

PROCEEDINGS

SEMINAR ON

DEVELOPMENT RESEARCH AND NATIONAL DEVELOPMENT

Bangkok, 1984

DECEMBER 1 - 2, 1984

Volume 1

Position Papers 1 - 4

- (a) THAILAND DEVELOPMENT RESEARCH INSTITUTE
- (b) Seminar on development research and national development, Bangkok, 1984
- L Proceedings . . .



(a)

**THAILAND DEVELOPMENT RESEARCH INSTITUTE**  
RAJAPARK BUILDING 163 ASOKE ROAD BANGKOK 10110 THAILAND  
TEL. 258-9027-29, 258-9013 TELEX 20666 RAJAPBS TH

PROCEEDINGS

SEMINAR ON

DEVELOPMENT RESEARCH AND NATIONAL DEVELOPMENT

Zangkok,  
1984

DECEMBER 1 - 2, 1984



IDS Documentation & Library Centre  
University of Sussex  
Falmer Brighton BN1 9RE, UK

PLEASE RETURN BY:

30/6/91

Volume 1

Position Papers 1 - 4

(a)

THAILAND DEVELOPMENT RESEARCH INSTITUTE

748

## CONTENTS

	Page
PREFACE	i
REPORT: Dr. Snoh Unakul, Chairman, TDRI Foundation	v
OPENING ADDRESS: H.E. Sanya Dhamasakdi, Chairman, Privy Council	viii
ADDRESS: H.E. John L. Paynter, The Ambassador of Canada	ix
DISCUSSION ON GENERAL ISSUES	xiv
POSITION PAPER NO.1: MACROECONOMIC POLICY	
I ABSTRACT	1-1
II THE PAPER: MACROECONOMIC POLICY	1-2
1. Introduction	1-2
2. The Present State of Macroeconomic Policy Framework	1-2
3. General Research Issues: Existing Policy Framework	1-4
4. Research for TDRI in Macroeconomic Policy	1-9
5. The Work Plan for the Outreach Program	1-23
6. Appendix	1-25
III ISSUES OF DISCUSSION	1-29
POSITION PAPER NO.2: AGRICULTURE AND RURAL DEVELOPMENT	
I ABSTRACT	2-1
II THE PAPER: AGRICULTURE AND RURAL DEVELOPMENT	2-2
1. Introduction	2-2
2. Current Research in Agriculture and Rural Development	2-2
3. Proposed Areas of Research	2-4
4. Work Plan	2-9
5. Tables	2-11

	Page
III ISSUES OF DISCUSSION	2-17
POSITION PAPER NO.3: INDUSTRY AND INTERNATIONAL TRADE	
I ABSTRACT	3-1
II THE PAPER: INDUSTRY AND INTERNATIONAL TRADE	3-2
1. Introduction	3-2
2. Industry	3-2
3. International Trade	3-7
III ISSUES OF DISCUSSION	3-10
POSITION PAPER NO. 4: NATURAL RESOURCES AND ENVIRONMENT	
ABSTRACT	4-1
● AGRICULTURAL RESOURCES	
I ABSTRACT	4-3
II THE PAPER: AGRICULTURAL RESOURCES	4-4
1. Introduction	4-4
2. The State of Agricultural Resources	4-6
3. Research and Policy Issues	4-15
4. The Role of the Thailand Development Research Institute	4-17
5. Appendices	4-18
APPENDIX A Land Resources	4-19
APPENDIX B Water Resource	4-40
APPENDIX C Forest Resource	4-59
III ISSUES OF DISCUSSION	4-67

	Page
● MINERAL RESOURCES	
I ABSTRACT	4-72
II THE PAPER: MINERAL RESOURCES	4-73
1. Introduction	4-73
2. Role of the Government in the Promotion of the Mineral Industry	4-74
3. Problems of the Industry	4-80
4. Policy Issues to Develop the Mineral Resource Industry	4-83
5. General Issues for Research	4-85
6. Priority Areas for Research for TDRI	4-87
7. Work Plan	4-89
8. Tables	4-91
III ISSUES OF DISCUSSION	4-98
● ENVIRONMENT	
I ABSTRACT	4-100
II THE PAPER: ENVIRONMENT	4-101
1. Introduction	4-101
2. The "Environment" Consciousness	4-103
3. Current Efforts on R & D in Environment	4-107
4. Constraints to Environmental Research	4-110
5. Regional and International Cooperation on Environment	4-112
6. General Policy Issues for Research	4-114
7. A National Resources Conservation and Management Strategy for Thailand	4-120
8. Conclusions	4-122
9. Appendix	4-124
III ISSUES OF DISCUSSION	4-128

## PREFACE

Thailand is accelerating its rate of change in all spheres, economic as well as cultural, political as well as social. The traditional Thai value structure and mode of behaviour, long accustomed to gradual adaptive changes, is under growing pressure to increase its rate of change in response to rapidly changing circumstances both within the country and in the world at large. New phenomena come into play, giving rise to new patterns of behaviour, and leading the country in unforeseen directions.

Amidst these evolving patterns of economic, political and cultural forces, the Government of Thailand finds itself in new and unexpected roles. Government action itself has become bound in complexity. Decision makers in the public sector, as well as leaders in the private sector, are finding it increasingly difficult to grasp the changing circumstances and to apply the limited energies available to precise and well-aimed responses to crises as well as to rapidly emerging new opportunities.

In spite of the traditional Thai adaptive spirit, there has been a growing awareness in Government central planning and decision-making circles, as well as among business leaders, of the need to strengthen the research and monitoring capacities which are the basis for informed decisions. The last decade has seen a considerable growth of research activities in the country, with a number of minor attempts to carry out research with a direct bearing on policy-making. Focussed policy research is still, however, in its infancy. Many important policies, both in the public sector and implicitly in the private sector, are rarely analyzed in sufficient depth. Many serious problems which are properly articulated fail to generate adequate policy responses, while many other problems remain largely intractable and ill-understood. Public agencies in charge of planning and policy-making, as well as line agencies charged with policy implementation, lack the resources,

both financial and human, for carrying out effective policy research. There are serious needs for new creative solutions to new problems, as well as for critical monitoring and evaluation of existing responses to changing circumstances.

What is needed is seen, therefore, as a sequence of research activities providing sufficient in depth data for informed decision, recommending efficient mechanisms for the conversion of the researched information into policy and the implementation of such policy, to be followed by well researched monitoring systems to study the effect of the policy on the people. The effect may well indicate a need for a modification of the policy due to various conditional changes, and at this point more research is required. And so the sequence is repeated until acceptable benefits to the country is obtained.

This is to be done through the conduct of research projects, commissioned by government central planning agencies, implementing agencies, as well as private sector institutions, international financial institutions and donor countries providing bilateral and multilateral assistance to Thailand.

These perceptions have been gradually translated into a decision to establish a national policy research institute in Thailand. The pivotal role envisioned for such an institute goes well beyond the conduct of research. It must function to create an atmosphere of credibility and trust in the ability of policy research to provide sensible and effective results. As such, it must promote closer relationships between researchers and decision-makers, and insure that research is of the highest possible standard. Such an institute must be a focus of intellectual activity, able to attract the best of minds into the policy research arena. It must promote respect for independent and non-partisan thinking and action, and remain free of bias and partiality. It must balance the need to remain close to decision-makers with the equally important need to remain uninvolved in the conduct of political affairs.

These considerations have been long in the minds of many, but have only very recently born fruit. The National Economic and Social Development Board (NESDB), the central planning and monitoring agency of the country, acted to establish an independent foundation, to be named the Thailand Development Research Institute (TDRI), to perform the central role of a national policy research institution. Following a Cabinet approval of the Board's initiative on April 24, 1984, the Government has demonstrated its strong support of this initiative in securing a substantial financial base for commencing the operation of the Institute. His Excellency, Prime Minister Prem Tinsulanonda, was instrumental in promoting the establishment of the Institute during his recent tour to Canada, and witnessed the signing of an agreement between Thailand and Canada, ensuring an operating fund for the Institute during its first five years.

The initial small working group for the institute selected seven priority areas and a Development Information Center deemed to be necessary for the development of the country. These are Macroeconomic Policy, Agriculture and Rural Development, Industry, Trade and International Economic Relations, Natural Resources and Environment, Human Resources and Social Development, Energy Infrastructure and Urban Development, Science and Technology, and a Development Information Center. However, with its small number of staff and as yet without a firm stand as to the research directions, TDRI felt a need to have an airing of possible directions to guide the Institute even in the simple task of recruitment. TDRI must shop around for the content of the big frame of policy research we have set out to do: good high-quality researchers and research agenda. Consequently, this seminar on "Development Research and National Development" was launched.

We have been very fortunate to have such a large number of experts to come and give their versions of directions of research in their particular fields for TDRI. Ideas and viewpoints were subjected to fruitful debates and discussions, and TDRI has already begun to digest the wealth of



information obtained from the seminar. It is hoped that with the digested information and the technical assistance TDRI is getting from consultants, a good framework of research activities can be drawn up for TDRI's first five-year operation.

The seminar has not only provided TDRI with substantive to-date development scenarios, but has also provided valuable viewpoints on policy research in general and thoughts and perceptions about TDRI in particular. Participants have been more than sincere in their offering of recommendations and warnings, and all in all TDRI could not have had a more whole-hearted support of all concerned. May I once again say "thank you very much".

Dr. Anat Arbhabhirama  
President

Bangkok  
June 1985

## REPORT

Seminar on "Development Research and National Development"  
convened by Thailand Development Research Institute

Dr. Snoh Unakul  
Chairman, TDRI Foundation

---

Your Excellency,

On behalf of the Thailand Development Research Institute please allow me to express our deep appreciation to Your Excellency's kind consent to preside over the opening of the Seminar this morning.

In view of its very recent formation as a new institute, and being the first of its kind in the country to concentrate on policy research for national development, may I have this opportunity to describe briefly the events that lead towards the establishment of TDRI.

Through the past decade, Thailand has been keenly aware of the need to utilize policy research for her national development, and consequently, centers and institutes dealing with economic and social development have been established. Yet, the fact remains that none of these centers and institutes have been able to conduct policy study on an integrated basis, encompassing essential aspects of development such as agriculture, industry, social, science and technology. It has been difficult for any single center or institute to pool multidisciplinary research resources together from both the public and the private sectors to provide much needed recommendations for the resolutions of development problems.

Thailand is currently entering a critical transitory threshold from an agrarian society into a semi-industrial society. For Thailand to develop and attain her noble goals, much will depend on appropriately practical policies. Development policy decision-making will be more

critical than it has ever been before. In order to meet this challenge, it was generally agreed that a special kind of institute is required -- an institute that will be a center for development policy studies, endowed with the ability to draw upon varied resources.

In 1981, the National Economic and Social Development Board (NESDB) commissioned the Thailand University Research Association (TURA) to undertake a feasibility study for an establishment of a policy research institute. The concurring expenses were kindly provided by the Ford Foundation.

In 1983, the Canadian International Development Agency (CIDA) provided experts to review and analyse the findings and recommendations put forth by the TURA feasibility study, for consideration by the Canadian Government. Their findings revealed a strong support for an establishment of such an institute. Subsequently, on April 11, 1984, an aid agreement between Canada and Thailand to support the TDRI Foundation was signed during the state visit to Canada by H.E. the Prime Minister.

With that support, TDRI has been established under the TDRI Foundation as a non-profit organization. The principal officers are Dr. Snoh Unakul, as Chairman of the Board of Directors, and Dr. Anat Arbhabhirama, as President of the Institute.

To support the operating cost of the institute during the initial five-year period, the government of Canada gave a grant sum of Canadian \$4.48 million. The Institute has also approached the Government of Japan for a grant-in-aid for the construction of its permanent headquarters plus other appropriate assistance. The Government of the United States has also been requested to assist through its fund on "Emerging Problems of Development" that would help strengthen the institute's research capability, both in the main policy research and other necessary related activities.

TDRI has planned its activities with a goal that within this initial five-year period, the Institute will serve the planning staff as a "think-tank" for development policy, and hopes that the work to be conducted will be of value for the policy decision-making process.

The objective of this seminar is to bring together research workers, technologists and development workers with different expertise, to help pave TDRI's research directions in the chosen priority fields of: macro-economics; agriculture and rural development; industry, trade and international economic relations; energy, infrastructure and urban development; science and technology; natural resources and environment; human resources and social development; and the development information center.

