economy.

Figure 12 – 13: Focus group in the local community for "Determinant of health"

Unlike the mining company which basically adhered to reductive thinking in addressing health issues, the local group handles the issues in holistic manners including physical, mental, social and spiritual aspects involving all stakeholders. Therefore, HIA process is defined not only as a tool to assess the health impact but also a learning process of the local community to understand the relationships between health and other sectors (in transdisciplinary approach). Finally, they can design their own ways (related to the potash mining) based on shared information and values leading to a healthy society in Udon Thani Province.

5. HIA Process



6. Local Empowerment

HIA is a core value and core activities that encourages people from various sectors, such as government sector, academic sector, NGOs and local community,, to work together in order to search for facts or information about the potash mining and predict the impact on people health that may possibly occur. In order to attain the goal, groups of volunteer were particularly assigned to conduct activities. A co-ordination team held a forum with the aim to provide the space and process for deliberative discussion among stakeholders on both positive and negative impacts of potash mining. Knowledge, information and values were collected from various groups and then would be used as an input for options and collective decision making process.

Forum at the community level was applied to empower local people on the impact assessment. The results from local forum indicated that the people in local community have learned about the holistic health including physical, mental, social, and spiritual. The forum brighten up their thinking about the impact of potash mining in many dimensions. Furthermore, the participants from various sectors of Udon Thani province have a chance to get involved in every process of HIA. They have learned together about the meaning of holistic health, investigation of the health determinant, identification of the project's values, collected the baseline data, and risk assessment. From this process, the participants learned not only about HIA, but they also link their learning to other problems in the society. Moreover, they could use tacit knowledge and local wisdom to explain these phenomenon, predict the impact, and link each dimension of these impacts. The

following are anticipated possible consequences to potash mining:

1. Health risk that is associated with the development of the potash mine. Potential health problems include physical and psychological conditions, stress, suicide and crime-related injuries and deaths, which result from social changes and conflict within communities.
2. Health impacts arising from a loss of livelihood and degraded environment are also critically evaluated Furthermore, the spread of sexually transmitted diseases, particularly HIV/AIDS, in the community are of serious concern.
3. A labour force of over 800 workers, many temporary, coming from other provinces and abroad will have a major influence on prostitution in nearby urban centers such as Udon Thani. In addition, there is no risk assessment for health impacts arising from accidents.
4. The capacity of the community and local health services to cope with such potential health impacts is highly doubted given the lack of baseline health data. Moreover, there is no health monitoring process nor plans to evaluate and eliminate risk. The extent of health impact assessment carried out in this potash mining proposal is limited to the figures of hospital and patient in Udon Thani only.
5. Moreover, the problem of water scarcity may get more serious in the area and it remains unclear about the source of water supply for the project which will consume huge amount of water each month. Also, there is risk of land collapse because of underground mining.
6. In term of social impact, the magnitude of financial investment surrounding the mining project will cause

> further socioeconomic changes in the Udon Thani town. This may affect patterns of employment, migration, housing, transportation, private investment, and tourism.

Many sectors of Udon Thani province involved in the HIA process of potash mining are expanded these learning experiences into their work. For example, in the academic sector, a group of lecturers from Udon Thani Rajabhat University used benefits from these learning experiences into their teaching and developed a new curriculum about Health Impact Assessment and Healthy Public Policy. Besides, the Udon Thani Provincial Health Office has discussed this issues and prepared important information which will affect decision making about Strategic Health Planning and Public Health Policy. Regional Environmental Office has a plan about water quality surveillance in the lake, river and canal surrounding the project.

The most important matter is that this learning process has empowered the civil society Udon Thani. It could say that HIA process is an entry point for local people to have a discussion about other problems in their province and about the projects or public policies that have an effect on their life. At present, they have tried to encourage more people in wider community to get involved in the process of developing Udon Thani public policy. Therefore, local empowerment through Health Impact Assessment not only empowers people in local area around the potash mining project, but it also empowers people from every sector of Udon

Thani civil society to join HIA process.

7. Conclusion

Over the past two years that HIA has been in place, with deliberative and learning process, local people have been encouraged to link the eco-culture, environmental and health impacts in broader aspects. By now, local people are able to explain the linkage of mining process and its potential impacts on the environment such as watershed ecology.

HIA provides not only clear information on the impact of potash mining, but also an opportunity fot people to learn on how to present their tacit knowledge and local wisdom systematically as other academic and technocrats do.

Although HIA process firstly focuses on the impact of the potash mining, it does not stop there. Instead, it becomes the entry point for local people in pursuing their right on the development of healthy public policy which requires their active participation. At present, local people in Udon Thani province have raised a question on the direction of city development as they are asking for the healthy city under the principle of sufficiency economy and sustainable development.

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Learning for Our Beloved River :

HIA Applications in Tha Chin River Basin Management

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1. Introduction to Tha Chin River Basin

Thailand 's rapid development over the past decades has contributed not only to economic growth but also environmental crises. Many parts of the country have encountered serious pollution problems and environmental degradation. Various rivers, including Tha Chin River in the Central Plains, have faced with chronic water pollution.

Tha Chin River is 325 kilometers long and runs through four provinces in the central part of Thailand, namely Chainat, Supan Buri, Nakhonpathom, and Samut Sakhon. Tha Chin River can be compared to the artery of Nakhonpathom province. The part that runs through Nakhonpathom province is called Nakhonchaisri River. It is 97 kilometers long and covers the area of three districts, which are Bang Len, Nakhonchaisri, and Sampran districts.

This area is dubbed as the land of sweet pomelo and white rice. There are branches of many narrow and wide canals along the two banks of Nakhonchaisri River which connect to one another like a web. Moreover, this river is closely attached to the way of life of Nakhonpathom people because the province is the land of agriculture. There are many produces such as rice, pomelo, grape, rose apple, guava, mango, coconut and orchid that are very well known.

Figure 1: Nakornpathom is a fertile land with numerous agricultural products that has been well-known for very long time.

Nakhonpathom province -- once called "Nakhonchaisri city" -- is a prosperous land. In ancient times this land was the center of ancient kingdom called Dvaravati, which existed some 2,000 years ago. Thanks to foreign trade, Dvaravati became the most prosperous state in the Chao Praya River basin during the 12 th - 16 th Buddhist Century. Archeological evidences discovered at the ancient sites show the integration of local culture with external influence, which consequently became the unique identity of Dvaravati's culture. The development of Buddhism in the Dvaravati paved the way for the strong establishment of Buddhist state which is the root of national development until today.

In 1710, western merchants, especially Portuguese and Dutch, came for trading and expanded their influence over Southeast Asia. They wanted to buy more sugar and rice. Due to the fact that Nakhonchaisri city was a very fertile land, the more intensive plantation of rice and sugar-cane was thus imposed to Tha Chin River Basin. The communities were enlarged, and the canel improvement was done to facilitate the new settlements and the

transportation system. Therefore, the ways of production in Nakhonchaisri city were transformed to serve international trade.

As this process was evolved for over hundred years, local people have adopted new trade paradigms and developed their own knowledge and expertise in production as well as the skills to apply new technologies according to the changes in both domestic and foreign markets. It helped prepare the local people for the more accelerated pace of national development under the National Economic and Social Development Plan in the century after.

Figure 2: Nakornpathom was the most prosperous state in the Chao Praya River Basin during the 12th - 16th Buddhist Century.

♣ *The Age of Intensive Development and the Fate of the Local*

During the15 years of the implementation of the First to the Third National Economic and Social Development Plans, there was the

massive change in terms of economic infrastructure, including the construction of the first bridge across Tha Chin River, which is called Phokaeo Bridge. The Third Plan (1972-1976) stipulated the promotion of foreign investment in Thailand. This period witnessed the establishment of agricultural, labor-intensive industries in the rural area, providing employment opportunities to local people and new markets for agricultural produces. Therefore, when the Third Plan ended in 1976, the area along Tha Chin River, from Nakhonchaisri district to those located downstream, had been transformed to an industrialized zone. One of the impacts from this was the polluted water, especially in the community and factory areas where the wastes were dumped into the river and canals.

When the Fourth Plan was implemented in 1977, the lower part of Tha Chin River, from Sampran district to the downstream, was in a sorry state with low water quality. This was eventually spread to the upstream and other canals. The conflict over the allocation of water resources between the farmers and households on one side and the industries on the other erupted. However, the Government was unable to resolve this problem which led to several violent confrontations. In early 1988, 500 villagers in Klongyai Sub-district, Sampran district siege a dyeing factory that drained waste water into Bang Pra canal. It heavily polluted the water in the canal, causing trouble to local people who could not use it for agricultural activities. Angry local people assaulted government officials who protected the factory. A number of local people injured during a violent crash which came to an end without solution to the pollution. The factory has continued draining polluted water into the Tha Chin River until now (2004).

At the beginning of 1994, when most part of the country encountered water shortage, Tha Chin River faced another pollution crisis as a sugar factory in Supan Buri province and pig farms in Nakhonpathom province released a large amount of

polluted water to Tha Chin River. In 1994, the spread of water hyacinth (Java weed) dealt a big blow to part of Tha Chin River in Nakhonpathom province as the plant blocked sunlight from the water and obstructed water transportation. That left people on the banks Tha Chin River desperate just as not a single state organizations picked up the issue.

For thirty years, Tha Chin River was designated as an industrial zone under the development strategy. It seemed like this river was going to be the lowest of its fate without any help from the government.

♣ *HRH Princess Maha Chakri Sirindhorn: the royal inspiration*

The television news on 20th September 1994 showed HRH Princess Maha Sirindhorn's visit to Sansab canal in Chachoengsao province by boat for the distance of 72 kilometers. The royal trip tremendously delighted local people who lived near Sansab canal who turned up in force to welcome the princess. The Cabinet later designated 20th September of every year as the day of Thai canal conservation.

Apparently, the Thai public appreciated the princess' traveling at that time. The gathering of local people to do activities for their canal provided a new hope to the people in Tha Chin River basin. Four years later, Nakhonpathom's people joined hands to tackle Java weed problem and extended their activities further to protect Tha Chin River and its branches. The activities have continued until today.

2. We Love Tha Chin River Society Nakhonpathom: the love of a river

In 1997, there were a seminar with an excursion trip to the sources of waste and treatment in order to raise public awareness on environmental pollutions. In 1998, the seminar was reorganized and it was found that the people living along the river as well as the factories, temples, schools, communities and markets on the river banks had their share in water pollution problem as the river literally became a dump site for garbage and chemical toxins. The seminar resulted in the call for the establishment of people's organization for tangible environmental conservation without waiting for government support. Mr. Prasob Chan-Inngam invited important persons from the public and the private sectors and the monks to collaborate on the setting up of a society named "We Love Tha Chin River Society Nakhonpathom" on 7th September 1998. The office of this society is located at Nakprasit School in Sampran district and is also joined by Pratepkunaporn (Pradhammasenanee), chair of the provincial Sangha office and the abbots from 41 riverine temples. The motto of We Love Tha Chin River Society Nakhonpathom is "Connecting the people, conserving Tha Chin River".

♣ The Roles of We Love Tha Chin River Society Nakhonpathom in solving the Tha Chin River crisis in 2000

During 13th – 18th April, a big flood hit a vast area of rice fields, totaling 132,000 rai, in Supan Buri province. The flood water then overflew into the already polluted water of Nakhonchaisri district

and Sampran district which reached Samut Sakhon province. The board of We Love Tha Chin River Society Nakhonpathom attempted to solve this crisis on 26th -28th April by asking the Department of Irrigation to release clean water from Phopraya and Thasan Bangpla water gates at 200 cubic meters per second to dilute the polluted water. For three days, the water quality in Tha Chin River improved.

However, in that time the polluted water immensely damaged the ecosystems of Tha Chin River with the massive loss of aquatic resources. The damage was worth around 120 million baht. Afterward, from 29th April – 11th May 2000, We Love Tha Chin River Society Nakhonpathom worked with the mass media, Mr. Padermchai Sasomsab M.P., and the governors of Chainat province, Supan Buri province, Nakhonpathom province and Samut Sakhon province to find the ways to solve this problem. During the struggle, We Love Tha Chin River Society Nakhonpathom has 1,785 more members. The role of We Love Tha Chin River Society Nakhonpathom was more recognized. We have the members who have the same goal and the society concentrates on expanding network for the restoration of Tha Chin River.

Figure 3: Water quality crisis in Tha Chin River in 2000

3. We Love Tha Chin River Society Nakhonpathom and Health Impact Assessment

As a result of the trend in public health system reform which was promoted by the Health System Reform Office (HSRO) and Health Systems Research Institute (HSRI), a "Research and Development Program on Health Impact Assessment" was founded in March 2001. The aim is to integrate academic, social, and political collaborations between all parties in the health network for

developing health impact assessment system. Afterwards, this program was renamed as "Research and Development Program on Healthy Public Policy and Health Impact Assessment (HPP-HIA)" in 2003.

Then, HPP-HIA has expanded the policy network to push forward for healthy public policy by using HIA as an important tool.

The issues of agronomy, industry, energy, water management, urban and transportation development, and resource base management are especially addressed. "We Love Tha Chin River Society Nakhonpathom" was invited to join the network and was granted funding for a research on "The people of Tha Chin River Basin: A story of people who wish to manage the water themselves".

The participation with HSRO and HSRI was driven by key issues surrounding Tha Chin River's problem as follows:

1) The water quality in Nakhonpathom's Tha Chin River has been the lowest of all rivers in Thailand since 1983.

2) The problem of public policy impacts on Nakhonpathom people's health, that is, the Department of Irrigation's proposal for two dam construction projects in Tha Chin River at Bang Len district of Nakhonpathom province and Muang district of Samut Sakhon province respectively.

3) The mobilization by We Love Tha Chin River Society Nakhonpathom for health-supportive public policy on the community's participatory water management by using HIA as a tool.

In 2001, We Love Tha Chin River Society Nakhonpathom joined the activities with HSRO in a public hearing in Nakhonpathom

province on the National Health Bill. This was a good chance for them to learn about public policy and HIA through the process of HSRO. Furthermore, We Love Tha Chin River Society Nakhonpathom used the health assembly as the channel to present the public policy process in the case of the Department of Irrigation's two dams projects. HIA was used as a tool for building a learning process in the community as well as for the making of healthy public policy, both in the cases of the dam construction and the water management by the local administrative organization of Bang Rakam Sub-district, which will be discussed later in this chapter.

In 2002, the Department of Irrigation proposed to build 2 dams over Tha Chin River in Bank Rakam Sub-district, Banglen District, Nakhonpathom province and in Thasa-I Sub-district, Muang District, Samut Sakhon province. The projects' total cost was about 10,000 million Baht and the reason was given as follows :

"Since 6-7 years ago and up until now (1995-2002), Tha Chin River has been one of the important rivers in the central plains, but there are some problems happened in this river such as the contamination of seawater, the water quality of Tha Chin River, frequent floods…etc. After the study in terms of irrigation and the environment, we proposed the dam construction project on Tha Chin River to solve these problems. "

In order to cope with such problem, We Love Tha Chin River Society Nakhonpathom applied Health Impact Assessment, which will be explained into the six steps, as the following.

3.1 Screening

The dam proposal of the Department of Irrigation demonstrated how a public policy could cause adverse impacts on the livelihood

of people in the Tha Chin River Basin. Therefore, We Love Tha Chin River Society Nakhonpathom held a meeting between the board of directors, the leaders and interested people to consider the documents for organizing the referendum on the dam construction project which was managed by the team of Consulting Engineering and Management Limited Company.

The board of We Love Tha Chin River Society Nakhonpathom and the networks of 8 canals decided to turn this crisis into an opportunity for the local people to learn and be aware of the threat to the river. Furthermore, HIA was applied as a tool for building the learning process in the community. In this case, HIA was designed as Prospective HIA in an urgent process in which the result of this impact assessment would come out in time before the decision was made on the proposal.

3.2 Public Scoping

After analyzing the documents, there was the most critical problem that might happen if the dam construction project was done, that is "the water pollution will affect the quality of life of the people who live in Tha Chin River basin (Nakhonpathom province and Samut Sakon province)".

Afterward, the board of We Love Tha Chin River Society Nakhonpathom and the leaders of networks and communities went to observe the completed, similar dam construction project at Chachoengsao province.

In this case, they found out that the dam did not function well and instead caused so many problems that the cost to solve them exceeded the dam construction cost. Moreover, Mr.Sakda Tongprasit from We love Bang Pakong River Club who did a

research about the impact from the dam construction in Bang Pakong River was invited to give the knowledge to the members of We Love Tha Chin River Society Nakhonpathom.

We Love Tha Chin River Society Nakhonpathom agreed to address the issue about the changing way of life of the local people in Tha Chin River basin (Nakhonpathom-Samut Sakon provinces) and the adverse impacts on the eco-system and scenery.

Tha Chin River possesses both spiritual and economic values. The Gross Provincial Product of Nakhonpathom province is approximately 40,000 million baht each year, and the fishery industry in Samut Sakhon province is also worth several million baht. The dams; if built, would substantially change the ecosystem, and might make water pollution worse. Alto threatened were the floating market traders, rice farmers, orchards, orchid farms, inland fishery, more than 40 schools and temples located on the river banks, of which life support system will be at risk.

3.3 Assessing

Then the Society's members managed to lobby for the information and prepared the documents. After that, stakeholders' meetings were organized alternately in important areas (Bang Rakam and Bang Len Sub-districts), with a plan to provide information to affected communities. Furthermore, people in Samut Sakhon province and We Love Tha Chin River Society Samut Sakhon and Nakhonpathom held several meetings, including the planning for organizing referendum in Nakhonpathom province.

3.4 Public Review

On 21st May 2002, We Love Tha Chin River Society Nakhonpathom held a conference at Buddhamonton's auditorium,

Nakhonpathom province, to listen to the voices of all stakeholders and relevant agencies. They shared together the facts, opinions, and choices in terms of action and concern.

The theme of this conference, attended by 4,000 people, was "Advantage and Disadvantage of the dam construction in Tha Chin Rive." The majority of them disagreed to the proposal out of concern for adverse impacts on their occupations and ways of life. The polluted water with pungent smell has physically and mentally affected the people who live near Tha Chin River. Also a large amount of accumulated toxic substances in Tha Chin River had effects on the ecosystems of Tha Chin River and the people's health. To make it worse, this dam construction project can transform Tha Chin River into a large polluted water cistern with 90 kilometers in length.

As the projects were proposed on large agricultural area, the dam would hold the water during floods, thus making the condition worse. Hence the board of the society decided to make a press release on the result of the referendum, to be disseminated in the next referendum which was to be organized by the Department of Irrigation. On 21st May 2002, the Conference participants included the shop owners in the floating markets of Nakhonpathom province, the monks from the 43 temples located near Tha Chin River. The issue also drew media attention as the event appeared in Matichon Newspaper the day after.

Moreover, We Love Tha Chin River Society Nakhonpathom produced the documents to inform the people, including:

1. The Sobbing of Bang Pakong Dam
2. The Fate of Tha Chin River
3. The Press Release of We Love Tha Chin River Society Nakhonpathom

3.5 Influencing

On15 th July 2002, the Department of Irrigation organized the referendum for listening to the opinions of the society on the draft reports, which were separately made by We Love Tha Chin River Society Nakhonpathom and by the Department of Irrigation. Some 6,000 people attended the event at Buddhamonton's auditorium.

Dr. Teera Satabuth was appointed by the Minister of Agriculture and Co-operatives as chair of this referendum. He made the following conclusion of the result from the referendum, which would be presented to the Minister of Agriculture and Co-operatives:

1. The committee of the referendum agreed to the problems that happened to Tha Chin River as studied by the Department of Irrigation in 4 aspects, which are the contamination of seawater, frequent floods, water scarcity and the water pollution. Moreover, the proponents and opponents of the dam construction project agreed that these problems should be addressed.

2. The opinion of the committee is, however, that the Department of Irrigation should propose some alternatives in solving the problems, apart from the dam construction.

3. Although the Department of Irrigation insisted that the dam construction can solve the flood problem and the contamination of seawater, but the result of the research in terms of the solution for water pollution was not clear.

Furthermore, the study of the ecosystems in Tha Chin River is not well-detailed, especially in terms of creatures in brackish water, which were very important to the fishery. That is one important reason why the people disagreed to this project.

4. The proposal of the Department of Irrigation was still unclear and did not cover all important issues. So, the opponents use this point to argue against this project. The proposal should include the solution of Bang Pakong Dam, in order to ensure the stakeholders that if the dam was to be built in Tha Chin River, the problem that was similar to Bang Pakong River could be avoided.