This seminar is made possible through the excellent cooperation of all concerned, both from the public and the private sectors, and through the financial support from the USAID. TDRI wishes to record its thanks and gratitude to all these helpful people on this occasion.

The time is indeed auspicious, may I now ask for your kindness, Your Excellency, to declare open the Seminar, so that all of us assembled here would be so honored.

Thank you, Your Excellency

OPENING ADDRESS

Seminar on "Development Research and National Development"

convened by Thailand Development Research Institute

H.E. Sanya Dharmasakdi

Chairman, Privy Council

---

Mr. Chairman of the TDRI Foundation,  
Your Excellencies the Ambassadors,  
Ladies and Gentlemen,

I am very pleased and honored to preside over this important seminar.

I agree with Mr. Chairman of the Foundation that appropriate policy is truly needed to keep the country's development on course. It requires meticulous studies on all aspects of development, and therefore, the establishment of The Thailand Development Research Institute, as reported by Mr. Chairman is very appropriate and timely to meet the needs of our country.

However, the founding of TDRI may not have been realized if Thailand did not have cooperation and support from our friends -- especially from the Governments of Canada, the United States and Japan. I wish to express my appreciation to the three countries on this significant occasion.

The gathering of so many researchers, technologists, and experienced development experts here today is indeed special for the institute, and I would like to entertain the hope that the outcome of your deliberations will be valuable for the ensuing work of the Institute.

It is now an auspicious moment for TDRI and I declare the Seminar open

Best wishes to all of you and to the success of the Seminar.

## ADDRESS

Seminar on "Development Research and National Development"  
convened by Thailand Development Research Institute

H.E. John L. Paynter  
The Ambassador of Canada

---

It is a particular honour and pleasure for me to have the opportunity to participate in this important and even historic meeting. Indeed, it was just two and a half years ago that Canada participated with Thailand in another seminar here in Pattaya to begin to plan the project that ultimately resulted in the Thailand Development Research Institute.

It was a privilege and a pleasure for us to work with our Thai friends and partners on that project: a privilege because Canada was able to share in an historic occasion in shaping Thailand's development future; and a pleasure because of the spirit of openness and cooperation that characterized the dialogue. It is therefore particularly gratifying to see that spirit of consultation and frankness which characterized the planning of TDRI will also be a hallmark of its actual operations.

And, since those days, the TDRI team has grown-- and I am delighted that our American friends and other donors are also joining the TDRI experience. We are also very pleased to see so many eminent Thai as well as international experts and scholars here today to share the exciting task of working with TDRI and make some contribution to the solution of those critical issues which will shape Thailand's development.

We are only 15 years away from the year 2000 and the end of a century that has seen extraordinary technical advances. Mankind now has powerful technical resources at its disposal -- but how those resources are used depends not on the technocrats, but the policy makers. We need now to ensure that the advanced technologies serve humanity if we, as a society, are to solve the human problems.

There has been extensive investment in the research and scientific institutions advancing modern technologies. However, the enormous potential of these technical breakthroughs has not been harnessed to solve the critical human problems of this century.

Mankind is being confronted with problems of gigantic proportions -- poverty, population growth, environmental deterioration, resource depletion, unmanageable urban centres, land limitations. But these problems not only require technical solutions, they require human solutions -- leadership, commitment, imaginative policy measures and the spirit of international cooperation. If we do nothing to address these problems, we are denying our responsibilities to our future generations. TDRI is an institution that accepts this responsibility -- to search for ways in which our modern technologies can be the servant of innovative, forward thinking.

Canada and Thailand share many interests. As trading nations with considerable natural and human resources, our development is intricately woven into the international community of nations. More than any time in the past history of the world, nations are inter-knit in a global system by trade and investment, communication and transport networks, tourism, sport, music, entertainment, by common problems such as atmospheric and oceanic pollution, and the threat of war.

We share a common destiny and must work together, both as friends and as partners, to ensure that it is a future worth sharing. It is in everyone's interest to address our problems on a national scale and then to look beyond our borders to the regional and global realm. Human survival depends on the capacity of human initiative and commitment to create the policies, strategies and institutions necessary to be prepared for and deal with the challenges of the year 2000.

Mankind needs forward thinkers to plan for the colossal changes that lie ahead in such vast fields as population, food, energy and the environment. These thinkers must have the capacity to plan across extended time horizons, since the real impact of their decisions will come not today but in the world of tomorrow, and even of the next century.

These global issues -- rural development, international trade, natural resources, human and social development, science and technology, energy and urban development -- are part of the TDRI workplan being discussed this week-end. They are also part of the international agenda. The work that goes on under TDRI will not only serve Thailand; the search for breakthroughs and measures to address these issues can also be transferred to serve the regional and global community as it struggles with the same problems.

For the agenda of the seminar here this week-end, it could be an agenda for any country in the world. The issues identified are those being faced by industrialized and developing countries alike, and those that require national and international cooperation for their resolution. It is thus most appropriate that TDRI seeks to bring together the best thinkers in Thailand and the international community to serve on its Council of Trustees and to participate in this important seminar to formulate a workplan for the future.

Those of us that are fortunate enough to be involved in this experience may perhaps be able to make some contribution, however small, to Thailand's future. However, the benefits which we receive from our participation will also undoubtedly serve our own nations as well in their search for solutions to these problems.

Too often policy research is done on specific topics in isolation from other issues, or practical realities. In the complex world of today, there is no isolation - of issues or peoples. We no longer take the simplistic view that the key to development is only economic growth or "getting the price right" as some economists used to tell us. But we



do believe that "getting the policy right" is essential to successful achievement of development goals that reflect not only quantitative achievement, but look closely at qualitative considerations.

Thailand has experienced exceptional growth over the past two decades. But, as the TDRI agenda indicates, the nature of development itself is the critical issue for Thai policy makers, not only growth per se. Economic issues, social issues, environmental issues, urban and rural issues have equal time in the discussions for this week-end.

The imagination and foresight which marked the founding of TDRI promises to put Thailand in the forefront of innovation in development. TDRI can be an example for Asia, indeed for the entire world -- a model for development research, a model that recognizes the holistic nature of development, the need to address the crises of tomorrow by foresight and action today, the need for national and international cooperation, and the mobilization of the community of mankind to address these issues.

The longterm success of a new institution is usually determined by its performance in the initial five years. The innovative and ambitious program that TDRI has set for itself, the commitment and dedication of Dr. Snoh and his Board of Directors, and the talented resources brought together here today to address that challenge, augurs well for the long term success of TDRI.

I personally am very grateful for the opportunity to be involved in this exciting venture. Although it is with a sense of both responsibility and modesty that I look forward to participating in the deliberations, I know I will come away stimulated and enriched by the experience.

Indeed, as someone once remarked about the founding of another organization, it is a real honour both for myself and my country to be "present at the creation" -- and to have been privileged to make some contribution to the birth.

Thank you very much.

## DISCUSSION ON GENERAL ISSUES

- Thoughts and perceptions about TDRI as a policy research institute

## Issue 1 TDRI's non-partisan nature

Comment 1: It is very important for TDRI to be free from any form of control by the government, donors or foreign organizations. TDRI as a policy research institute must maintain clear objectives and a willingness to obtain and give cooperation with a non-partisan view. The services of TDRI should be charged sufficiently to enable the operation on an independent basis but at the same time as a non-profit institute.

Comment 2: TDRI needs the support and cooperation of the NESDB, but TDRI's work must not be confused with the work of the NESDB. Although the work done at TDRI does have some association with some aspects of the Sixth Five-Year Plan, TDRI will not be involved in the decisions of the plan. TDRI and NESDB will have to work together for a common interest of the country's development.

Comment 3: TDRI must keep a good balanced relation between the public sector, the private sector and foreign organizations.

Comment 4: By working as a coordinator for the 'data bank' system, TDRI must avoid multiplicity and overlapping work. TDRI should be conscious of producing good quality research work by maintaining its non-alignment strategy and insisting on utmost academic freedom.

Issue 2 TDRI as the pivot for policy research and dissemination

Comment 1: Thailand does not lack experts to do research in development when compared with other countries in the region. What is lacking is the capability to have all the experts working together for the development of the country. TDRI should concentrate on how to mobilize all these manpower resources to produce good work, both at the personal and at the institutes' level since a large number of them have already engaged in research work of various development fields.

The question is how does everyone come together. Usually people come together to work for a common goal, and it is hoped that TDRI's goal will be that of quality research. We must not come together at the expense of quality, the common goal must be quality.

Comment 2: TDRI's role should be to support and promote policy research in all institutions and organizations particularly universities. It should act as a coordinator coordinating and integrating the research activities of the country.

Comment 3: The research at TDRI should be in-depth attempting to identify problems, policy solutions and effective measures for the implementation of the policy. TDRI must make clear to all agencies concerned that TDRI's roles are those of a catalyst, a coordinator and not of an investigator nor just another new research agency.

Comment 4: TDRI's part in the country's policy making can be summarized as having to engage in promoting research for development, conducting the studies, and disseminating the results. Through dissemination, reactions on the findings will be triggered and at least there will be some mental involvement

among the people concerned which may lead to an acceptance or a non-acceptance of the findings. An acceptance will bring about a process of change inducing many people to believe in the same thing, and finally to making them work for the same objective. TDRI can play an important role in that process of change through the dissemination process.

Comment 5: TDRI should be the disseminating center of policy research. Through publications and seminars, policies can be disseminated, knowledge can be propagated and ideas of the experienced can be shared.

Issue 3 TDRI's clients and marketing strategy

Comment: It is important to consider the marketing aspects starting at the identification of TDRI's clients. TDRI must then establish a framework whereby the taste and preference of the customers are considered in designing various project activities; but always with the basic neutral attitude. TDRI must be aware of various prejudices and decide from the very beginning whether such prejudices are acceptable and whether the project should be undertaken.

Issue 4 Whether the donation to TDRI is tax deductible

Comment: Only donations to some foundations are tax deductible. At present there are only forty organizations to which the donations are tax deductible. Therefore for the assistance of TDRI it was suggested that the Government be requested to put TDRI on the list of tax-deductible-donation organizations.

## Issue 5 TDRI's communication

Comment: TDRI should establish a communication linkage, perhaps through a liaison officer, with various government units, so that both TDRI and the government units know the demand, supply of policy research.

TDRI should not only let the public know what is on its agenda, but should also ask for the market's needs for research. Some of the needs may be satisfied by TDRI's capacity but some may require the cooperation of other institutes.

The same type of communication is just as important for the private sector.

## • Policy research in general

### Issue 1 The multidisciplinary nature of policy research

Comment 1: There is a strong need for policy research to have an integrated approach. All or as many of the development factors whether they be social, economic, or technical, should be kept in mind when addressing a development policy issue. It should be carried out with a multidisciplinary nature. Goals must be set, and research projects should be carefully structured and aimed towards the same goals.

Comment 2: The planning of any research project should incorporate the concept of "balance of development" maintaining a good relationship between social, political, administrative and economic development parameters.

Comment 3: In defining various research projects, TDRI must make an effort to maximize the interrelated nature of the projects. In this way there will be less redundancy, more sharing of data, facilities and cost.

Issue 2 The human element (especially rural)

Comment: In undertaking any type of development research work it is very important to identify all potential resources. A good example is the potential of the people in the rural areas. In the past, the rural people have been somewhat inhibited in their development role. This was probably due to lack of support, encouragement and incentive for their involvement in development planning. It is generally recognized that if the culture, the traditions and the mental state of the people are duly considered in development planning, the ensuing policies are likely to be more practicable and successful.

Issue 3 The negative approach to research

Comment: The affirmative approach to research i.e., what the government should do, should now take an opposite turn by researching on what the government should not do, especially in the provision of educational and public health facilities in the rural areas.

Issue 4 Involvement of policy makers

Comment: Too little attention has been devoted to development agenda-setting i.e., the process of deciding which questions are important for research. If policy makers consider the results of research to be useful tools for policy decisions, they must be more involved in deciding the issues for research.

- Comments and Recommendations about the seven research programs at TDRI

Comment 1: Experts have a tendency to concentrate on their own specialized fields which is primarily the reason why the inter-relatedness and transectoral nature of different fields have been neglected in the past. It is important that the research areas at TDRI be treated in a related manner at least in the long run.

Comment 2: To have an overall research program that addresses the major questions of Thailand's development instead of undertaking a series of ad hoc studies will dictate that individual research studies be related to each other. But the mechanism to achieve this goal is not easily designed given the ad hoc nature of research in the past and the existing resource constraints. Nevertheless TDRI must strive to achieve the overall related approach to policy research.