3.6 Monitoring and Evaluation

We Love Tha Chin River Society Nakhonpathom and other 33 organizations submitted an open letter to the Prime minister, the Minister of Agriculture and Co-operatives, the governor of Nakhonpathom province, the Chairman of Natural Resource and Environment Committee under the House of the Representatives, the chairman of the Public Participation Commission in the Senate and to the chairman of the National Human Rights Commission, explaining the reasons why they opposed the project.
The submission of the letter opposing the dam construction project in Tha Chin River and the conclusion from the referendum have resulted in the following actions:

1. The National Economic and Social Advisory Council, chaired by Mr. Anand Panyarashun, held a meeting on 12th September 2002 to consider the dam construction project in Tha Chin River and suggested that the government should suspend this project, regarding Tha Chin River's severe condition, compared with other rivers nationwide. The polluted water, damaged ecosystems and frequent flood never have been cured by the public and private sectors or by the people. The official recommendation of NESAC was also submitted to the Prime Minister.

2. The chairman of the Natural Resource and Environmental Committee under the House of the Representatives invited the board members of We Love Tha Chin River Society

Nakhonpathom, including Mr. Prasob Chaninngarm, Assistant Professor Densiri Tongnoppakun and Mr. Chaisak Chittateerawattana to join a working group on the impact study of the dam construction which was conducted 3 times.

The outcomes of applying HIA as a tool for building a learning process for the community, are as follows:

1. The people who participated in the referendum cherished and became more aware of the values of Tha Chin River. Furthermore, they willingly joined in the restoration of Tha Chin River with We Love Tha Chin River Society Nakhonpathom.

2. This was the first time in Thailand that the referendum held by the civil society was successful in influencing the Government's decision.
3. We Love Tha Chin River Society Nakhonpathom has learnt and gained experiences on how to use HIA as a tool for making a learning process in the community and has applied HIA to other activities such as the water management project of Bang Rakam and the gas-fuelled electricity project of Lampaya Sub-district.

4. We Love Tha Chin River Society Nakhonpathom participated in the national effort to include Health Impact Assessment in the national healthy bill till it was successfully taken into effect.

4. The Case Study of Health Impact Assessment: *Water Management by the Local Administrative Organization of Bang Rakam Sub-district, Nakhonpathom province*

The Local Administrative Organization of Bang Rakam Sub-district is located in the south of Bang Len District, which is 17 kilometers distant from Bang Len district; its area is about 30 km^2 (18,000 rai). This land is a plain. The Tha Chin River runs through and separated this land into two sides of the banks: the east and the west. Most of the area is the green and fertile land. Moreover, this area was divided into 15 villages for the administration. There are 1,242 households with 4,549 citizens.

In 1999, Savittachat Canal faced many problems such as water pollution, the fast growth of java weed, canal sedimentation with many kinds of grass. Furthermore, water in the canal is so polluted that it is no longer fit for consumption and in certain areas people cannot use it even for agricultural activities. Mr. Somchai Chan-Inngam, the village headman raised the problem with the villagers, convincing them of the water's poor quality and the impact on their livelihood. It was agreed that the villagers should help themselves without waiting for the government to solve these problems. They eventually mapped out an action plan as follows:

- ***The 1st period***

On 5th December 1999, the villagers gathered in a clean-up campaign to pick java weeds and remove wastes up from Savittachat Canal.

Figure 4: Collective efforts of communities to recover the Savittachat Canal

- ***The 2nd period***

To create a long-term plan by setting up "We Love Savittachat Canal society" for canal conservation. The villagers from each household agreed to donate 200 baht for canal clean-up activities. The money is paid to volunteers who look after the canal. Eligible volunteers were people in the village who lived along Savittachat Canal. Moreover, there was an agreement that they would not use herbicide as the activities were monitored by the villagers.

- ***The 3rd period***

There were supporting and the public relations for the community to stop using the chemicals and dumping wastes into the water. In addition, it encouraged farmers to use EM (Effective Microorganism) liquids instead of chemicals as farm chemicals also cause water pollution.

Afterwards, We Love Savittachat Canal society joined We Love Tha Chin River Society Nakhonpathom and the government in calling for other community leaders to restore their canals.

Therefore, there was the gathering of the people in other communities who came to learn from Savittachat canal.

Despite some problems, the "Savittachat Canal Model" was applied to other 9 canals namely, Kwaai, Bang Kamoi, Tarang, Pooyai Samran , Rangmadan, Bang Rakam, Chaipan, Bang Born and Rangkae canals.

The villagers who lived by these canals can use clean water for their everyday activities. When the water was clean, the aquatic animals increased.

The Local Administrative Organization of Bang Rakam Sub-district realized the importance of public participation in conserving canals. Therefore, they decided to set aside the annual budget of 20,000 baht for each of these canals. The success of Savittachat canal network led to participatory process in canal conservation in other 26 canals in Bang Rakam Sub-district. Mr. Somchai Chan-Inngam held a meeting for the network members and re-named this network as "We Love Canals of Bang Rakam Sub-district society" and the Local Administrative Organization of Bang Rakam Sub-district distributed the budget for development activities for the canals.
The process of the canal development under "We Love Savittachat Canal society" was expanded as "We Love Canal of Bang Rakam Sub-district society". The people of Bang Rakam have addressed the issues, contributing to the improvement of canals, finding ways to solve the water pollution. Moreover, these attempts are also for the learning and public policy making processes of Bang Rakam Sub-district.

Afterwards, the Office of Natural Resource and the Environment of Nakhonpathom province supported Bang Rakam Sub-district, and the Environment Office Region 5 also joined the project.

Nowadays, the Sub-district Administrative Organizations from every part of Thailand come to observe and learn at the Local Administrative Organization of Bang Rakam Sub-district.

In addition, the Local Administrative Organization of Bang Rakam Sub-district has decided to address land use policy and designated the area as an organic agricultural zone. They replaced farm chemicals with organic fertilizer and EM substance. Moreover, they also built the organic fertilizer factory with an aim to minimise the release and contamination of toxic substance in the Tha Chin River and canals.

Figure 5: Canals in Bang Rakam Sub-district at present

EHIA of Pesticides Use for Public Policy Decision Support in Local Level[1]

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1. Introduction

Thailand has been an agriculture country for decades and now facing many problems from an increasing pesticides use in order to increase the agriculture products for competing with other countries. Consequently, Thai farmers have to change the way of growing crops from integrated agriculture to single agriculture by increasing pesticides on the process of the production. According to data from Department of Agriculture there has been two times increasing amount of imported pesticides during 8 years (from 45.7 million kilograms in 1996 to 79.8 million kilograms in 2003).

A high amount of pesticides for agriculture absolutely affects both directly and indirectly on increasing risks for health and environment among farmers and consumers. Hence, the demand to support more sustainable agricultural practices, contributing to health, environment and economic development, thus has resonance throughout wide sectors of Thai society. Supporting safer pesticide use alongside viable alternatives (e.g. Integrated Pest Management), however, is no easy task. At present, policies controlling agricultural pesticides are set forth in the Hazardous Substances Act (B.E. 2535), and under the responsibility of the Hazardous Substances Committee. This

committee is composed solely of appointed government officers and technocrats. Public involvement in the policy process as well as in the monitoring and evaluation systems is largely absent. Moreover, a lack of managing essential evidence of impact of pesticides on the environment, health, social and economics is still being the most important problem in policy-making process for effective control measures on pesticides utilisation. Hence, the development of process or measures among related stakeholders for their concerns and participation for making effective policy on pesticides is crucial.

According to the limitation of researches based on a restriction of context and tools to support a decision in a process of public policy process could not operate the process of learning at macro level. Therefore, this research would be focused on the process of decision making of a local administration (sub-district administrative organization) on public policy process. It would be a model as the first template before covering to other sub-districts and direct a development plan at provincial level.

Local administrative organization and people in the area could not avoid the impact of pesticides use in health, environment, economy and society. They could not identify the extent and severity of problems on their own due to they do not receive any data collected by governmental officers e.g. surveillance data from health centre, district agricultural office or provincial environment and resources office. Most data are collected and reported to central level in the capital and partly reflect problems. Hence, Local Administrative Organisation cannot use or analyse this data for sub-district development plan to solve problems in the area.

A development of learning process in community to support a decision making process of pesticides use was a tool for learning process in local area. It was applied from different tools that could be used in an analysis of direct associations between pesticides use and impacts in the environment and health. It should be also easy to provide knowledge, understanding and concerns among related people and finally to analyse alternative methods for solving community problems.

2. Methods Used

The research team proposed to undertake an environmental health impact assessment of agricultural practices at Thoung-Thong Sub-district in Kamphaengphet Province. It was proposed as an appropriate tool that could be used to investigate the health and environment concerns in evolving development of agriculture in term of community-based learning. It followed a three-stage process:

A. **Identifying and collecting information** for key health, environment and economic -related problems and situations in the area. The data were presented to learning activities.
B. **Involving stakeholders**; a total of 50 people participated, including representatives of local farmers, community leaders, member of Sub-district Administrative Organization, volunteer health worker, public health officer and agricultural officer. A total of 4 activities were held at the area as follows:

1) Biodiversity analysis with the objective that the participants could understand about the biodiversities in various habitats, threatened situation to the biodiversities and prioritization species to be nearly extinct, analyze together with the environment impact that has significance from threatened factor or hazard to environment of the community and link to indicate that pesticide is threatened hazard to biodiversities. It consists of the activities as follow

- Understanding of biodiversities
- Survey of biodiversities in the community
- Specifying causes of destruction or threatened situation to biodiversities
- Prioritization of species to be nearly extinct
- Analysis of species details to be conserved in the community

2) Health Impact analysis by collection of evidence base data either from survey with questionnaire and other data sources from concerned agencies in the community. And it was also added with qualitative data attained from the arrangement of learning process which is analysis of health determinant factors and health impact from pesticides use significantly including analysis of socio-economic factors that relates to those issues. This stage consists of the activities as follows:

- Understanding of pesticide situation
- Analysis of the amount of pesticide used per year
- Analysis of Health effects: Body mapping of illnesses was used as a tool to help pinpoint associations between pesticide exposures and health effects.
- Classification of types and hazard of pesticide
- Keeping and eradication of pesticide containers and health risk

3) Healthy Agricultural Field trips for knowledge sharing on best practice model in decreasing pesticide application was extremely vital for providing alternative policy development which is concrete and appropriate for the area.

4) Participatory planning process was established among the participants. It emphasized on strategies about decreasing the

pesticide use promotion, environmental restoration, local wisdom and cultural inheritance in holistic approach.