Comment 3: For each of the programs, TDRI must safeguard against being bogged down in a multitude of detailed research proposals, otherwise deciding on priority becomes an added burden.

Comment 4: It is important to know how the research priorities of TDRI are related to the needs of the NESDB, the sectoral ministries, the private sector and the Thai population as a whole.

Comment 5: Any policy research must identify the manner in which the results can be utilized, can help improve policy-making and development planning, can evaluate existing or proposed policies and programs and can benefit the people of Thailand.

Comment 6: The human factor has to be well considered when designing each research study because policies will have repercussions and direct bearing on the people.



## Issue 5 Development Research vs. Policy Research

Comment: The difference between development research and policy research is that development research is normally conducted by institutions and government agencies with the objective of improving technical know-how, efficiency and improving commodity-productivity; whereas in policy research, the objective is to take the results of these technical know-how, including other factors, both social and economic and integrate them with the policy environment so that recommendations could be presented to the government. By scope, policy research is wider than development research.

"Development Research and National Development"

Position Paper No. 1

MACROECONOMIC POLICY

by

Virabongsa Ramangkura  
Piyasvasti Amranand  
Chaiwat Wibulsawasdi  
Teera Ashakul  
Bandid Nijathaworn

I ABSTRACT

Over the last twenty years, several changes have occurred that have altered the picture of a limited governmental role in Thailand's macroeconomic policy-making environment. Whereas before, the Thai Government intervention stressed on economic stabilization, e.g., fiscal, monetary, and exchange rate realignment, and on direct regulation over areas where it was thought that the economic system could not cope such as the provision of basic infrastructural facilities. This role at present has expanded at a level where the Government is now expected to lead, to coordinate, to assist and to regulate many facets of economic life. A further change in macroeconomic framework reflects an expanded and more complex international interrelationships intensified by the emergence of energy issues, the more closely integrated economy as a whole and, the growing number of international agencies and their functions. In social issues such as minimum wage, public utility pricing and poverty eradication, the range of macroeconomic decisions have also expanded. Further to which, more complex demands are now being made on the making of macroeconomic policy, because there is a changed community understanding and awareness of at least what is happening throughout the economy and overseas coupled by a growing concern to be involved in the decision-making process. With a more sophisticated economic structure, the country now needs a formal approach to its macroeconomic policy-making. Such approach involves the basic relationships between policy objectives and instruments. However there are substantial gaps in the major prerequisites to this approach, among them are two critical ones: the unavailability of relevant macroeconomic data and the inadequacy of analyses. TDRI seeks to fill these gaps. The paper discusses five main research programs for TDRI for a four-year period in the macroeconomic research program viz., Development of a Macro-Data Bank, Short-Term Macroeconomic Stabilization Model, Basic Research in Macroeconomic Issues, Medium-Term Macroeconomic Studies, and Long-Term Macroeconomic Perspective. TDRI, as a policy consultative

and investigative machinery, hopes that the successful completion of these research programs shall be able to significantly contribute to the macroeconomic environment of the country.

## II THE PAPER: MACROECONOMIC POLICY

### 1. Introduction

In the last twenty years since the inception of the First Development Plan (1961-1966), broad changes have occurred in the community's perception of the Government's role in macroeconomic policy-making. Compared with the pre-war period, there has been a change from a situation in which only in a very limited sense was the Government generally accepted as a leader and coordinator of overall economic activity, to a situation in which the Government is expected to provide a framework within which the economy could efficiently operate. The Government is now expected to lead, to coordinate, to assist, and to regulate many facets of economic life. These expectations led to a recognition by the Government that it must participate more extensively in maintaining a healthy economic environment on the assumptions that major imbalances arising in the domestic economy would not be largely self-correcting.

### 2. The Present State of Macroeconomic Policy Framework

In the past, much of the intervention by the Thai Government in the areas of macroeconomic policy was limited to two broad categories: those concerned with economic stabilization, where decisions were of the nature of fiscal, monetary, and exchange rate adjustments; and, those concerned with direct regulation in the areas where it was

thought that the economic system could not cope, such as the provision of basic infrastructural facilities. The sophistication of Thailand's economic development has now reached a level where there is a mounting pressure on the Government to accept more direct responsibilities in each major area of economic activity. A lucid example of this is a change from a macro-policy that sought to provide assistance through fiscal incentives to influence the details of private industry performance, to acceptance that, this approach was inadequate and that the Government had to assist directly through the provision of financial assistance and negotiation of trade concessions. In perspective, macro-economic decisions now seem to have a greater qualitative and discretionary content.

A further change in macroeconomic policy framework reflects expanded and more complex international interrelationships. Thailand has always been closely involved in the international arena in trade and, to a lesser degree, in the field of finance. A change in intensity has occurred arising from the emergence of energy issues, the more closely integrated international economy as a whole, and the growing number of international agencies and their functions. Consequently, many more domestic, economic and social issues are of international significance. Some of these, such as public foreign borrowing policy and economic obligations arising from membership of the World Bank and the International Monetary Fund (IMF), operate at the highest levels of government while other issues, such as those concerning the food export standards, are at more technical levels.

The change in the macroeconomic policy framework also shows up in the accepted need for Government involvement in issues relating to social compensation. Determination of relevant minimum wage level, pricing of public utilities, and implementation of poverty-eradication program are some of the most recent examples of such extensions. In each of these cases, there has been an extension of the range and number of macroeconomic decisions to be made.

Finally, there is a changed community understanding and awareness of at least what is happening throughout the economy and overseas and a growing concern to be involved in the decision-making process. This change indicates that the major economic issues that have to be understood by the community are increasingly complex. Issues such as exchange rate realignment is known to be of considerable importance, yet the range of economic and non-economic issues that have to be understood in order to make a sensible judgement in this issue is very wide. These difficulties are compounded by the fact that problems which may appear straightforward will have answers, far from intuitively obvious, often with side effects which are totally unexpected. It is within this broad change in community understanding and expectation that more complex demands are now being made on the making of macro-economic policy.

### 3. General Research Issues: Existing Policy Framework

Macroeconomic policy is a highly integrated and interconnected process. Within Thailand's system of government, decision-making on macroeconomic policy issues is, at least in principle, in the domain of Ministers. The manner in which these decisions are made including the extent of the availability of policy machinery and how this machinery is used is the real critical determinant of how effective the decision-making process is.

Policy decisions at the ministerial level, either made individually by a Minister or made by Ministers acting collectively, usually as a Cabinet, rely a great deal on information and analyses made available to them by the departments concerned. Prior to the discussion at the ministerial level, the basic contexts in which policy options are made is formulated through the coordination and consultation between department heads, key experts from private sector, and specialized academic analysts. It is at this level that the most recent information, results of analyses, experience and viewpoints are exchanged and discussed in an attempt to yield a course of policy actions that are deemed appro-

priate under specific decision-making situations. These coordination and consultation procedures are the cornerstones of macroeconomic policy-making in Thailand at the present time.

Such approach to macroeconomic policy has been useful in dealing with problem issues which have limited broad implications, and of which the associated level of analysis is not demanding. The approach, however, proves to be an inadequate framework when the issues under consideration involve a greater level of technical complexity, and of which the implications are of a much wider signification. A typical situation is when there are multiple macroeconomic objectives to be considered and a set of policy instruments to be adjusted. In such a situation, a measure designed to improve the efficiency of one objective may adversely affect the performance of other objectives. This property of interrelatedness between policy objectives and instruments, and the priorities in the achievement of objectives over time, make the issues of macroeconomic policy much more difficult to handle.

### 3.1 The Formal Approach to Macroeconomic Policy

Experience from overseas suggests that solutions to this type of problem can be facilitated from a formal approach to macroeconomic policy. Such an approach, typically embodied in sizable macroeconomic models, involves explicit identification of the quantitative relationships between policy objectives and instruments. Appropriate policy adjustments for a given set of policy objectives are determined from these empirical relationships. This approach to macroeconomic policy is currently being used in a number of countries for medium-term policy planning and as attempts to quantify the issues and choices to be made in the stabilization policies. Both the National Economic and Social Development Board (NESDB) and the Bank of Thailand (BOT), have experimented on this formal approach on a small-scale basis.

As a means to improve the understanding of the policy issues, and their interrelationships, this approach to macroeconomic policy should play an important role in the development of a systematic basis for

policy thinking in Thailand. In practice, however, there are substantial gaps in the major prerequisites that limit an effective extension of this formal approach. The more important ones among these gaps are the availability of relevant macroeconomic data, and the adequacy of analyses. These issues are elaborated below.

### 3.1.1 Availability of Data

An important prerequisite for effective policy analysis is accurate, reliable, and timely basic data collected and compiled systematically across the range of economic activities in which the Government is, or may need to become, concerned. Concern with the data base will include the coverage of statistical services, accessibility to data collected, the speed with which it is made available and the extent to which integrated services are used and accepted. From many points of view, the body of economic statistics available for Thailand can be regarded as one of the most complete for developing countries. Yet, despite this noted achievement, there are two major aspects of statistical development which give cause for concern, particularly with respect to the relevance and the usefulness of a good deal of these data in terms of their ability to assist macroeconomic policy analysis.

Firstly, there remain serious gaps in the availability of macroeconomic data at a disaggregated level. In this paper, we have not attempted to construct a comprehensive list of these gaps but the list would include: an up-to-date input-output table; sectoral investment and capital stock statistics; and production and inventory indexes which improve the timeliness of our knowledge of short-term business fluctuations. These gaps are of critical importance. For example, a lack of adequate information on sectoral investment makes it difficult to assess the impacts of government policy on the formation of production capacity on a sectoral level.

Secondly, there is a frequently voiced contention that, despite the enormous expansion in the availability of macroeconomic data, the

available data are not documented in the manner which can be effectively utilized for rigorous macroeconomic analysis. The most relevant problem is the lack of a systematic data organization that can facilitate effective utilization of the available information. Policy formulation will obviously benefit with greater internal integration of statistical data and with internal coordination of data collection within the government system.

## 1.2 Availability of Analyses

Given the large influence that macroeconomic management policies have on the economy, continuing and detailed empirical analyses of these issues is of considerable importance. At present, the existing capacity for such continuing analyses seems small given its potential importance. This problem is reflected partly in the extensive use by the Government of task forces, working groups, ad-hoc committees, consultants and the like. In many ways, such a procedure provides an effective means of re-examining a situation with limited restraints set by established methods, procedures, and existing ideas. In most institutional situations, however, such procedure has led to the use of the incremental approach to macroeconomic policy in the sense that changes are made at the margin rather than making major changes as would, otherwise, be contemplated.

A number of factors seem to contribute to the present lack of analyses. In the first place, there is a limited number of competent staff within the Government who could do much in the way of basic research. This limitation is in sharp contradiction to the rapid expansion of government involvement in economic affairs. For example, the issues of competition policy, the service industries, as well as all the sector policy, except perhaps agriculture and industry, are significantly lacking in detailed and continuing analyses. The importance of this gap in the range of analyses will continue to grow as the Government becomes a larger provider of economic output.



In the second place there exists only a few distinct research institutes or centers outside the government system that can provide the Government in the ways of alternative policy analyses and research. This problem contrasts strongly with overseas experience. The problem arises partly from the shortage in the supply of competent, empirically-oriented macroeconomic analysts outside universities and government. As a result, there is a limited involvement of non-academic economists in policy formation.

Extending the availability of macroeconomic information and enlarging the capacity for applied economic research in macroeconomic policy are the two important prerequisites to macroeconomic policy in Thailand at the present time. These are the major areas which require immediate attention. But, even with substantial improvements in these areas, such extensions in themselves are unlikely to be sufficient. Nor, will these extensions provide the Government with alternative viewpoints that are technically sound but, which stem from lines of thought and value assumptions different from those likely to be available within the government. Such viewpoints are likely to emerge from an institutionalized body that can expand the extent and the range of analyses on macroeconomic problems, and which can disseminate research activities to promote wide public debate in macroeconomic policy. TDRI seeks to fill this gap in macroeconomic policy-making.