The participatory activities for learning process developed for this study consists of 7 steps as shown in Figure 1

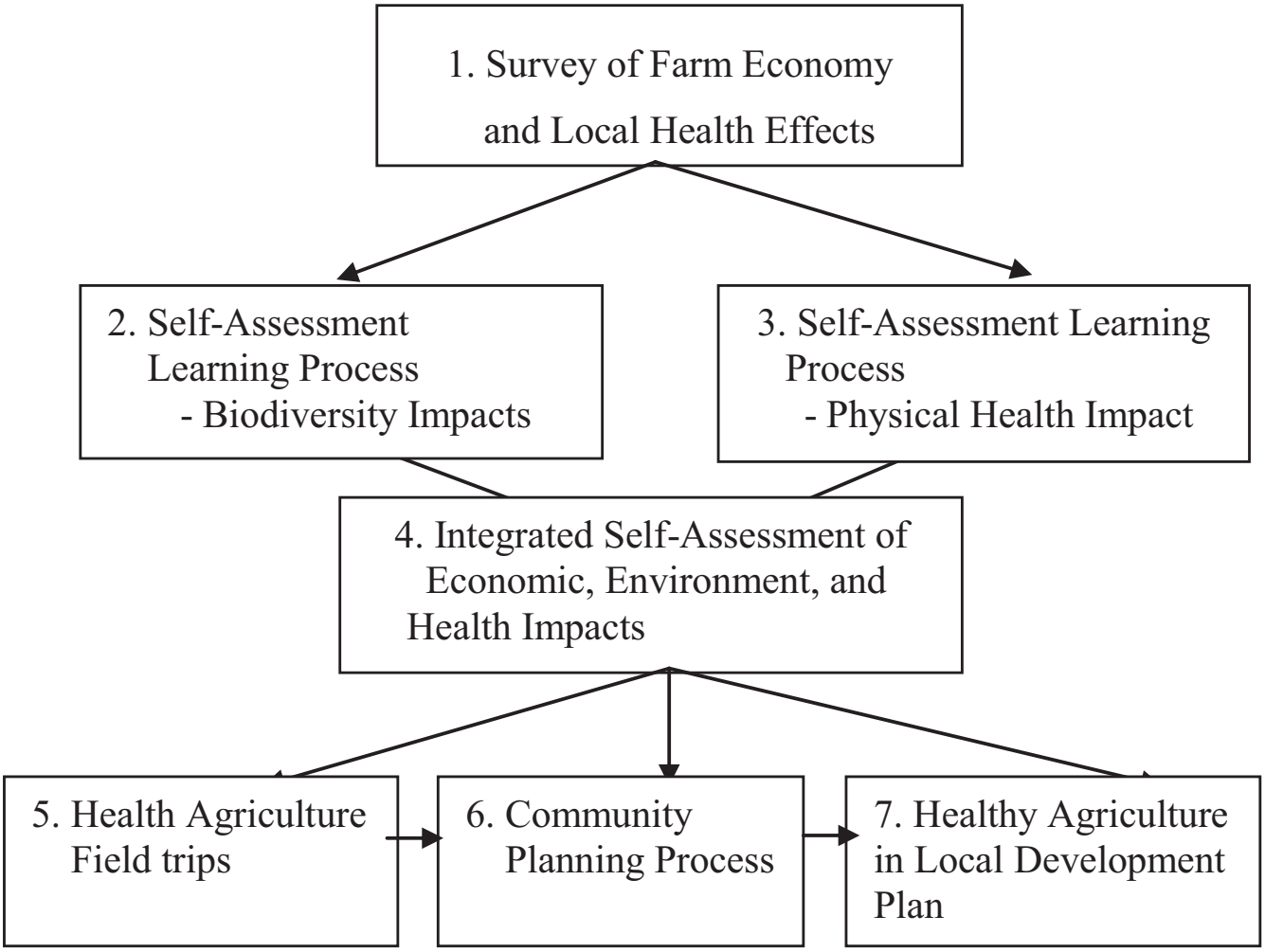

Figure 1: an Overview of Participatory Assessment and Policy Decision Making Process at the Local Level

3. Results

The process thus generated both knowledge gains among the group, and new data on health and environment linkages and risks associated with local pesticide use. Key findings and linkages are described in Box 1.

Box 1: Results from Participatory Assessment Process

- Pesticides are the main factor implicated in the deterioration of certain local food resources and biodiversity, including snake-headed fish, frog, freshwater prawn, land crab,
- ground lizard, and grasshopper. Some pesticides affect 'beneficial insects'.
- Although Endosulfan has been banned in Thailand for three years, local farmers can easily buy it and, indeed, it is the second most popular chemical used in the area. Endosulfan is an organochlorine pesticide categorized by WHO as moderately toxic to humans (*WHO 2004*).
- 67.1% of farmers spray pesticides themselves. 41.5% spray on an average of once a
  month, and 62.2% spray more than 5,000 litres per year.
- Average pesticide and chemical fertilizers costs are around one-third of total production costs in rice production and one-fifth in sugarcane production.
- 61.2% of farmers mix more than one pesticide into each spraying, leading to higher
  risks of exposure and toxicity.
- 46.3% of farmers mix chemical pesticides without using gloves.
- 69.1% of farmers never use eyeglasses or masks to protect their eyes.

Box 1 (cont.): Results from Participatory Assessment Process

- 34.0% of farmers fail to wash their hands before eating or drinking, while engaged in pesticide applications.
- 62.8% of farmers are fully soaked by pesticides during spraying.
- 35.6% of farmers always wash pesticide mixing and spraying tools in local water sources.
- 73.1% of farmers keep their pesticides in the places that children can easily reach.
- 43.0% of farmers have experienced "intermediate" health effects from pesticidespraying (e.g., blurred vision, spasmodic eyelids, choking feeling in the chest, squeamishness and vomit).
- Only 39% of farmers who experienced negative effects from pesticide spraying went to the hospital or to a health care provider, while 65% recovered on their own.

The participatory collection and assessment of health and environmental risk information, boosted the awareness of local farmers and the local administration regarding the impacts of excessive pesticide use, and spurred interest in healthy farming alternatives. The group learning process was thus the launching point for a "participatory public policy process" whereby group members were motivated to become involved in community planning, integrating findings and lessons learnt into local development plans and policies.

Following the conclusion of the impact assessment, a community planning process was launched. This community plan set up far-reaching targets and goals for the reduction of pesticide use, and support for healthy farming alternatives, to be integrated into the local development plan. (presented in Box 2).

Box 2: New Targets for the Thoung-Thong Sub-district Development Plan

- 2006: reduce pesticide uses by 30%.
- 2006: apply biological controls to 80% of paddy fields.
- 2009: 30% of rice and other farm products will be pesticide-free products.
- 2015: all Thoung-Thong Sub-district will be pesticide-free area. Increase freshwater animals by approximately 300,000 living organisms.
- Increase organic fertilizer use to more than 2 tons/village to improve soil fertility and increase crop rotation in paddy fields by 30%.
- Organize women farmer groups for healthy agriculture and income generating activities.
- Save farmer households 5-10% annually in farm costs, through healthy agriculture alternatives.

While the proposed plan was still awaiting local council approval, many of its elements already have been implemented independently by the stakeholders that were involved in the process. In addition, the Thoung-Thong Sub-district has already taken the following steps:

- Approved a new budget supporting local farmers in experimenting with biological control methods to replace pesticide uses.
- Set up local groups organized around pesticide-free agriculture.
- Introduce the IPM-farmer field school approach, in collaboration with the agricultural extension office, to create a learning process and technical consultancy for local farmers.
- Introduced a local course in primary care for pesticide-affected cases.
- Local farmers are now implementing less-pesticide practices in their own farms.

4. Conclusion and Recommendations

Based upon the lessons learnt in the Thoung-Thong sub-district, certain assessment tools as well as methods for policy implementation and surveillance were identified as particularly relevant to the integration of health and environment concerns into policies on pesticides use. These include the following:

- A participatory assessment process framed around the values of "Living Healthily Together" provides an opportunity for all policy actors to exchange perspectives and knowledge needs and to draw upon all relevant experiences in understanding of the multi-factorial health and environmental impacts caused by pesticides. This process is likely

to propose healthier solutions more than conventional methods of data collection and evidence development alone. As seen in the Thoung-Thong case, such participatory assessment processes also can yield a complete and very integrated understanding of the investments and actions by various social and economic actors that are both necessary and feasible to achieve change.

- A tool for community planning of alternative agriculture and pesticide reductions would support integration of health, environment, economic, and social aspects of agriculture into participatory planning processes for community development. It is important that public participation be incorporated into the early phases of development plans and proposals so as to give community views more legitimacy and standing before decision-makers.

- The crucial element is the creation of community participation and empowerment mechanisms that give all stakeholders an appreciation of linkages between health, environment and ecosystems, society and economy. Understanding the risks, farmers will be eager to protect their own right to live in a healthy environment. Policymakers must

also take part in the learning process so that they are aware of issues, and can take appropriate actions.

- Clarification of authority relationships among all stakeholders in policy processes should be an essential element of self-assessment and group learning models and exercises. Understanding these authority relationships provides entry points for public policy mobilization.

- A tool should be developed to guide and facilitate surveillance of pesticide use by local farmers and local administrations. This tool should cover the entire plant-to harvest cycle, including pesticide disposal and environmental restoration. Implementation of such a local tool over time, could be built into a broader provincial and national surveillance system, filling an important gap in existing surveillance mechanisms.

- Many policy recommendations can be implemented even prior to their formal approval – through voluntary mechanisms (e.g. farmers using IPM methods); conversely, formal policy approval by the local administrator does not guarantee that a plan will be implemented. Therefore, farmers and stakeholders need to be involved in follow-up, monitoring and evaluation of plans. Developing policy networks inside and beyond the community can help reinforce and strengthen policy implementation.

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Public Participation in Renewable Energy Development in Thailand:

HIA Public Scoping and Public Review of the two controversial Biomass power plant projects[1]

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Decharut Sukkumnoed[3]

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[1] Based on the research project on "Public Participation and the Health Impact Assessment in Alternative Energy Development: HIA Public Scoping and Public Review in the two controversial rice husk power plant projects in Nakorn Sawan and Singh Buri Province" funded by the Health Systems Research Institute, Thailand. It was presented in the HIA Stream, The Annual Meeting of the International Association for Impact Assessment (IAIA) 17-20 June 2003 in Marrakech, Morocco

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1. Healthy public policy and the conflict in the Thai energy sector

Energy project has long been one of the main causes of conflict in Thai society. There have been many controversial cases around the country. Some are still going on at present and the new cases are emerging. The controversial projects share common characteristics -- either being large-scale or utilising fossil fuel, or both. Therefore, small-scale renewable energy project has been considered as an important solution to conflict in the energy sector.