### 3.2 The Role of TDRI in Macroeconomic Policy

The role of TDRI in macroeconomic policy will be tantamount to a role of a policy consultative and investigative machinery that exhibits utmost independent thinking and high-professional integrity. Its main function will be to provide high-quality research capacity to the Government and to publish reports and commentaries on macroeconomic policy with a view to widening public interest and discussion on macroeconomic issues. The specific objectives of TDRI in relation to macroeconomic policy will be:

- to provide an enlarged capacity for systematic policy-oriented review and research in macroeconomic policy;
- to provide a means by which forecasts of the short and medium-term economic situation can be published regularly;
- to publicly report the results of research activities and analyses and, to participate in public discussion and debate on the technical aspects of macroeconomic policy;
- and to provide a basis for expanding consultation between interest groups and policy makers both nationally and internationally.

The more important ones among a number of options available according to objectives seen as important for TDRI, are those listed above. These objectives will provide a broad framework on which research activities and the relevant outreach programs of TDRI will be structured. A program of research activities on macroeconomic policy is outlined in the next section. We hope that the successful completion of the research program will contribute significantly to improving the efficiency and the effectiveness of macroeconomic policy-making in Thailand.

#### 1. Research for TDRI in Macroeconomic Policy

The following paragraphs describe a plan of research activities in macroeconomic policy to be undertaken by TDRI for the next four years. The overall research plan is organized into five main research components or programs. They are:

Program I:       Development of a Macro-Data Bank

Program II:       Short-Term Macroeconomic Stabilization Model

Program III:     Basic Research in Macroeconomic Issues

Program IV: Medium-Term Macroeconomic Studies

Program V: Long-Term Macroeconomic Perspective

With each of this program, there are a number of research projects associated with it. Altogether, there are twelve research projects to be carried out. The basic contents of the research projects are summarized below.

#### 4.1 Research Program I: Development of Macro-Data Bank

Research Program I is part of a broad program of work aimed at improving the macro-data base to support TDRI's research activities in the area of macroeconomic policy. The Program's main concern is to remedy the immediate problems of data deficiencies and to develop a mechanism by which the available macro information can be integrated into a comprehensive data system. Under Program I, there are three research projects: one project relating to data integration and two projects relating to data development.

##### 4.1.1 Project 1: On-line Computerized Macro-Data System

This project deals with the development of a computerized macro-data system to support macroeconomic decision-making. The main thrust of the project is to create a computer-based facility which maintains annual, monthly, quarterly, and daily information as required. The data necessary to support macroeconomic policy decisions will come from both government and non-government sources. Government sources, primarily the National Statistical Office (NSO), the National Economic and Social Development Board (NESDB) and the Bank of Thailand (BOT), produce most of the basic economic data. Non-government sources concentrate more on surveys of economic conditions and expectations, together with data and particular economic problems that all or part of the private sector may be experiencing at any particular point of time. Examples of these are the data compiled by international agencies,

by local commercial banks, and Thailand's principal trading firms.

The development of the macro-data system will involve integration of these data into a unified data system. The development will begin initially with NESDB's existing data bank. The system will be expanded to include the works being undertaken at other public and private agencies, particularly, the works at the Ministry of Commerce where computerized trade statistics are being compiled. The format of the data system will be organized in such a way that it can provide capability for the application of statistical and econometric procedures. This data system will be used jointly with the NESDB.

#### 4.1.2 Project 2: Comprehensive Consolidated Macro-Data in the Format of SAM

The objective of this project is to construct a Social Accounting Matrix (SAM) for Thailand. The data framework of SAM will feature a set of national accounts in matrix form, reflecting a Keynesian model for market of goods and services, an input-output account of production interdependence, and a household income-expenditure account. At the same time, substantial extensions will be made to encompass statistical information on income distribution, employment and poverty in an integrated framework. The resultant SAM will consist of a set of accounting relationships which balance simultaneously eight sets of accounts:

- (1) activities
- (2) commodities
- (3) factors
- (4) household
- (5) government
- (6) corporation
- (7) capital, and
- (8) the rest of the world.

At present, a number of studies relating to the construction of SAM

for Thailand have been made. The immediate focus of this project is to achieve a more disaggregated system of data classification as well as to elaborate on the methodological approach. The compilation of the SAM data will utilize published data from a large number of sources, a majority of which will be the output of the computerized macro-data system (see Project 1). The overall data needs are identified on the basis of the United Nations system of standardized National Accounts which presents annual data in a SAM framework. However, unlike the UN system, the format of SAM enables consistent integration of sporadic macro-data within a unified framework. It is due to this property that SAM provides a convenient scheme for the consolidation of macro-data on an economy-wide basis. This consolidation procedure (into a SAM) will be computerized in order to assist an accurate and speedy consolidation. The NESDB's SAM and computer programs will be used as the starting point.

The constructed SAM data can be consulted for a detailed description of the Thai economy for a given period. The SAM data will provide an excellent basis for empirical implementation of a number of the existing macroeconomic models of which data requirements are structured within the SAM framework. Among these are the SIAM II Model, the NESDB Energy Model, and the NESDB-THAMMASAT Telecommunication Investment Model. With these models, SAM data can facilitate useful analysis of medium-term macroeconomic policy issues by method of fixed-price multiplier analysis. Recent application of fixed-price multiplier analysis, using a tentative SAM data base, to the analysis of employment problems in Thailand has shown very promising results. On this basis, it is expected that an elaboration of SAM can contribute significantly to the analysis of medium-term macroeconomic policy issues in Thailand.

#### 4.1.3 Project 3: Construction of Quarterly National Income Accounts Data

A major limitation of empirical work on macroeconomic stabilization policies in Thailand is the absence of adequate information on economic activities on a short-term basis. This project is a part of a broad

program aimed at improving the data base for the systematic study of short-term macroeconomic stabilization problems.

The project is concerned with the construction and the development of quarterly national income accounts data for Thailand. At present, quarterly observations are available only for a small number of important trade statistics, government revenue and expenditure, prices and most of the monetary aggregates. What is not available are the quarterly observations on real macroeconomic aggregates such as private consumption, gross investment, change in inventories and sectoral production. It is the construction of a quarterly observation for these variables that this project will be concerned with.

A number of statistical procedures have been developed to estimate quarterly observations of economic aggregates from the annual totals. The first part of the project is to review these statistical procedures, and to apply them on the existing quarterly data in order to test the validity of methods. The second part of the project will be to apply these statistical procedures to generate (backcast) quarterly observations from the existing annual time-series. This estimation procedures will be computerized wherever possible. The constructed data will form an empirical basis for the development of a quarterly macroeconomic model of the Thai economy.

The second phase of this project, i.e. the application of statistical procedures will be done jointly with the National Accounts Division (NAD) of the NESDB who will eventually carry out the construction of quarterly data on a regular basis.

#### 4.2 Research Program II: Short-Term Macroeconomic Model

The following paragraphs outline a program of research pertaining to analyses of short-run macroeconomic issues and the development of a short-run macroeconomic model for Thailand.

#### 4.2.1 Project 4: Development of a Quarterly Macroeconometric Model for Thailand

A number of macroeconomic models have been developed to guide policy analysis in Thailand. A major limitation of these models is that their empirical structures are based on annual information and, hence, do not provide an adequate analytical framework for studying short-term macroeconomic policy issues, i.e. problems for which adjustments occur within a period of less than one year. The principal aim of this project is to construct a quarterly macroeconometric model that may be used to guide policy decisions on problems and issues that are of a short-term nature.

The model will exhibit a number of desirable features that are important to the understanding of short-term economic fluctuations in Thailand. Among these features are:

- quarterly lead-lag relationships with input-output structure on the demand side;
- stock-adjustment dynamics to capture lagged responses in economic decisions;
- consolidated public sector accounts for a proper examination of the role and the implications to the economy of the government's fiscal activities;
- an extended financial sector that emphasizes on economic linkages between real and monetary sector particularly the influences of monetary and credit variables on real behavior; and
- an extensive treatment of the international sector that properly accounts for the transmission mechanism and the linkages with international trade activities.

The model will be developed in parallel to the construction of quarterly macroeconomic data (see Project 3). The project is designed in three phases, absorbing a total capacity of 57 man-months. In the first phase,

theoretical foundation for the model will be developed to yield an analytical framework suitable for the analysis of macroeconomic issues in an economic setting typical for Thailand. The developed theoretical foundation will provide a framework in which desirable macroeconomic features which deal with short-run behavioral adjustments may be integrated and expanded.

The second phase of the project is concerned with empirical estimation and validation of the model. Most of the data needed for estimation will be made available by Research Program I (see Project 1 and 3). Model validation is perhaps a crucial step in model construction. The dynamics and the overall performance of the model will be assessed to test the general validity of the model.

The final phase of the model is concerned with model applications. The model will be used to provide short-term economic forecasts and to analyse policy issues of interest. As far as model specification is concerned, it must be able to provide a quantitative framework for the analysis of the implications of various exogenous shocks and domestic policy issues. For example, it will be possible for the model to study the dynamics of macro-implications of a policy package combining fiscal and monetary adjustments.

#### 4.2.2 Project 5: Development of Leading Composite Indicators for Short-Term Macroeconomic Monitoring

A prerequisite to the assessment of short-term economic performance is the availability of key composite indicators that can be used to provide reference points for monitoring economic performance and to evaluate the impacts of policies. Recently, attempts have been made by the Bank of Thailand to develop these composite indicators to assist and guide short-run macroeconomic policy. At present, the availability of these indicators is far less than adequate given its general importance.

The main concern of this project is to extend the development of



composite indicators to cover a wider range of macroeconomic activities so as to assist the monitoring and the evaluation of short-term economic performance, and to guide stabilization policies. The methods of preparing indicators and the problems of survey design will be the important components of this project. Taking the work of the BOT as a starting point, the study will proceed with the analysis of related data sets which can complement what is already available. Next, the project will proceed with the development of composite indicators that identify short-term imbalances in major economic areas. These indicators will be used to monitor and to evaluate the short-term impacts of policies on production levels, stock of inventories, consumption and income levels, and the general standard of living of the population.

#### 4.2.3 Project 6: Preparation of Short-Term Macroeconomic Forecasts and Analyses

This project is an extension of the short-term macroeconomic model project. The short-term model will be used to prepare quarterly forecasts of the Thai economy. The forecasts will be documented and presented to the public in the form of a Quarterly Economic Bulletin. In parallel to forecasting works, the data bank for the short-term model will be regularly updated to allow the most recent economic information to be considered in the preparation of economic forecasts. The short-term model will also be used to analyse the relevant short-term economic issues, the results of which will also be published in the Quarterly Economic Bulletin. The project is to begin after the construction of the short-term model is completed.

#### 4.3 Research Program III: Basic Research in Macroeconomic Issues

The activity of Research Program III is designed to supplement the existing gaps in basic analyses in areas pertaining to the behavioral and the institutional constraints which are important to the formulation of macroeconomic policy. There is one research project proposed under this program, under the present plan.

#### 4.3.1 Project 7: Studies of Special Macroeconomic Issues

Another important limiting factor in dealing with the macroeconomic policy issues in Thailand is the lack of detailed, comprehensive, and up-to-date studies on some of the principal relationships underlying the short-run behavior of the economy. For example, it is difficult to ascertain in the short-run the manner in which the consumers and the producers would respond to the economic stimuli provided by the Government, and to a change in economic circumstances imposed on them by a sudden change in world demand or prices. Successful quantitative modelling of the economy requires that these basic relationships be properly understood.

At the present time, there are five areas in macroeconomic issues relating to short-run behavior which require extensive studies. They are:

- (1) stock adjustment behavior of consumers and producers;
- (2) private investment behavior;
- (3) import-demand behavior;
- (4) determination of interest rate and capital inflow; and
- (5) institutional factors relating to the choice of policy mix, for instance, the role and behavior of the informal sector.

The basic aim of this project is to carry out a detailed examination of these important issues. In each of these issues, special attention will be given to the formation of demands, the role of expectations, and the economic and institutional factors which limit these demands and expectation to be fulfilled. Better knowledge of these relationships will contribute significantly to the understanding of the nature of short-run macroeconomic behavior in Thailand. These basic studies will serve as a good starting point for the empirical modelling of the economy on a larger scale.

#### 4.4 Research Program IV: Medium-Term Macroeconomic Studies

This section outlines the main content of a research program designed to enhance the level of analyses for studying medium-term macroeconomic issues in Thailand.

##### 4.4.1 Project 8: Installation of the SIAM II Model

SIAM II is a large-scale Computable-General Equilibrium (CGE) model of the Thai economy. The model has been developed jointly by the NESDB and the IBRD. At present, a full computer version of the model is installed at the technical planning section, NESDB, and is regularly used to provide policy consultations on medium-term macroeconomic adjustment issues. As a model, SIAM II contains many interesting theoretical underpinnings and the work related to SIAM II has been published in a series of research articles.

The main activity of this project is to create a facility for which the SIAM II model can be installed at TDRI: to provide TDRI staff with access to SIAM II technology and applications. The task will involve installation of SIAM II computer software on TDRI computer, experimentation with test runs on SIAM II, and appropriate modifications to simulation algorithm and software to ensure compatibility of results. It is expected that the presence of SIAM II will provide policy analysts at TDRI with a common tool of analysis of macroeconomic adjustment issues.

##### 4.4.2 Project 9: Further Development of the SIAM II Model

To increase its general capacity and application, a number of modifications are needed to be made on the existing version of the SIAM II model. This project is concerned with modifications designed to strengthen the empirical specification of SIAM II and to extend the scope of model coverage for wider policy applications.

The project has three interrelated components. The first component

involves the improvement of the existing SIAM II's data base, by providing the model with an up-to-date data base. Presently, the data base for SIAM II, which is organized in the form of an extended social accounting matrix, is structured on the empirical observation of economic conditions of 1981. The main task here will be to provide the SIAM II model with a data base of 1984 configuration. Most of the SAM data for 1984 will be made available by the consolidated social accounting matrix data (see Project 2). The main aspect of data base improvement will involve transformation of the available SAM data into SIAM II's data format. This transformation procedure will be computerized wherever possible.

The second component deals with improvement of SIAM II computer software in presenting and documenting the model results to facilitate their implementation and communication. The main concern here will be to extend the software configuration of SIAM II in two directions:

- (1) to modify its output format with a clear and more detailed presentation of simulation results;
- (2) to broaden the simulation techniques in the ways of providing the model with greater flexibility to accommodate a variety of simulation applications.

The third component deals with the extension of the present specification of SIAM II to account for the analysis of external debt problems. In its present form, SIAM II contains no explicit specification to deal with such issue. The issue of external indebtedness, although of no serious concern for short-term analysis, has been recognized as important for medium-term consideration. The main objective is to develop a quantitative framework that will contribute to an understanding of the interrelationships between external indebtedness and economic growth in an economy-wide setting. Such an extension will allow policy makers to apply SIAM II to explore the medium-term implications of external debt-servicing obligations and to identify the factors that can contribute to ease the country's current external debt situation.

#### 4.4.3 Project 10: Medium-Term Employment Studies

This project is concerned with a study of medium-term employment problem in Thailand. The project involves the development of a macroeconomic module to study the behavior of employment and the labor market absorption. The study will focus on the detailed labor market disaggregation, such as by occupation and by education; and the analysis of the impact of a number of government interventions on the labor market, including both direct interventions such as government employment, minimum wage, and job creation program; and indirect interventions such as taxes, tariffs, and the pattern of government investment. This will evaluate the possible strategies for labor absorption, and will provide a basis for the formulation of employment strategy for the Sixth and Seventh plans.

Another important property is that the study will feature a regional disaggregation: Bangkok and the rest of the country. Explicit treatment of inter-regional migration will be included in the study, by focusing on the quantification of likely migration patterns in response to expected development in agriculture. The study-design is based on the need for an economy-wide framework in order to analyse, the medium-term prospects for labor absorption and the impacts of government policies taking into account all the interlinkages.

The quantitative work on this project will be based on work already undertaken under the NESDB-IBRD's SIAM II project. The link with the SIAM II project is clear since a part of this project will involve a macroeconomic exercise focusing on employment. This project will extend previous research into labor market absorption in Thailand. In particular, previous research on the rural labor market has led to a great deal of controversy as to the inadequacy of the questions in the Labor Force Survey relevant to this topic. The project will generate better data to shed light on this issue.

#### 4.4.4 Project 11: Installation of Thailand Agricultural Model (THAM)

Thailand Agricultural Model (THAM) is a dynamic simulation model of the Thai economy with emphasis on food and agriculture. The model has been developed for Thailand by the Center for World Food Studies, the Netherlands. The model is based on a general equilibrium approach. It contains a static linear program of agricultural supply for six regions in Thailand, and a national general equilibrium exchange model. The works relating to the development of THAM have been published in a number of reports.

At present, the THAM Model is not available for use in Thailand. The aim of this project is to provide a computer access to THAM by installing a version of it in Bangkok, at TDRI. With THAM installed, policy analysts in Thailand can benefit from THAM technology and from its analytical capability in relation to medium-term policy issues on macroeconomics and agriculture. As with the case of SIAM II, the main activity of the project will include:

- the installation of THAM computer software on TDRI computer,
- experimentation with test runs on THAM, and
- application of appropriate modifications to ensure compatibility of results.

The project will be carried out jointly by the macroeconomic policy division and the agriculture and rural development division of TDRI.

#### 4.5 Research Program V: Long-Term Macroeconomic Perspective

Research Program V is aimed at the studies of Thailand's long-term growth and development patterns. The studies are carried out with a view that a better understanding of long-term economic issues may provide a guideline for greater coordination between long-term development strategies and medium-term macroeconomic policies.

#### 4.5.1 Project 12: Analysis and Forecasts of Long-Term Perspective

Thailand has a rapidly expanding economy. Proper formulation of medium-term macroeconomic policy needs to take account of long-term socioeconomic perspective and possible structural changes which are likely to occur in the future. This project deals with the studies of long-term economic trends and problems to provide an exploration into the strategies for optimal growth patterns in which the total amount and time patterns of the resource flows can be varied within limit set by these long-term changes. The problem is studied from the point of view of a country trying to make the best use of its domestic and foreign sources, by considering various growth strategies under different assumptions and viewpoints. These different viewpoints are reflected in alternative forms of long-term socioeconomic conditions and settings.

The study is organized into two phases. In the first phase, separate studies will be made on each of the basic socioeconomic framework which are important determinants of the future state of the economy. They are:

- demographic framework covering long-term changes in population structure, educational structure and urbanization;
- the demand framework which deals with long-term changes in the pattern of consumption, export investment demands and imports;
- the supply framework that concerns long-term changes in the pattern of production, technology, land availability, labor force composition, energy, water and mineral resources, and forestry; and
- institutional framework which deals with long-term development of the government sector, the financial sector and the world economic outlook.

In the second phase of the project, the results of these studies will

be integrated to provide a consistent basis for forecasting and analyses of long-term development perspective. Such forecasts will provide an insight into long-term development problems which the economy may run into, and will provide a point of departure for conditional forecasts. Different economic scenarios for long-term development patterns will be studied, by simulating changes in the important long-term variables. Taken together, these conditional forecasts will bring out the inter-relationships between long-term development strategies and policy options and suggest the advantages of having a greater coordination between the two.

## 5. The Work Plan for the Outreach Program

TDRI attaches great importance to its efforts to increase public awareness of the macroeconomic policy problems, by elucidating macroeconomic issues, and to disseminate its research activities to widen academic and public discussions. Its efforts in these directions will take a variety of forms as described below.

### 5.1 Publications

Results of TDRI's research activities will be made available to the general public through the publication of occasional papers and research reports. These papers and reports will be available when the research projects are completed or when the results of analyses become available. In its third year, TDRI plans to publish its own Quarterly Economic Bulletin. In the Bulletin, quarterly forecasts of macroeconomic activity and other related analyses of macroeconomic issues will be reported as well as commentaries on the current macroeconomic policy problems. The publication of the Bulletin will provide the main context in which research activities of TDRI are to be disseminated to the general public.

### 5.2 Seminar and Workshop

TDRI plans to conduct regular seminars throughout the next four years.



These seminars will provide a forum for the exchange of views on current macroeconomic problems between TDRI staff, key experts from the private sector, academic analysts, and government officials, both nationally and internationally. In addition to seminars, TDRI will conduct occasional workshops on the technical aspects of macroeconomic policy so that the interested public can be informed of the analytical techniques used by TDRI. It is expected that, through this formal training programs and workshop, the public will have a clearer understanding of the level of analysis and methodology that TDRI uses in interpreting macroeconomic issues and deriving policy results. Such enhancement of public knowledge will only help to promote wider discussion on macroeconomic policy issues.

### 5.3 International Exchange and Communications

As part of a broad program to widen research activities of TDRI on an international scale, in addition to seminars, TDRI will provide facilities to stimulate formal exchange and communication with other economic research organizations both internally and overseas. At present, formal contacts, at the organizational level, with the following international bodies have been made:

- Central Planning Bureau, the Netherlands
- Center for World Food Studies, the Netherlands
- International Bank for Reconstruction and Development
- International Monetary Fund
- Korea Development Institute
- Institute of Applied Economic and Social Research, Australia
- Economic Planning Agency of Japan
- Development Planning Division, ESCAP
- Harvard Institute for International Development, USA and
- International Institute of Applied Systems Analysis, Canada

6. AppendixTDRI Staff Work Plan

Unit: Man-Month

Year 1	Senior Research Fellow	Researcher I	Researcher II	Senior Research Assistant	Junior Research Assistant	Total
I Data Bank	1	-	3	7	7	18
II Short-Term Forecasting	5.5	-	3	4	7	19.5
- Model	3	-	2	2	4	11
- Indicator	2	-	1	2	3	8
- Forecasting	0.5	-	-	-	-	0.5
III Basic Research	4	2	3	5	10	24
IV Medium-Term	1.5	10	3	8	12	34.5
- SIAM II	0.5	2	-	2	3	7.5
- THAM	0.5	-	3	3	3	9.5
- Employment	0.5	8	-	3	6	17.5
V Long-Term Perspective	-	-	-	-	-	-

Total

12

12

12

24

36

96

TDRI Staff Work Plan

Unit: Man-Month

		Year 2			Senior Research Assistant			Junior Research Assistant		Total
		Senior Research Fellow	Researcher I	Researcher II	Senior Research Assistant	Junior Research Assistant				
I	Data Bank	-	-	-	2	4			6	
II	Short-Term Forecasting	7.5	-	6	8	10			31.5	
	- Model	2.5	-	3	4	4			13.5	
	- Indicator	2	-	2	2	4			10	
	- Forecasting	1	-	1	2	2			6	
III	Basic Research	3	3	4	5	8			23	
IV	Medium-Term	1.5	9	2	9	14			35.5	
	- SIAM II	0.5	2	-	2	3			7.5	
	- THAM	0.5	-	2	3	3			8.5	
	- Employment	0.5	7	-	4	8			19.5	
V	Long-Term Perspective	-	-	-	-	-			-	
Total		12	12	12	24	36			96	

TDRI Staff Work Plan

Unit: Man-Month

	Year 3	Senior Research Fellow	Researcher I	Researcher II	Senior Research Assistant	Junior Research Assistant	Total
I Data Bank	-	-	-	-	2	4	6
II Short-Term Forecasting	4	-	4	4	4	10	22
- Model	-	-	-	-	-	-	-
- Indicator	-	-	-	-	-	-	-
- Forecasting	4	-	4	4	4	10	22
III Basic Research	-	-	-	-	-	-	-
IV Medium-Term	1.5	8	2	8	10	29.5	
- SIAM II	0.5	2	-	2	2	6.5	
- THAM	0.5	-	2	2	2	6.5	
- Employment	0.5	6	-	4	6	16.5	
V Long-Term Perspective	6.5	4	6	10	12	28.5	
Total	12	12	12	24	36	96	

TDRR Staff Work Plan

Unit: Man-Month

	Year 4	Senior Research Fellow	Researcher I	Researcher II	Senior Research Assistant	Junior Research Assistant	Total
I Data Bank	-	-	-	-	2	4	6
II Short-Term Forecasting	4	-	4	4	4	12	24
- Model	-	-	-	-	-	-	-
- Indicator	-	-	-	-	-	-	-
- Forecasting	4	-	4	4	4	12	24
III Basic Research	-	-	-	-	-	-	-
IV Medium-Term	1.5	4	2	6	6	19.5	
- SIAM II	0.5	2	-	2	2	6.5	
- THAM	0.5	-	2	2	2	6.5	
- Employment	0.5	2	-	2	2	6.5	
V Long-Term Perspective	6.5	8	6	12	14	46.5	
Total	12	12	12	24	36	96	

### III ISSUES OF DISCUSSION

#### 1. Repercussions and simultaneous effects arising from a policy decision

Project decision-making must take into consideration the total picture and related repercussions which may arise from such decisions. Often, decisions are not made because policy makers are not sure what the repercussions will be on the macroeconomic level. Resolutions in certain areas may create new problems in others areas, and therefore with increasing economic complexity, a specific problem is no more restricted to a single ministry but poses more problems to several other ministries, and the government has to strive for resolutions simultaneously.