Apart from the environmental movement, new efforts to foster renewable energy development has been driven by the movement for human rights protection and health system reform. The Health Systems Research Institute (HSRI), together with other partners and colleagues in the health reform movement, has been working for healthy public policy in various strategic policy-sectors, including the energy policy.

By developing healthy public policy in the energy sector, we are currently working on two areas. The first is the Health Impact Assessment (HIA) with the aim to clarify and detail both the positive and negative impacts of the policy, plan, project, or activity. The second is focused on the public policy process to support and empower the meaningful participation of the civil society in the policy process.

2. Renewable energy development and the new policy measure

2.1 Renewable energy development in the electricity sector

The Thai electricity sector has totally relied on fossil fuel and large-hydro power since the 1970's. As almost all of the petroleum energy resource and some parts of natural gas have to be imported, the power sector has caused several problems to the Thai economy, especially during the remarkable expansion of the generation between 1990-1997 due to the high demand growth. Moreover, lignite, which is the only domestic coal, and large hydroelectric dams have also worsened environmental, health, and social problems to the society.

Therefore, the policy for renewable energy development has been developed with the primary aim to foster the self-reliance of the energy sector and thus, save the foreign currency and stabilize the electricity tariff. The other aims include reducing the investment burden of the government in the power sector, the conservation of the natural resources and the environment, and technological development in renewable energy field. It should be noted, however, that the development of the agricultural and rural sector has never been specified as an objective for renewable energy policy.

The first policy measure is the Small Power Producer (SPP) Program which started in 1995. This program allows the private power producers, who use renewable energy or co-generation

system to sell the electricity up to 90 MW to the grid. This has resulted in the power of 1,970 MW being sold to the system at present. But several obstacles have limited the production of this type of energy to 177 MW or about 9 percent only. (EPPO,2003).

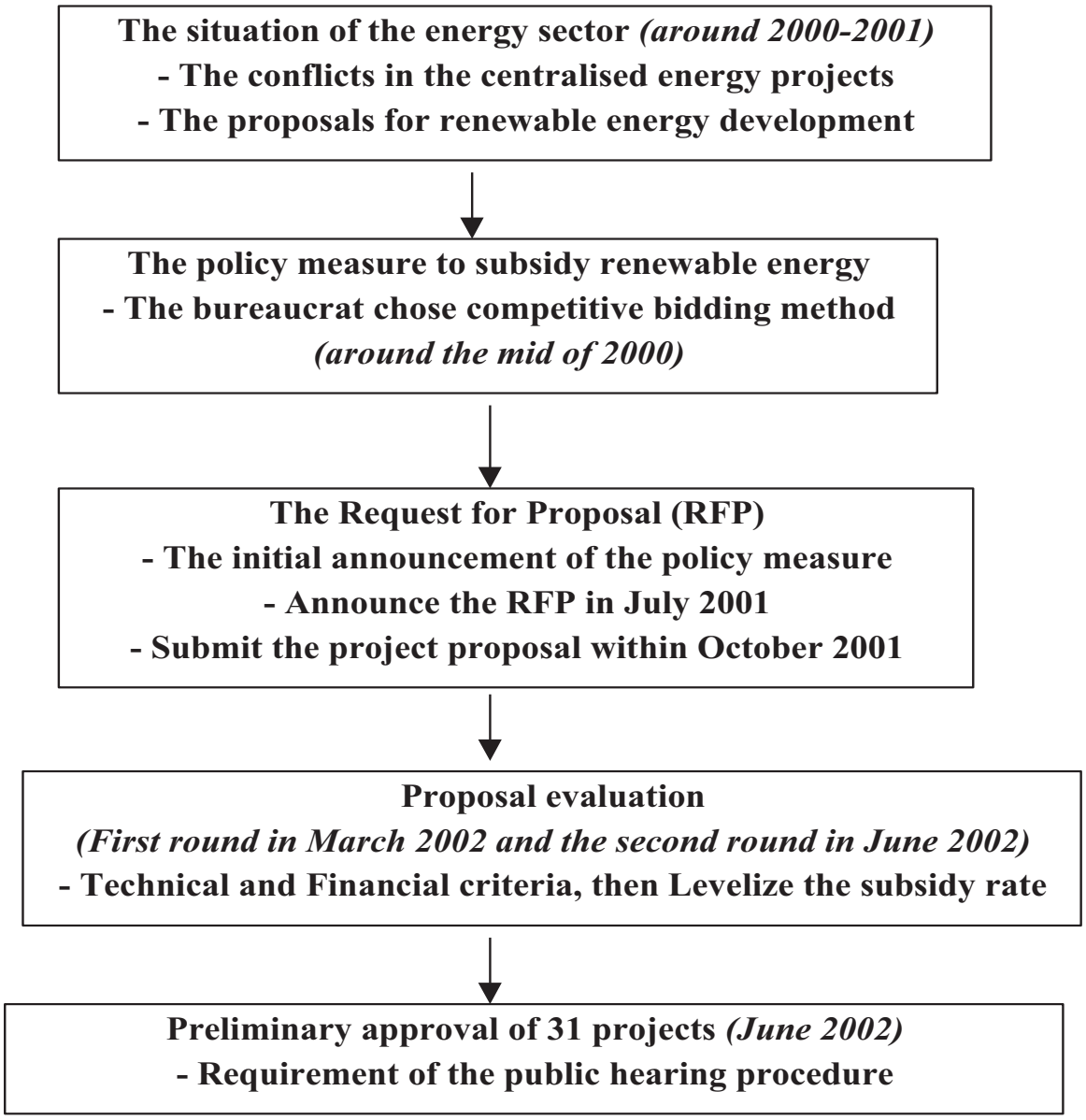
During 1999-2001 conflicts over two major coal-fired power plant projects triggered a public debate on energy policy and planning. They resulted in growling attention in renewables as potential source of energy.

2.2 The subsidy scheme

In 2000, the Energy Planning and Policy Office (EPPO) initiated a project to support the electricity price for renewable energy under the SPP Program by using 2,060 million Baht (about 47 million USD) from the Energy Conservation Fund.

The project selection method was competitive bidding, which means that the project that requires least subsidy will get the support first. But after all, the final decision of the subsidy will be made by the Energy Conservation Committee, which is chaired by a Deputy Prime Minister. The implementation of the subsidy scheme is summarized in Figure 1.

Figure 1 The process of the policy measure



Source: By the author

In summary, the 31 projects that passed the bidding process had the total capacity of 511 MW with the total subsidy amounting to 2,991 million baht (about 68 million USD). Table 1 summarizes the fuels in these projects.

Table 1 The preliminarily approved projects by type of fuel

Type of fuel	Number of project	Total capacity (MW)
1. Rice husk	12	246
2. Rice husk and wood	3	66
3. Bagasse	7	50
4. Bagasse and wood	2	30
5. Wood	1	20
6. Wood and palm oil	1	20
7. Cassava	1	22
8. Black liquor	1	25
9. Small hydro	3	32
Total	**31**	**511**

Source: Energy Planning and Policy Office, 2002, **The Announcement of the Preliminary Approval Projects by the Energy Conservation Committee under the Project "Supporting Small Power Producers Using Renewable Energy"**, Energy Policy and Planning Office, Ministry of Energy, www.eppo.go.th

2.3 Public participation in the process

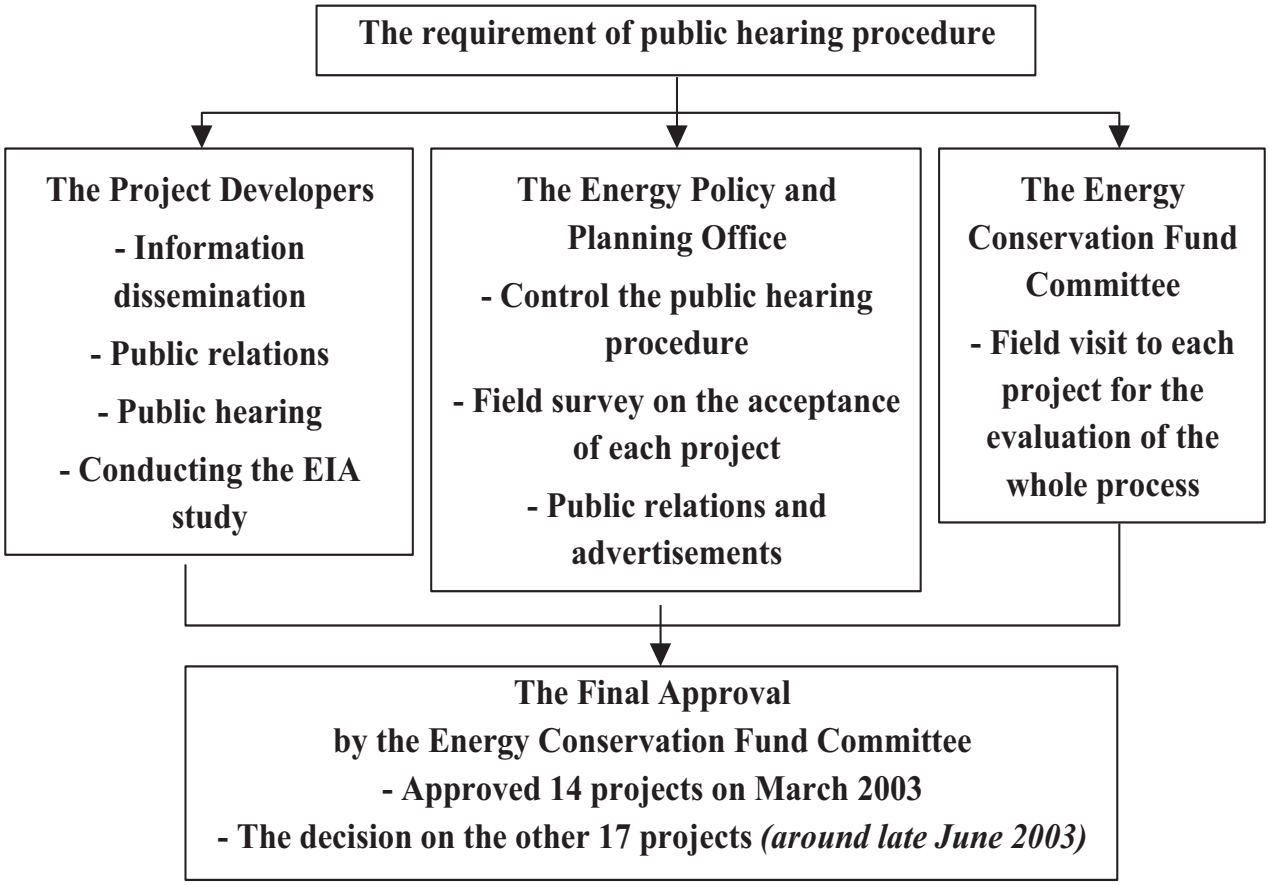
Even though, there were oppositions and conflicts in the previous energy projects, the public had no chance to participate in the process before the announcement of the bidding result. Since the originating of the scheme, EPPO initiated the idea of the price subsidy and chose competitive bidding method. Then, they team up with the other energy administrations and state-owned enterprises to design the details, announce Request for Proposal, and evaluate the proposals.