Comment 1: The Macroeconomic Policy program should consider covering the taxation system not only for the objective of stabilization but also for the objective of the country's development.

Comment 2: The program should consider issues such as the impact of certain laws and regulations on the economic system. Projects in this program should cover fiscal and monetary policy, financial system, taxation system - affecting the macroeconomics of the country.

#### 2. The need for understanding between government personnel and researchers in policy formulation

Government personnel and researchers do not often have an occasion to meet or understand each other. The people responsible for macroeconomic policy are often preoccupied with the feasibility or the possibility of such and such decision-making process, and the emphasis here is more on process. Their task is always an urgent one, leaving no time for them to think about the philosophy behind the policy or about new ideas or concepts. Whereas, the university researchers are well-equipped with knowledge and theories, they do not understand the process of decision-making in the government. Their analyses and researches, however

profound, exist only as theoretical work if they cannot address the policy implications due to the lack of understanding of the government decision-making process. A task of the Macroeconomic Policy team is to bridge this gap by involving both groups of people in the team's policy research work. They will put their efforts together, in order to shed more light on all facets of a problem and to arrive at a more complete and practical solution.

Comment 1: In the policy formation process, institutional factors should be taken into account since they are important indicators of the implementability of certain policies or models.

Comment 2: The program should study the actual policy formulation process, including its problems and constraints to facilitate a more efficient policy formulation process and to provide a means to assess the feasibility of each policy.

Comment 3: The Macroeconomic Policy program should consider lead-lags in the policy formulation and implementation.

Comment 4: The program should include land and water aspects which could compensate for the environmental aspect.

### 3. The need for an overall view for macroeconomic policy decision-making

No single policy is going to benefit everybody. The work of the Macroeconomic Policy program will attempt to provide decision-makers with an overall view before undertaking policy decisions. This dictates the need for coordination with various areas so that an integrated framework can be presented to show the related effects of various policies in the economic system. Prior to this, it is necessary to first, show how all the parts of the economic system are related. This picture will be useful for macroeconomic policy decision-making.

#### 4. Tools in macroeconomic analysis

The Macroeconomic Policy team will be able to make the best use of all macroeconomic statistics which, till now, have not been usefully maximized. The work will involve developing a methodical collection system of the statistics so that they can be interrelated, correlated and checked. With this system, the statistics can be updated and made available at all times.

Comment: The Macroeconomic Policy program should cover developing new tools or, improving existing ones.

#### 5. Macro-Data Bank

Comment 1: The Macroeconomic Policy program should aim at processing and improving data-base and developing economic models.

Comment 2: The finance sector in the model may not be sufficient to correct the financial system, especially on the unregulated market.

#### 6. Short-Term Macroeconomic Stabilization Model

Comment 1: The Model should detail problems which are difficult to quantify and this is significant for the short-term macroeconomic model and the identification and implementation of stabilization policy.

Comment 2: The model should not be used solely for economic forecasting but must also incorporate the institutional factors as well.

Comment 3: The model will be different from the model of the Ministry of Agriculture and Cooperatives because the proposed model will be linked with the macroeconomic economic model at the NESDB and will be used by policy planners while the



Ministry's model is currently used solely for agricultural forecasting purpose.

#### 7. Basic Research in Macroeconomic Issues

Comment: The Macroeconomic Policy program should emphasize the importance of certain details and problems which are difficult to quantify but are considered important for the acceptance and success of policy planning and implementation, i.e., the finance policy.

#### 8. Issues of Social Compensation

Comment 1: The Macroeconomic Policy program should be formulated with a focus on the issues of social compensation such as inequality of income, employment opportunity, urban-rural disparities which are closely related to the implications of macroeconomic policy.

Comment 2: The Macroeconomic Policy program is going to be very large that will cover various aspects, especially in the field of macroeconomic policy concerning structural changes, data model establishment, etc. What is worrying is that, all the economists are going to be so preoccupied with numbers, data and statistics and will be so tired of them, that in the end, they may concentrate less on the research itself when it comes to real research. And in the research itself, it is also important to consider the social problems.

Quoting a speaker from the floor:

"In our country, an important observation is that during the last twenty years, we have been experiencing a satisfactory GDP growth and we have been hoping that this growth, both in the short-term and long-term, would be beneficial to the country. We still have a lot of natural resources

and other resources which have been established and built-up by the Government. In spite of all these resources, it is interesting that we are still poor, at least in two fields. The first one is that we still have income discrepancy. For example, there is an extreme difference between the rich people living in the urban areas and the employment possibilities and the people living in the rural areas. You can see that the employment possibilities exist only in the cities. Therefore, I think the research which TDRI should undertake within the four years' time should concentrate on this aspect. How can we have economic growth but still have a lot of social problems? Can we consider this in a new perspective by stressing the personal income distribution? My personal opinion is that, economic growth is not an answer to employment possibilities. We should create more jobs and distribute more income to more people. I would like to propose this idea for consideration by TDRI. We should undertake analysis in the field of wealth and income distribution? We should study to see in what ways we can distribute the income, especially to the rural people who have the lowest income so that they may enjoy a higher income. At the same time, we can also find ways of improving the level of income of those people in the medium income-level bracket. In the past, all the economists believed that solving problems, especially in the field of unemployment, would require a lot of investment especially from foreign countries. But the result has been clear that, big foreign investments did not help us in solving our unemployment nor our income-distribution problems. I would like to suggest that we should stress the importance of the social issue of income-distribution and employment possibilities in research projects in the field of macroeconomic policy. I feel certain that about five million people in Thailand enjoy a fixed income. Would it be possible for another million people to enjoy a higher income that is being enjoyed by those five million? I think providing the Thais with more employment opportunities would, not only, give these people more happiness but it will also attract more foreign investment."

9. TDRI as the center of information

TDRI hopes to be able to provide some answers when the government seeks for answers to its questions.

Comment: TDRI should not wait for questions from the government, they should tell the government what to do because, sometimes the government does not even know what to ask.

10. Dissemination

It is considered another important task of the institute, to disseminate its work through various means.

Comment 1: The policy formulation process should consider conducting dialogues and seminars as means to familiarize the people concerned with certain ideas and policies that are being developed.

Comment 2: Before submitting the results of the research, it is important to make sure who the real policy makers are.

Comment 3: The macroeconomic policy must be disseminated in a manner that would be easily understood. It is important that the general public should understand what the researchers do and their purposes in doing such researches.

# "Development Research and National Development"

Position Paper No. 2

## AGRICULTURE AND RURAL DEVELOPMENT

by

Ammar Siamwalla

### I ABSTRACT

The Agriculture and Rural Development sector in Thailand has enjoyed a long tradition of research but the progress of this research has been uneven. An overly-specific and narrow attack on agriculture and rural development has, inevitably, ignored the systemic context of the problems/issues involved. Past attempts of rural development studies by governments and non-government organizations avoided crucial questions such as, the preexisting relationship between the rural society and the outside world and, the functioning of the rural economy independent of outside intervention that has led to a reduced understanding of these processes at work. On the issue of rural credit, there is at present a very little understanding of the credit market system and the governments' role in this system. The paper points out that this segmented ad-hoc nature of past research is a product of short-term, consultancy-type research from foreign-aid agencies which merely provided guidelines for implementing an already-set policy or evaluating the consequences of such a set policy. A careful scrutiny of the basic assumptions of a policy has thus, been overlooked. If only the agricultural sector and the rural economy can be examined as parts of a larger system, then perhaps policy questions can be formulated and research can be conducted along this framework. TDRI will attempt to make a scrutiny of all the existing policies within this framework through research on four major areas viz., the structure of the rural economy, determinants of agricultural productivity, domestic and international markets for agricultural products and the interaction between agriculture and the rest of the economy. The research on the structure of the rural economy will focus on rural credit markets and rural labor markets, information/extension systems and source and structure of rural household income. The paper stresses that TDRI will avoid studies of governmental and non-governmental projects unless these programs are of special interest to TDRI. The research on determinants of agricultural productivity will tackle the issues on: supply and utilization of agricultural inputs, the economics of irrigation, resource allocation in agricultural research and scale and organization of agricultural production. The research on domestic and international markets for agricultural products will avoid the systemic context of the previous research but will, instead, attack two

concrete issues on, the Thai-European Community Trade Agreement and the Economics of the Aflatoxin Problem in Thailand's Maize Exports. These programs will deal more with short-term studies of specific commodity issues or, with specific market studies of some minor crops as they arise. The program on the Interaction Between Agriculture and the Rest of the Economy will attempt to quantify the cross-impact between agriculture and the rest of the economy. TDRI envisions a very tight schedule for 1985 in undertaking the projects for the first 3 main areas, whereas maximum restraint will be exercised in the conduct of the fourth project within the first 3-year periods.

\*

## 11 THE PAPER : AGRICULTURE AND RURAL DEVELOPMENT

### 1. Introduction

Research in this program area has had a long tradition, but progress has been uneven. Some topics have either been given a great deal of emphasis or neglected, depending on their recurrence in the policy agenda. Table 1 presents some of my judgments of what past and present research has tended to emphasize and what I consider to be some of the blind spots of that research. In itself, the last column of Table 1 would provide a sufficient agenda for research to keep TDRI busy for the next generation of economists.

### 2. Current Research in Agriculture and Rural Development

To propose a whole series of research projects to cover these blind spots would, however, merely attack the symptoms. An underlying characteristic of the type of research that has been carried out in the past is the overly-specific and therefore, narrow attack on each of the topics, ignoring the systemic context in which each of the problems or issues arises.

To take the first of a few concrete examples. We have had a number of studies on rural development. Most of them were intended to evaluate some programs or projects launched by governments or non-governmental organizations. From the way the problem has been set up, these studies tend to set the rural society in isolation. Then, the project or

---

\* See page 11

program "happens", afterwhich, the outcome of this "happening" is to be evaluated. Typically set aside are the relevant, but also complex questions related to the preexisting relationship between the rural society and the world outside. Many studies also tend to avoid questions related to how the rural economy, itself, functions as an entity independent of outside interventions. In avoiding both these crucial questions, our understanding of the processes at work is reduced considerably. As a consequence, researchers have framed their questions by presupposing many issues that are, by no means, resolved. Many such presuppositions have ideological roots, and rest on dogmatic beliefs. Such dogmas include, either that, the markets for all goods and factors function perfectly and should be the major, if not, the sole guide to action or its total opposite, namely that the market is a device for the exploitation by the better-off against the poor and that therefore, rural societies should be insulated as much as possible from its evils and should either maintain or revert to a self-sufficient economy.

A second example pertains to rural credit. We have snapshots of how much farmers borrow, what they pay for their loans and, from whom they borrow. There is also a very clear government program to inject more credit into the agricultural sector by forcing commercial banks and the government-owned Bank for Agriculture and Agricultural Cooperatives to push more loans out into the countryside. Between the micro pictures that we have and the macro policies that we pursue, there is little understanding of how the entire credit-market operates and how the government program is supposed to fit into that system.

The segmented, ad hoc nature of much of the past research in the area has not come about accidentally. It has arisen in response, by the research manpower, to short-term, consultancy-type research demand emanating from foreign-aid agencies and, lately, from Thai governmental organizations. It is not so much the case that these agencies do not require a systematic look at a problem, but because most research are commissioned to provide the guidelines for implementing an already-set

policy or to evaluate the consequences of such a policy, the basic assumptions of a policy are not carefully scrutinised. Indeed, there is a systematic bias against too close an examination of these premises.

It is not my intention to put TDRI in the role of a social critic, although there is much to be said for such a stand. Rather, by a careful scrutiny of all the evidence without any predisposition either for, or against existing policies, a better understanding of the problems that the nation is facing can be obtained and a correct approach to solving them can be formulated. The basic theme of the program is therefore, to examine the agricultural sector and the rural economy as parts of a larger system and, to formulate policy questions and conduct research within this framework.

### 3. Proposed Areas of Research

We shall divide the program's work into four major areas.

- The Structure of the Rural Economy.
- Determinants of Agricultural Productivity.
- Domestic and International Markets for Agricultural Products.
- The Interaction between Agriculture and the Rest of the Economy.