Furthermore, as project operators were not sure whether they would win the bidding or not, they had no reason to involve the public before the announcement.

Together with the result of the bidding, EPPO required all projects to follow the public hearing procedure. Each project had to make the public hearing plan that covers people in the area within ten kilometers from the project.

EPPO firstly approved each public hearing plan and, then, monitored the implementation of each project. In addition, it also implemented other tasks to enhance the public hearing process. These included the extensive surveying of local situation and the acceptance to the project, the advertisement at both local and national level on the benefits of renewable energy, and the evaluation of the local acceptance by the representatives of the Energy Conservation Fund Committee. Figure 2 shows the public hearing procedure.

Figure 2 The public hearing procedure



Source: By the author

3. The implementations and the conflicts in various projects

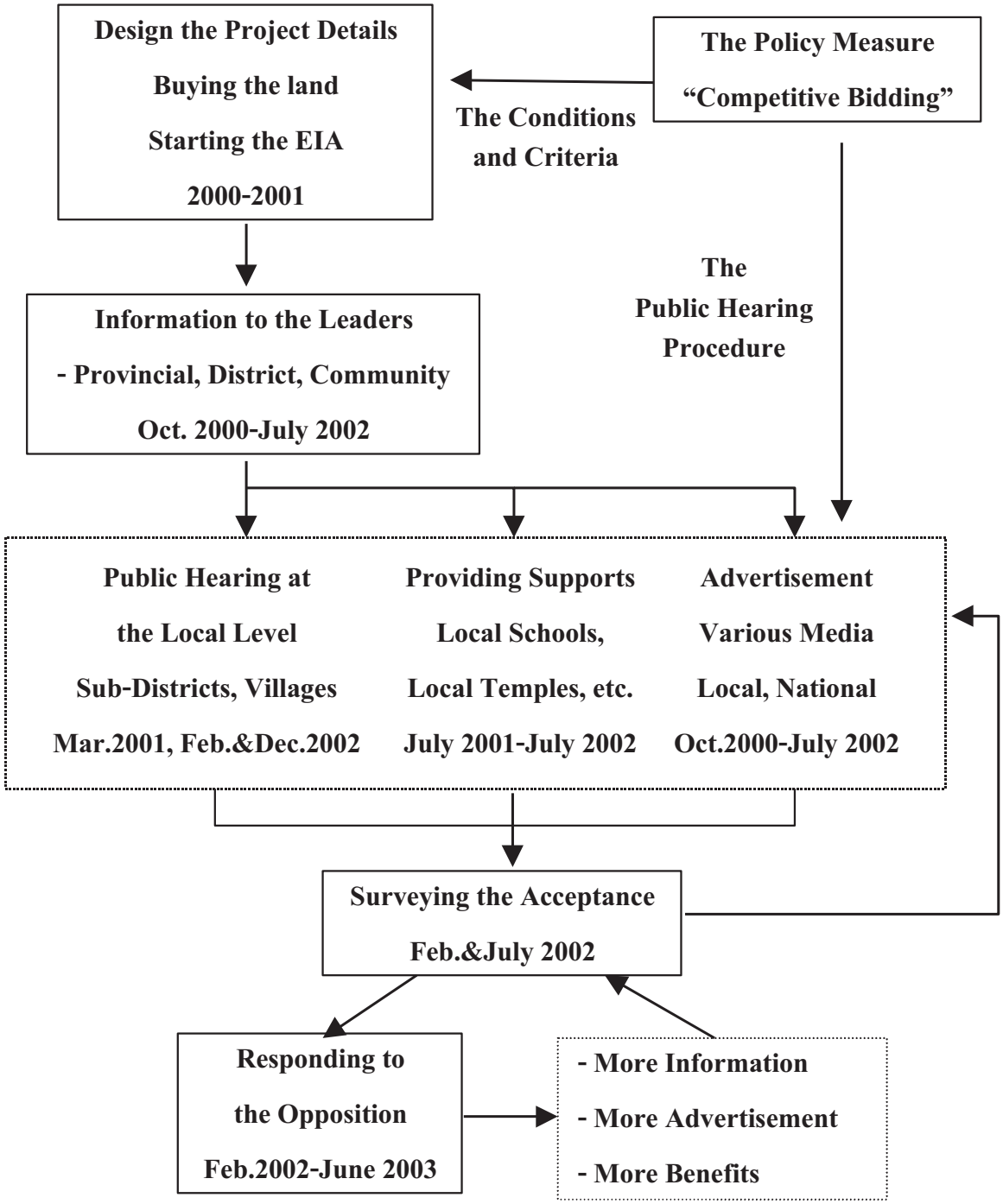
3.1 The implementation and the public hearing of the two controversial projects

Following the criteria set in the Request for Proposal, each project developer had designed the project details, bought the land, applied for various permissions, etc. For these two projects, they also started the EIA study.

Then the process of information dissemination and public relations took place at the local level to convince the people to accept the project (See Figure 3). As some local people did not accept or even opposed the project, the project owner put more efforts to disseminate more information and also, provided more benefits to the local people.

Apart from taxes to the local administration office and the compensation fund for environmental damages, these 'additional' benefits also included the community development fund, the subsidy to all local habitants for their electricity bill, and the proposal for setting up a community rice mill.

Figure 3 The implementation and the public participation in the two controversial projects



Source: By the author

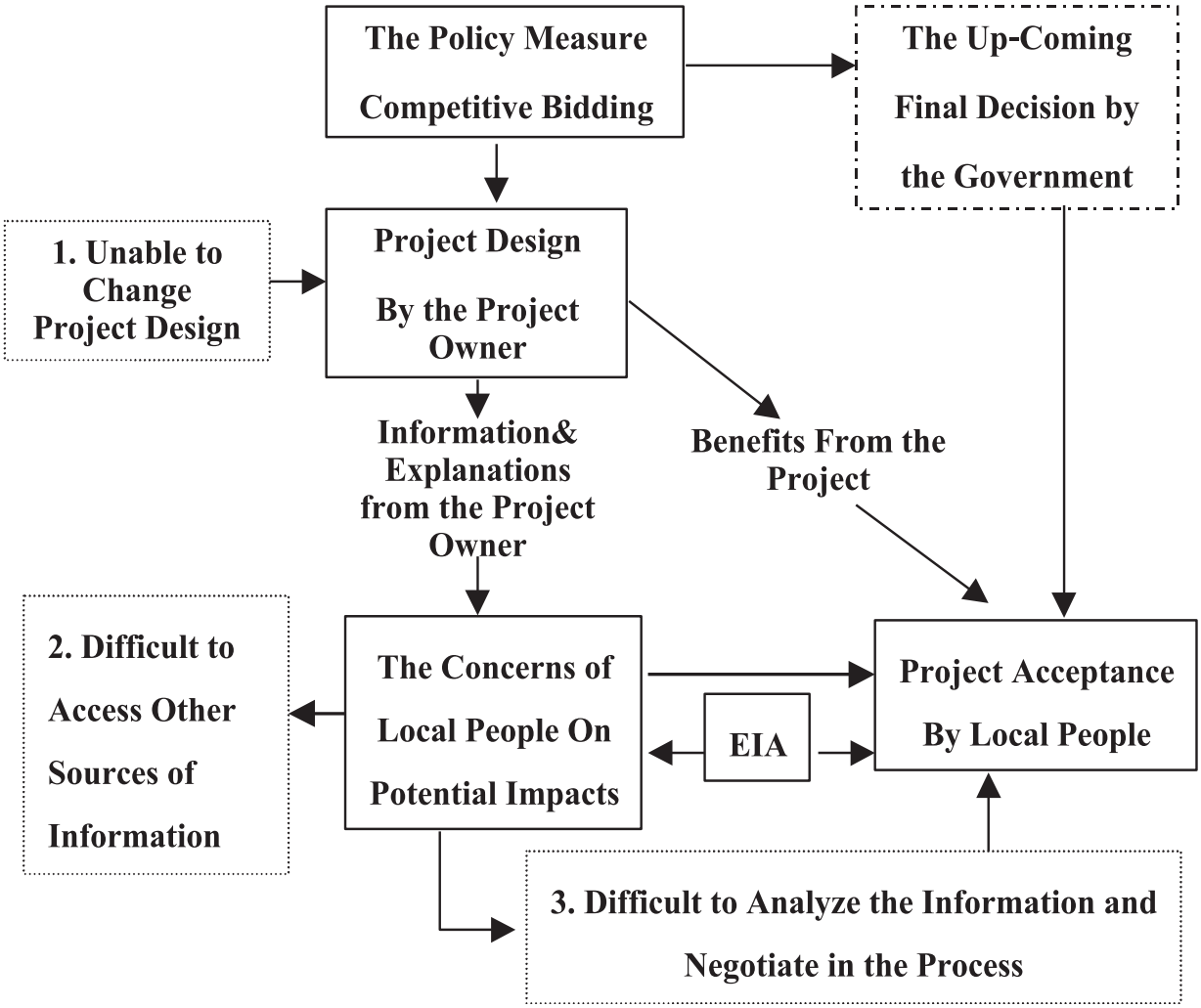
3.2 The main causes of conflicts

The causes of local opposition are shown in Figure 4. These can be synthesized into two quite simple issues: local people are not confident about the potential impacts of the project and they cannot trust the project owners in project implementation.

Since all of the project details have been specified, the information and explanations from the project developers are more in the way of convincing the local people than open discussion. Moreover, it is difficult for the local people to analyze some information, for example, the EIA report, and access the other sources of information.