The following presentation outlines certain topics and areas of research that the Agriculture and Rural Development Program will develop and undertake on its own initiative. The program will, in addition, accept projects conceived and developed by other Thai and international agencies if the proposed work is related to the research that has been done by TDRI, is currently under way or, is expected to be initiated within the planning horizon of TDRI.

### 3.1 The Structure of the Rural Economy

The focus of the Agriculture and Rural Development Program work in this area will be on the analyses of the different points at which rural households interact with the world outside their villages. While the focus will be on economic interaction, other forms of interaction will also be attempted. Generally, the institute will avoid evaluative studies of existing programs either by governments or non-governmental organizations unless, the programs are particularly innovative in attacking problems of interest to TDRI or, are sufficiently broadbased across the country or the programs concerned, focus on area or areas in which TDRI will, by then, have completed some research.

The Agriculture and Rural Development Program will focus its research activities during the next three years at least on the following specific topics.

- Rural credit markets
- Rural labour markets
- Information systems available to rural households. (Information systems here is taken to mean such things as technological and market knowledge and will also cover information provided by private sector agents such as fertilizer dealers)
- The sources and structure of rural household incomes.

In each of the years 1985 - 1987, each of the first three topics will be the subjects of a major study. Thus, in 1985 the program will conduct a credit study which will be followed by the study of the labour market in 1986 and, the study on the information system in 1987.

All the major studies will attack the economy-wide problems and issues, but they will always be accompanied by intensive studies at the village and the household levels in order to understand better the processes at work. It is planned that the micro-economic portions of



all the three major studies will be based on surveys of a group of households and the selected villages for their representativeness of the various techno-economic levels of development in the country. As much as possible, the same set of households and villages selected in the first survey will be returned to, in the succeeding studies, so that longitudinal data will be available for a group of households; particularly for such basic economic variables as incomes on agricultural production and other variables. These longitudinal data will then be the raw material for the fourth study on the Structure and Sources of Rural Incomes.

Once every year, the sequence of topics will be re-evaluated and a new topic for a major study to replace the already-launched one will be added. There will thus, be four topics always on our horizon. Each of the major studies is expected to take up a considerable amount of the Program's resources in any given year. However other activities will not be altogether excluded, particularly if they are small projects in, and around, the four topics within the horizon.

### 3.2 Determinants of Agricultural Productivity

Raising agricultural productivity will remain an important part of the government policy agenda for a long time. Four issues have been identified as foci of research.

- Supply and utilization of modern inputs, such as fertilizers, agricultural chemicals, seeds and machinery.
- The economics of irrigation, focussing on water management.
- Resource allocation and utilization in agricultural research.
- Scale and organization of agricultural production. (The issues here are the role and productivity of new developments such as contract-farming and agribusinesses)

The program is preparing a research proposal in the first area for a small project to be submitted to the National Economic and Social

Development Board so that at least, some preliminary results will be available for the preparation of the sixth plan. This will be the first of a series of studies on the subject which will examine, not only, the availability of each of the major inputs, but also, the issues related to the dissemination of information concerning them, (this part of the effort will obviously have to be undertaken in conjunction with the first topic of the area, the Structure of the Rural Economy), the distribution system of these inputs, and the interaction among these inputs. The second and third topics will have to be undertaken with the Natural Resources and the Science and Technology programs respectively. It is expected that the program will develop a concrete proposal on the former in the middle of 1986 and on the latter, by the end of next year. The final topic is of considerable importance, but is also quite complex. It is expected that the program will expend some resources during the next two years merely to prepare a researchable proposal, which we expect to be ready at the end of 1986.

### 3.3 Domestic and International Markets for Agricultural Products

This area differs from the other three in that we shall not put so much emphasis on the systemic context, because we have now accumulated a large body of work that addresses the systemwide issues directly. The work that remains to be done pertains to some very concrete issues which turn up from time to time but, unfortunately, cannot also be adequately forecast over the next several years. In the next year, the program will be looking at two specific areas.

- The Thai-EC cassava trade agreement. This trade agreement was concluded in 1982 and is due to expire in 1986. As action has to be taken before the end of 1985 if it is contemplated that the agreement will not be renewed, then the research will have to be completed before then. This research will try to evaluate the treaty and its results and will also examine the options that are open to Thailand in its new negotiations.

- The economics of the aflatoxin problem in Thailand's maize exports. In the last few years, a number of studies have been done examining alternative technical solutions to the aflatoxin problem in Thailand's maize exports. This study will examine all the data used in these studies, the costs and benefits of eliminating the aflatoxin problem, and, using alternative projections of Thailand's maize production capabilities, try and predict the future time-path of the discounts that our maize trade has to suffer on account of the problem.

In general, the program's effort in this area will be short-term studies directed at specific commodity issues as they arise. The program will not have any long-term study on any problem. In particular, large-scale modelling of the world's major commodities will be avoided as considerable resources and expertise have been expended more productively elsewhere. Specific market studies of some minor crops which are not studied elsewhere may, from time to time be undertaken, however.

### 3.4 The Interaction between Agriculture and the Rest of the Economy

It is now recognized that the impact of non-agricultural policies on the agricultural sector is quite substantial. Therefore, the agricultural sector cannot be considered in isolation. TDRI's Agricultural and Rural Development Program cannot serve well its function as a policy analyst for the NESDB and for the other branches of the Thai government unless, it has the ability to quantify this cross-impact between agriculture and the rest of the economy. While other models do exist in the various branches of the Thai government, (indeed, some are being developed in the Macroeconomic Policy Program) they are either a detailed model of the agricultural sector with very little attention to the rest of the economy or, they are overly-aggregative with respect to the agricultural sector.

The development of large-scale economy-wide models can easily swallow-up large amounts of manpower, and then yield relatively low returns. Even if successful, for the model to remain useful for a long period of time will require further resources. An uncontrolled growth of inputs in this area is an ever-present danger. TDRI's approach in this area will start by following a self-imposed constraint. So that in the first three years, this activity will not consume more than three man-years of a Ph.D.-level researcher and six man-years of Master's degree-level research associates. All the models that will be considered must pass the test that its development and maintenance can be undertaken within this manpower constraint.

As far as this area is concerned, the program is now in the exploration stage. We are examining the possibility of acquiring a ready-made large-scale model of the Thai agricultural sector (but including the rest of the economy aggregated into a few sectors) and the development of two smaller-scale highly aggregative models.

#### 4. Work Plan

##### 4.1 Operation and Manpower

The program will undertake the last area of research (The Interaction between Agriculture and the Rest of the Economy), using its own inhouse staff. As already indicated, the number of people engaged in this activity will not exceed one Ph.D.-level researcher and two Master's degree-level research associates.

As most of the work on the other three areas of research will be conducted as finite length projects, TDRI will mainly use researchers attached to the universities and government departments. The work to be done by TDRI's staff in these projects will largely be in the development of the conceptual framework, fund-raising, recruitment of outside researchers, management, supervision, and when the research is completed, in arranging for the best way to disseminate the results. Management and supervision here, imply

more than the purely administrative questions, but is expected to require close intellectual involvement of TDRI's staff in the projects. Consequently, it is expected that each research fellow or researcher can handle a maximum of five projects at a time.

Table 2 presents the tentative sequencing of the various projects to be undertaken by the Agriculture and Rural Development Program. Clearly, the outline of work for 1985 is better defined than those for later years. This covers only the project work that is initiated within TDRI, and thus, covers the first three areas of the program. If the fourth area (the Interaction between Agriculture and the Rest of the Economy) is added to the 3 areas and work is contracted with other Thai and international agencies, then the estimated staffing of the Agriculture and Rural Development Program by the end of 1985 is expected to be as follows.

- Ph.D.-level researchers 3
- Master's-degree level research associates 4

#### 4.2 Dissemination of Research Results

In a society where the spoken word has dominated the written as primary mode of communication, seminars and conferences will serve as the main channel whereby research results will be disseminated to the audience, here taken to mean, policy-makers, other researchers and to a lesser extent, the general public.

While seminars and conferences will be the main channel, these will not take place unless a clearly-written and edited research report or papers have been prepared. It is only by insisting on a written report from its researchers that the institute can hope to achieve high-standards of analytical rigour. As far as is possible, these reports will be prepared in both English and Thai.

In the main paper:

\* This paper is a personal statement, but I have benefitted greatly through discussions with Prof. Saneh Chamrik, Dr. Chirmsak Pinthong and Dr. Suthad Setboonsarng. They are not in any way responsible for the contents of this paper.

5. Tables

Table 1

Focus of Existing Research and its Blind Spots

Research Area	Focus of Existing Research	Blind Spots
Pricing and Marketing	<ul style="list-style-type: none"> <li>• Export policies.</li> <li>• Competitiveness of domestic markets</li> <li>• Marketing margins and channels</li> </ul>	<ul style="list-style-type: none"> <li>• Macroeconomic influence on agricultural product prices (particularly of exchange rates).</li> <li>• Input markets</li> <li>• Minor crops</li> </ul>
Farm-Management	<ul style="list-style-type: none"> <li>• Costs and returns for specific crops in a given locality</li> </ul>	<ul style="list-style-type: none"> <li>• Changes in incomes and input use over time</li> </ul>
Land Tenure and Land Use	<ul style="list-style-type: none"> <li>• Changes in land tenure, particularly for the Central Plains</li> <li>• Decline of forest areas</li> </ul>	<ul style="list-style-type: none"> <li>• Evolution of land tenure in newly-settled areas</li> <li>• Future supply price of land, from both the social and the private sector's point of view</li> </ul>
Cooperatives	<ul style="list-style-type: none"> <li>• Farm-management study of participating households</li> <li>• Organization and management</li> </ul>	<ul style="list-style-type: none"> <li>• The economic costs and benefits to farmers by participating in cooperatives or farmers' associations</li> </ul>

Research Area	Focus of Existing Research
Employment	<ul style="list-style-type: none"><li data-bbox="615 474 1263 600">● Labour requirements for single crops. Impact of high-yielding varieties and mechanisation.</li><li data-bbox="615 619 1263 746">● Sources of household income for a single period. Seasonal variation during any given year.</li></ul>
Credit	<ul style="list-style-type: none"><li data-bbox="615 812 1212 890">● Levels of farm borrowing and its determinants (on the demand side).</li><li data-bbox="615 909 1212 1034">● Levels of explicit interest rates charged and its variation by source of loans.</li></ul>
Irrigation	<ul style="list-style-type: none"><li data-bbox="615 1200 1259 1278">● Organizational problems at the farm-level.</li><li data-bbox="615 1297 1259 1374">● Distribution of costs and benefits of irrigation.</li></ul>



---

## Blind Spots

---

- Functioning of labour markets within rural areas and their relationship with urban labor markets
- Variations of household income sources over time
- Supply of male and female labor
  
- Functioning of credit markets within rural areas
- Supply of agricultural credit, both within rural areas and from the national credit market
- Credit-rationing by lenders, both formal and informal
  
- Economic explanations for lack of use of groundwater
- Incentive problems in operations and maintenance

---

Research Area	Focus of Existing Research
Production Technology	● Production function studies
Rural Development	● Impact of programs and projects on rural development

---

---

## Blind Spots

---

- The productivity and role of agricultural research, public and private
  - The functioning of the rural economy
  - The interrelationship between the rural and the urban economies.
-

Table 2  
Expected Timing of Various Projects

Project Name	1984				1985				1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<u>The Structure of the Rural Economy</u>																				
<ul style="list-style-type: none"> <li>• Rural credit markets</li> <li>• Rural labour markets</li> <li>• Information systems available to rural households</li> <li>• The sources and structure of rural incomes</li> </ul>																				
Development of Data Sources (in-house)																				
<u>Determinants of Agricultural Productivity</u>																				
<ul style="list-style-type: none"> <li>• Supply and utilization of modern inputs</li> <li>• Resource allocation of utilization in agricultural research (will be done inhouse)</li> </ul>																				

D---I-----C

D-----I-----C

D-----I-----C

Development of Data Sources (in-house)-----D-----I-----C

Determinants of Agricultural Productivity

- Supply and utilization of modern inputs
- Resource allocation of utilization in agricultural research (will be done inhouse)

D---I-----C

D-----I-----C

D---I-----C

Project Name	1984				1985				1986				1987				1988			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			

- The economics of irrigation D-----I-----C
- Scale and organization of agricultural production D-----I-----C

Domestic and International Markets for Agricultural Products

- Thai-EC cassava trade agreement D---I-----C
- The economics of the aflatoxin problem in the Thai maize trade D----I---C

- D = Development of Project (Design, Fund-raising, Recruitment of Personnel)
- I = Initiation of Project
- C = Completion of Project

### III ISSUES OF DISCUSSION

#### 1. Structure of The Rural Economy

Comment 1: Concerning the rural credit study, there are some very poor families who are not engaged in agriculture but are mixed in the farming communities. In fact, a lot of the farmers' income is supplemented by the non-agricultural sector. Therefore, in studying rural credit one should also consider the different aspects of agriculture family and non-agriculture family.