While the local people still concern about the potential impacts, the project owners try to increase benefits and to show that the protesters are just a minority part of the community. Last but not least, the deadline for the final decision is coming and this has intensified the conflicts.

Figure 4 The main causes of conflicts in the two controversial projects



Source: By the author

4. The empirical experiences: HIA as a tool for healthy public policy

With the concerns on the emerging conflicts in renewable energy project development, the Health System Research Institute has funded an action research project to apply the ideas of the Health Impact Assessment (HIA) for Healthy Public Policy (HPP) to the decision-making process. The main objectives are to contribute to the development of realistic public participation process in alternative energy development, and to support the common decision-making process as a conflict resolution.

4.1 The field study and discussions with the stakeholders in the local area

The researcher has translated the ideas on HIA for HPP as a proposal comprising five issues to be developed and/or implemented by all parties concerned.

1) The Public Scoping on the potential impacts of the project
2) The Public Review of the project
3) The academic support to the Public Review process
4) The mechanism for monitoring the implementation and the compensation
5) The sharing of the project benefits

Then, we approached operators of 31 projects to discuss the issues in October 2002. Only one project operator, who developed four projects, responded. So we chose two projects, with looming conflict as case study.

The two are rice husk power plant projects in Nakorn Sawan and Singh Buri Province. The principal project designs are almost the same. The rice husk of 472 Ton/day or 138,000 Ton/year will be transported to the plant for generating 22 MW of electricity. The main differences of these two projects are project sites -- in Nakorn Sawan the site is in the rice field, while the site in Singh Buri is surrounded by villages and communities.

The researchers had several chances to introduce and explain each issue to the project developer. They also made several field visits for focus group meeting and discussion with both the projects' supporters and opponents from November-December 2002 in both cases.

At that time, the conflict between the supporters and opponents who had different views over the project impacts was already intense thanks to corruption and lack of transparency in surveying the project acceptance of the local people.

Therefore, the researchers chose to have separate meeting with each group but openly informed both sides of the meeting results every time.

4.2 The preparation process of the Public Scoping report

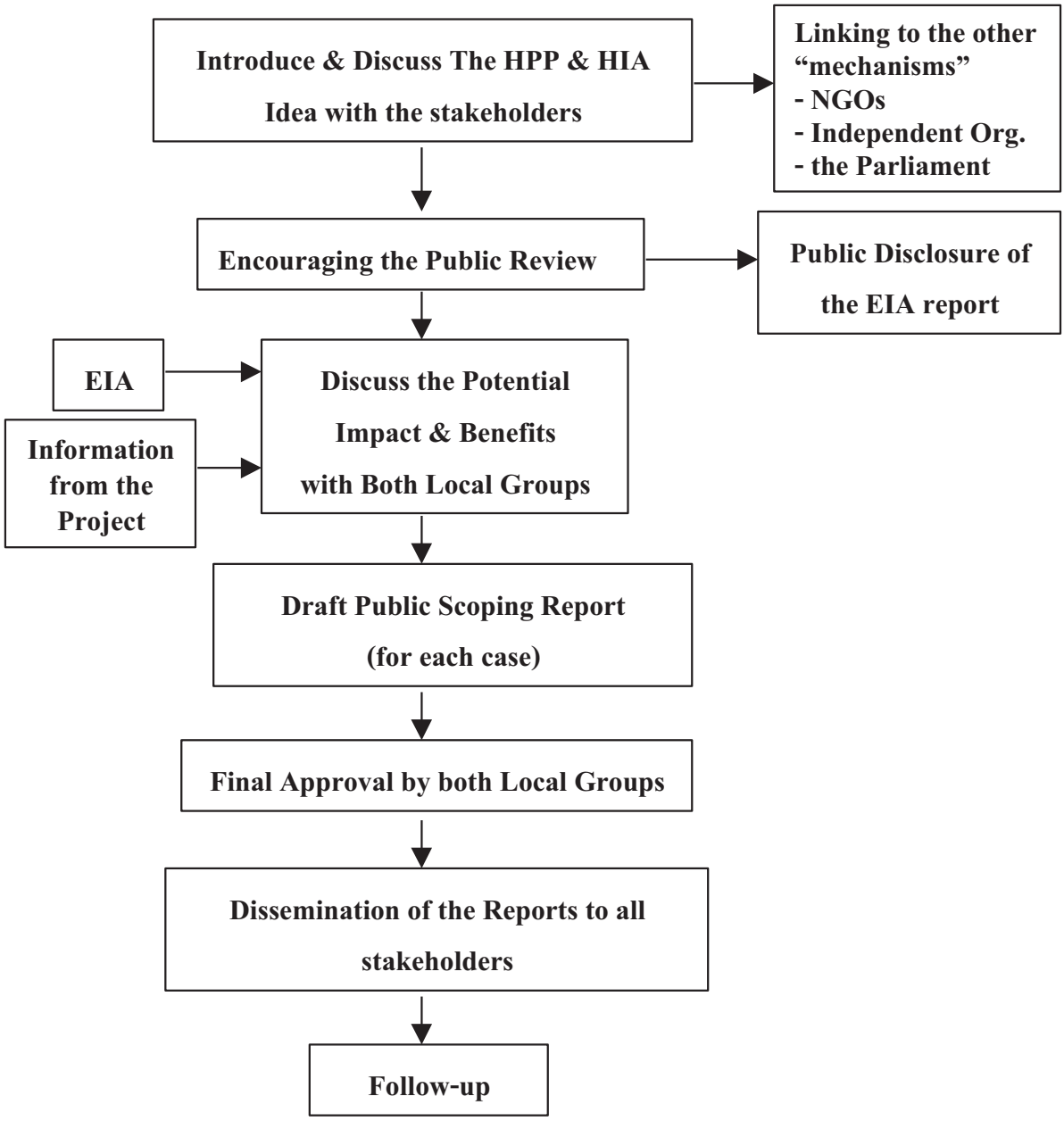
From discussions with both local groups, it was realised that there lacked of necessary information and/or analysis, especially on the potential impacts and benefits. At times, they became sensational and put the blame on the other.

Therefore, the Public Scoping report was produced for each case with the aim to express the local views from both sides on the potential impacts and benefits of the project to support the Public Review process. (Suphakit Nuntavorakarn, 2003)

The Public Scoping report was based on the information from the EIA report, the explanations of the project owner, and the information and opinions of the local people from both groups. Moreover, the final report was approved by both the supporters and opponents.

After that, the report was disseminated to all stakeholders and also a number of people and oganizations outside the energy field. These include the EIA reviewers, both local groups in the two cases, the local people in other cases of conflict, the project owners, the Energy Policy and Planning Office, the committee for the EIA system reform, the Provincial Environmental Department, the Human Rights Commission, NGOs, academics, etc.

Figure 5 The preparation process of the Public Scoping reports



Source: By the author

4.3 The impacts and consequences of the Public Scoping report

Firstly, the project developer decided to disclose the EIA report to the local people and other stakeholders at the same time they submitted to the Environment and Natural Resources Policy and Planning Office for approval. This is among the first cases involving public disclosure of the EIA report before the report was approved.

Based on the Public Scoping reports, it is clear that, in deed, the concern of the local people was not properly addressed and responded neither by the EIA nor by the information and explanations from the project owner. (Suphakit Nuntavorakarn, 2003) The main points are shown in Table 2

Table 2 The comparison of the main concerns of the local people with the EIA

Concerns of the local people	The EIA&the project explanations	The issue for public consideration
The project in Nakorn Sawan		
1. The impacts of the dust on their rice production	The precipitator has the efficiency of 99.5 percent and the average dust level is below the standard	The only 0.5 percent equals to 340 kg of dust per day. But no information about the impacts to the rice production.
2. Highly possible of severe flooding because of the enormous amount of water from different sources	Only mention in principle that *"the project will have appropriate drainage system"* and *"If the project blocks the natural waterway, the new waterway will be properly made."*	No data and the study on - different sources of water drained to the project site - The natural waterways in the site - The net water inflow and the total drainage capacity of the project

Table 2 (cont.) The comparison of the main concerns of the local people with the EIA

Concerns of the local people	The EIA & the project explanations	The issue for public consideration
The project in Singh Buri Province		
1. The project site is in the heart of the sub-district and next to a village of 119 inhabitants.	Specified that one criteria for site selection is *"far from dense residential area"*.	
2. High risks of accident from the transportation of the fuel, rice husk, by big trucks	*"The transportation of rice husk by big trucks will cause no impacts on traffic jam."*	No data and the study on the risks of accident

Table 2 (cont.) The comparison of the main concerns of the local people with the EIA

Concerns of the local people	The EIA & the project explanations	The issue for public consideration
The project in Singh Buri Province		
3. Noise pollution because of the site is next to a village.	*"The average noise level during the construction period will be 69.6 decibel (A) which is lower than the standard level of 70 decibel (A)."*	The reference point for noise pollution is 1000 meter from the site, while that are 4 houses next to the site and the other 115 inhabitants are in the distance between 10-500 meter from the site

Table 2 (cont.) The comparison of the main concerns of the local people with the

Concerns of the local people	The EIA & the project explanations	The issue for public consideration
The common issues for both projects		
1. Once the project implemented, the local people cannot monitor the environmental measures through 25 years of the project lifetime.	There will be the Public Agreement Contract and the Environmental Compensation Fund. These will be responsible by the tri-parties committee comprising of the local administrations, the power plant, and the local people.	Many crucial issues have been not clear eg. the selection process and the number of the representatives, authority and function of the committee, direct monitoring by the local people, etc.

Source: Suphakit Nuntavorakarn, 2003

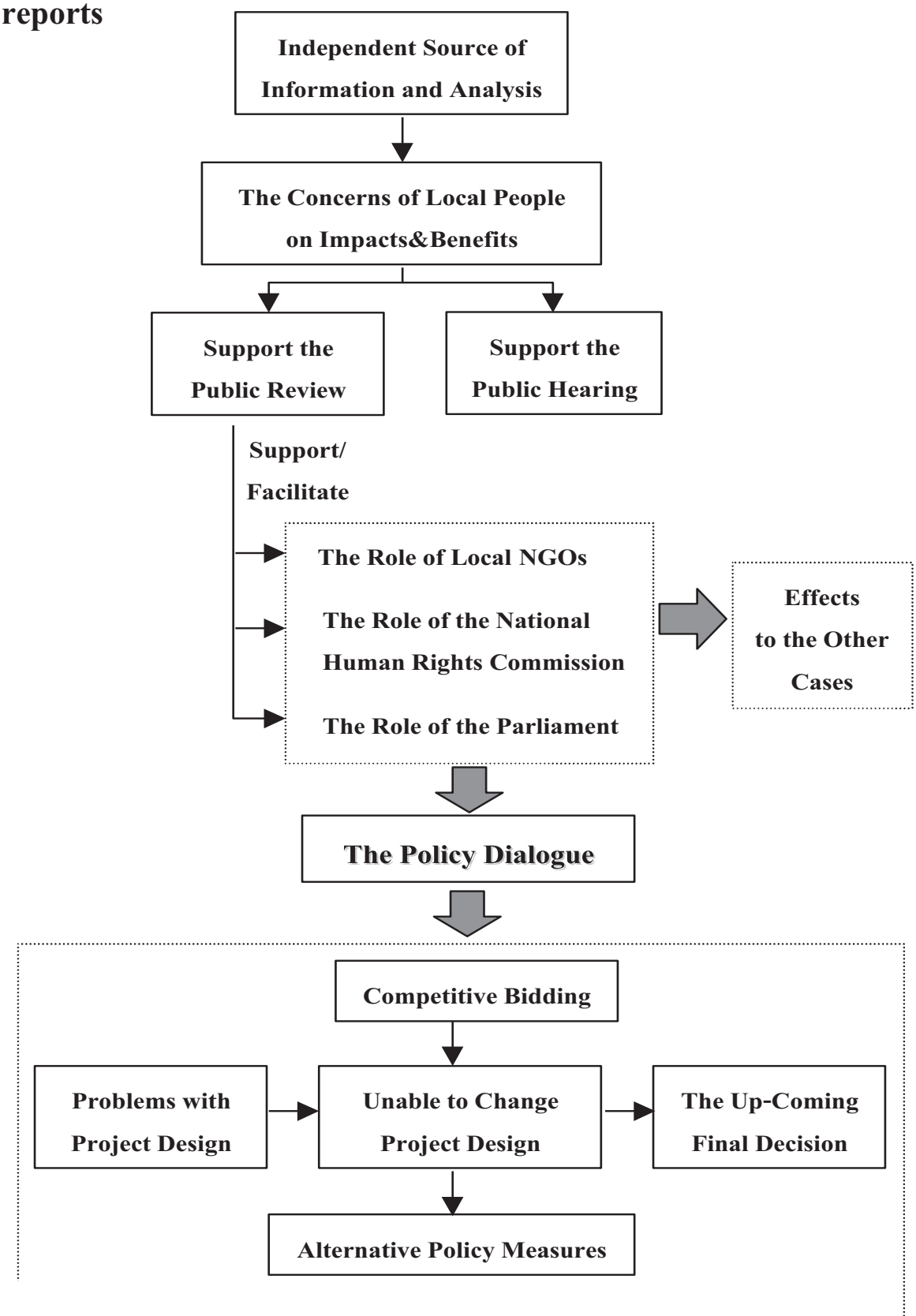
During the Public Review and the public hearing process, the local people, especially the opposition group, referred to the report in discussing the impacts with the others in different occasions, for example, during the field visit of the EIA reviewers in February 2003.

Furthermore, the information from the local people and also the issues to be considered was disseminated to the other actors involving in the process. The local NGOs cooperated with the local radio network to provide information and issues to the local people. The Human Rights Commission, the EIA reviewers, and the Energy Policy and Planning Office, received the Public Scoping report for consideration. But the exact results were still to be followed.

However, the project owner eventually decided to end the project in Singh Buri Province because they needed to buy more land and the price was just too high.

Lastly, the local people in the other case of conflict produced their own 'Public Scoping report' and disseminated it to the main stakeholders in the process.

Figure 6 The impacts and consequences of the Public Scoping reports



Source: By the author

4.4 The policy dialogue

During the discussion with the local people and other stakeholders, it was clear that a number of issues could not be solved at the project level as they were either set up or limited by the policy measure. Therefore, the policy dialogue was held in May 2003 by the research project together with the National Human Rights Commission.

The participants came from a wide range of sectors, including the Energy Planning and Policy Office, the project developers, the local people from six project sites where conflicts had erupted, the sub-committee of the senate on public participation, governmental departments, NGOs, academics, mass media, etc.

One of the most serious problems is the limitation in changing the project design because of the competitive bidding system. The Energy Policy and Planning Office explained that it was not able to allow for the change the design, or that would be unfair to those whose proposals failed in the bidding process. This was because had these proposals been changed, they would have emerged the winning proposals. In some cases, this put the project developer and the local people in a deadlock situation as they had to choose between accepting or cancelling the project.

Therefore, at least two solutions are proposed. First, the public participation and common decision-making process have to be finished before any project operator can submit the proposal for the bidding. The second proposal focuses on the alternative policy

measures that impose no restriction on public participation process, such as the Price Guarantee subsidy.

5. Discussion: The public participation process

5.1 The main issues at the project level

1) At present, the consultant company, which is hired by the project owner is the one who chooses the issues to be covered in the EIA study following the general guideline by the Office of the Natural Resources and Environment Planning and Policy. In many cases, this has resulted in the exclusion of the significant issues that cause concern in the local people or the other stakeholders. Therefore, **Public Scoping** is crucial to ensuring that the local people's concern is carefully considered and answered with data and analysis.
2) The **availability of information from different sources** to the local people will be the basis for better understanding and the effective examination of the project. Especially, the alternatives to the project, for instance, in term of site, size, technology, environmental measures, will support the comprehensive discussion and the decision making about the project.
3) Even though some information is already available, the capacity of the local people and other civil society organizations to analyze and make use of the information is limited. Moreover, in many cases, they cannot efficiently influence the process mainly due to lower bargaining power

and negotiation capability. Therefore, **capacity building on information analysis and negotiation in the process**

4) particularly for local people and the civil society will contribute to the more meaningful public participation.

5) To assure that the local people's concern is properly considered and answered with data and analysis, **Public Review** of the EIA report is necessary. However, the Public Review should not be limited only on the EIA process but also the other aspects of the project and the process, for instance, the protection of human rights.

6) The acceptance of the project by mean of percentage evaluation has intensified the conflicts and become problematic on its own. Both local groups tend to focus on amassing supporters on their side more than discussing the content of the issues. Moreover, the people can change their mind according to new information, so it is highly possible that two surveys may show contradictory results. The more desirable solution is **the process of common decision making**, where various information and analysis are discussed by various groups in various occasions.

5.2 The issues for renewable energy development policy

1) Renewable energy development policy in Thailand has been focused mainly on economic and, to some extent, environmental aspect. There have been policy objectives to reduce energy import, stabilize electricity tariff, support technological development, and protect the environment.

However, **the social aspect** has not yet been incorporated in the policy.

There are two important issues. Firstly, social mechanisms for monitoring the impacts should be developed. The mechanisms should also play an important role in imposing penalties and fair compensation in case there are environmental or social impacts.

Secondly, the economic benefits should not be limited only at the national or macro level. The contribution to local and community economic development should be an important objective of renewable energy policy. There are cases which prove that the local people can manage the energy system in their community by themselves by mean of the local energy planning process.

2) The policy measure of competitive bidding fundamentally limits the public participation process. The process involving project design submission is too rigid as it prohibits any changes after the bidding -- even though for the sake of conflict resolution or project improvement. In addition, the time frame for public participation and public decision process is limited by the bidding schedule.

The alternative policy measures exist, for example, price guarantee for electricity for renewable energy. This subsidy method will open the opportunity for public participation in project design, which is very crucial for the whole process. Furthermore, this will put no time limit on project development

and public decision process, as each project that can generate electricity will receive the subsidy anyway.

Concerning the public participation in project design, Strategic Environmental Assessment (SEA) is needed to provide the important information and analysis for the stakeholders and strengthen the discussion process.

3) Land zoning

The study indicates that the opponents in Nakorn Sawan and Singh Buri don't reject the utilization of renewable energy. But they oppose the project design, citing inappropriate project sites, one is next to the residential area, and the other is in the fertile rice plain area.

Therefore, **the land zoning policy** should be effectively implemented to control the site selection. This should be done not only on the power plant project but also the other industrial development.

4) The EIA process and the monitoring mechanisms

The present EIA process in Thailand has several weak points and problems. Some of the main issues are the study at the project level only, the screening criteria that some types of project do not have to conduct the EIA, no study on accumulated impacts, no effective monitoring for the mitigation measures, and the lack of meaningful public participation.

Hence, the current EIA system reform is very important to improving the EIA to make it an effective tool for providing comprehensive and reliable information and assessment of the potential impacts of a project. Nevertheless, it is clear that Public Scoping and Public Review are the two important requirements for any EIA studies.

Regarding the monitoring system for project implementation, there are many experiences in Thai society showing that only high technology cannot prevent the pollution if there is no **social mechanism** to govern the project. Therefore, the development of various social mechanisms to monitor the implementation and enforcing compensation for any environmental and social damages is crucial for building and strengthening public confidence on any project.

6. Conclusion

The policy measure that was initiated by the government in 2000, to subsidy the price of electricity from renewable energy has resulted in 31 projects being implemented. Even though these projects will utilize renewable energy and have smaller project size comparing with the centralized fossil fuel power plant, many of them still face with oppositions of the local people.

The ideas of the Health Impact Assessment for healthy public policy have been applied to the two cases of conflict with the aim to support the public participation process as a conflict resolution. These ideas have been introduced to all stakeholders and several

discussions with both the supporters and the opponents of the local people have taken place. It has been found that the main causes of conflicts are related to the issues of information on the potential impacts of the project and the surveying on the project acceptance of the local people.

The Public Review process has started with the public disclosure of the EIA report by the project owner. Consequently, the Public Scoping reports have been produced for each case based on the information from the local groups from both sides, the EIA report, and the information from the project developer. The report has played an important role in disseminating the information of the local people to the other stakeholders in the process. At the same time, the local people have the independent source of information and analysis on the potential impacts and benefits of the project.

Therefore, the Public Scoping and the Public Review are crucial for public participation process to guarantee that the concerns of the local people are appropriately addressed and responded with data and analysis. Moreover, the other necessary improvements in the public participation process include the availability of alternative sources of information to the local people, capacity-building for information analysis and negotiation in the process, as well as the evaluation framework of the project acceptance.

At the policy level, the competitive bidding method has posed significant limitations to the public participation process, especially the participation in project design. Thus, more rules are

needed to assure the effective public participation process, or the alternative policy measures such as Price Guarantee, will have no restriction on public participation process.

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