In response to the comment:

Work should be conducted on 'income' before looking into the condition of the 'credit' which goes on in the rural communities at the moment. Concerning the family, it is agreed that there are agricultural families and non-agricultural families, but in any case, they are still within the credit system. The reason why the term 'rural credit' is used rather than 'agricultural credit' is because the study will tend to go by the geographical rather than the functional basis.

Comment 2: In looking at rural credit one should try to consider, in detail, how much a family gets on a loan and from what institution, and these studies should be conducted on a dynamic concept basis. The rural credit at present is like a still life. We should ask ourselves, e.g., if a family has an income of  $\text{¥}5,000$  annually and if they could get  $\text{¥}3,000$  loan from the bank, in a few years' time they could end-up at a dead-end. One should take into consideration that, a lot of technology should be put into rural development with the view to helping the farmers raise their level of income. That is, in the rural credit market study, 3 issues must be addressed:

- the income of farmers from both agricultural and non-agricultural sources
- the magnitude of borrowings from informal sources
- the emphasis on the dynamics of farmer's incomes.

Comment 3: The Program can consider studying the dynamic aspect of the farmer's income, but this would involve a large sum of funding.

Comment 4: This concerns the effectiveness of the research on rural credit, because if it is undertaken in Nakhon Rachasima during the rainy season, the most positive conclusion for the research may not be reached.

## 2. Determinants of Agricultural Productivity

Comment 1: The Agriculture and Rural Development program may consider proposals on agro-industry, a long-term project on the quality of products, post-harvest technology for better production efficiency and low-cost transport systems for agricultural products.

Comment 2: The Program should consider conducting research for a more effective agricultural technology transfer.

Comment 3: There should be work done concerning the government policy on what to produce. The country should have a policy as to what product it would like to encourage for production, so that corresponding technical researches can be carried out. It is wasteful to be researching on a product that cannot be marketed, and worse than that, to be producing products which cannot be sold. Researches can be done to answer questions like: should Thailand promote the production of maize? What varieties should be promoted? and, what are the economics of this commodity? TDRI should undertake researches of this kind to give the right direction for further technical research

in order to assist agricultural development.

In response to comment 3:

It is important to bear in mind the need of the farmers and their crop diversification in order to give them some incentives. We should not let the farmers bear the burden of having to decide what crop to produce. These are the things that must be considered later. We need all kinds of existing information and data, and TDRI will have to try to get as much data as possible from the Ministry of Agriculture and Cooperatives concerning this policy issue. TDRI will have to try to present the results of its research findings in order to help the Government in its decision-making.

Comment 4: It should be possible to find ways of determining the optimum role of the government vs. the private sector, whether the government should compete with the private sector in commercial business or, whether it should maintain the role of being merely a policy planner, supervisor or controller.

### 3. Domestic and International Markets for Agricultural Products

Comment 1: The Program may consider the study and model-development of the movement of the world market and supply/demand situation of world commodities for forecasting trends. This is considered to be indispensable for an agriculture-based country like Thailand and is an important input for macro-economic modelling and planning.

Comment 2: The trade policy in the agricultural program will overlap with the policy in the Industry, Trade and International Economic Program, and careful coordination on relations is required here.

Comment 3: This Program may wish to look into the establishment of a commodity future market.



Comment 4: This concerns tapioca. There should be more research undertaken concerning the possibility of marketing this product outside the EC. Can it be Russia or Japan so that the dependency on the EC market can be reduced, and so that Thailand may be able to gain a better bargaining power with the EC authority ?

#### 4. Interaction Between Agriculture and the Rest of the Economy

Comment 1: A study of conflicting agricultural policies offering possible solutions can be considered.

Comment 2: It may be possible to consider studying the interaction among sectors since the protection of one sector may harm another sector. However the manpower and financial resources required for this are large.

#### 5. Interrelation Between Economic and Social Matters

Comment 1: Economic and social matters are interrelated. As we face economic problems they will, in turn, bear effect on social matters. The Program shall first look at the economic aspects and then, move on to the social issues after having gained a better understanding of the economic problems.

Comment 2: The Program should also focus on the advanced agricultural areas because society and economy cannot be compartmentalized.

#### 6. Dissemination

Comment: A dissemination process that will ensure reaching a wide Thai audience via seminars and written reports must be a part of this Program.

# "Development Research and National Development"

Position Paper No. 3

## INDUSTRY AND INTERNATIONAL TRADE: AN AGENDA FOR RESEARCH

by

Narongchai Akrasanee

### I ABSTRACT

The growth of the Thai economy and the welfare of its people is very much dependent on how the industrial sector develops and evolves over time. This sector, defined to include all manufacturing activities, employs 8% of the national labor force and provides a value-added of 21% of the country's GDP. The present situation, however, reveals that the sector is encountering problems that need to be properly understood in order that a desirable pattern of industrial development could be achieved. The first part of the paper is a discussion on the economics of the Thai industry followed by a discussion of international trade based on the inherent characteristics of the Thai economy, its current problems (such as growth-rate, industrial location, technology and finance) and its future prospects. The growth of this sector has been slowing down due to the difficulty in expanding the exports and the saturation of the domestic market for consumer goods. On the aspect of industrial location, efforts to disperse industrial concentration away from Bangkok and the surrounding towns have not been very successful. The sector's inferior technology inhibits its competitiveness and worse still, financing industrial growth has become a major problem as the financial market becomes more complex. The prospect of stimulating the growth rate through promotion of manufactured products and promoting industrial investment by way of research at TDRI is briefly outlined in the paper. It goes further to recommend studies on surveying the pattern of industrial location and, on finding ways and means of how to reorganize and relocate them. A medium and long-term technology plan for industrial development is also presented consisting of studies that concern standard systems, industrial R & D strategies and indigenous technology. Studies that would help identify the necessary changes and measures in the financial market in order to complement the transformation of the economy from agricultural to industrial and, to improve the present situation are also briefly presented. In international trade, the research program for TDRI as recommended in the paper is organized into three main areas of: import policy, export policy and the linkage between them in the form of regional and international economic cooperation.

## II THE PAPER: INDUSTRY AND INTERNATIONAL TRADE : AN AGENDA FOR RESEARCH

## 1. Introduction

This note outlines the major areas of research interest in the field of the economics of industry and international trade relevant to Thailand. The agenda is based on the basic characteristics of the Thai economy, its current problems and its future prospects. The agenda is meant to provide the basis for discussion, which will ultimately result in a research program on industry and international trade at TDRI.

## 2. Industry

Industry is defined here to include all manufacturing activities. By this definition, the value-added from the industrial sector presently accounts for 21% of the country's Gross Domestic Product. This share has been rising over time because of the relatively faster rate of growth of the sector than the national average. The sector directly employs about 8% of the national labor force of 22 million people, but is contributing much more to the earnings of those who are classified as having occupation in the agricultural sector. The growth of the Thai economy and the welfare of its people therefore, depends very much on how the industrial sector develops and evolves over time.

The research proposed to be conducted by TDRI should aim at policies and measures which may solve the major problems of industrial development, and contribute towards a desirable pattern of development. It is, thus, important to understand the current problems of the industrial sector and the desired pattern of industrial development. The nature of the proposed research is basically policy research, emphasizing on the "what to do" rather than on the question of "why things are the way they are." Thus, various aspects constituting the feasibility of policy and policy measures will be investigated.

The industrial sector as we witness it today is encountering several

problems which require immediate attention by all parties concerned.

- Firstly, the growth rate is slowing down, due to the difficulty in expanding exports and the saturation of domestic market for consumer goods.
- Secondly, industrial production continues to be concentrated in Bangkok and the surrounding towns, a factor that adds to the city's congestion. This area is running out of supply of land suitable for industrial sites. Efforts to disperse industrial concentration have been futile so far.
- Thirdly, the industrial sector remains technologically-deficient, thus, inhibiting its competitiveness.
- Finally, financing industrial growth has become a major problem as the financial market has grown in its complexity.

## 2.1 The "Growth Rate" Issue

Following the major problems outlined above, the very first area of research proposed would be on how to stimulate the industrial sector to grow at the rate of 8 to 10 percent a year for the next five years as compared with the present growth rate of 5 to 7 percent. This growth would come from production for exports and, for general sales. Growth strategy therefore, can be seen in terms of the strategy to promote manufactured exports and the strategy to promote industrial investment.

A research project on the promotion of manufactured exports is proposed. The project should have two components: one component refers to a group of issues which are distorting export sales from the situation of free trade, and another component deals with the effectiveness of measures that would stimulate export sales and investment in manufacturing for exports. The first group of issues is well-known. It involves mostly the tax refund and rebates for exports. The priority issue for research should be on the tax rebate system that would really create a situation of free-trade for export manufacturing. As for the second group of

issues, the main interest should be on how to promote high (local) value-added exports. These products are handicrafts, processed foods, and other (local) material-based products. The import substitution-turned-export industries should also receive attention. The measures include, both investment and marketing promotion.

On the strategy of production for general sales, research should take a subsectoral approach, and should single out production by small-sized firms. On the subsectoral approach, the subsectors which should receive the highest priority are:

- . agro-industry,
- . engineering industries, and
- . chemical industries.

The research design should be comprehensive, including the functioning of the subsectors in terms of demand and supply behavior, and the factors determining them. The policy measures to be investigated are those which would eliminate the supply constraint and enhance the domestic demand for the products.

Small and medium-sized firms should receive top priority in industrial development, for they form the base of the entire industrial sector amounting to 95% of the country's industries. It is now pretty well-known how small-sized firms function. Research should be on how to organize the various supportive measures including legal and financial measures that would nurture the growth of these firms.

## 2.2 The "Location" Issue

Two types of issues are noted:

- the haphazard nature of the existing industrial location, and
- future location for industry.

It is apparent that industrial factories in, and around Bangkok are sited everywhere regardless of the areas being residential or commercial. The government wants to reorganize or relocate many of these factories especially the smaller ones, but has been unsuccessful so far. Research in this area should first, survey the pattern of the factory location in, and around Bangkok, and second, to investigate ways and means on how to reorganize and relocate some of them.

Many studies and plans are now going on regarding the future location of industrial activities. These include the Eastern Seaboard, the Upper South, and other regional studies. Future work in this area should result in translating recommendations of these existing studies into program of actions to promote industries in these areas.

### 2.3 The "Technology" Issue

As Thailand's industry transforms from a simple processing and import-substitution stage towards manufacturing of products at a higher degree of sophistication and manufacturing for exports, a higher degree of self-reliance in terms of technology becomes crucial. For this purpose, it is now necessary for Thailand to have a technology plan for industrial development. Research should be done for the purpose of developing this plan for both medium and long-term. It is envisaged that the works will include the entire standard systems, the strategy for promoting industrial research and development (R & D), and a program for the promotion of indigenous technology. On-going research activities have confirmed the significance of these components. Future works should go into more detail down to the levels of products and processes.

### 2.4 The "Finance" Issue

The need to consider finance as an issue in industrial development

has stemmed from the fact that, the financial need of Thailand changes in tune with the transformation of the economy from basically a trading and an agriculture-producing nation to a manufacturing-nation. The demand for long-term private credit is growing. There is, therefore, a need to establish a mechanism to mobilize and channel long-term fund to industrial investment. This calls for a research on the financial institutions, with a view to identifying the necessary changes and the new measures. Furthermore, the government needs to have at its disposal, ways and means to finance the areas of high-priority in terms of industrial development. At present, there are research works in the areas of credit-guarantee scheme, export-credit guarantee and insurance schemes, industrial development fund, etc. Future works should be on the improvement of the existing institution and/or the proposals.

## 2.5 Summary

In sum, research on industrial development should include:

### Growth strategy

- Promotion of manufactured exports
- Subsectoral development
  - agro-industries
  - engineering industries
  - chemical industries
- Development of small-sized firms

### Location issues

- Survey of location pattern and plan for reorganization/relocation
- Promotion of industries in new locations

## Technology

- Technology plan for industrial development

## Finance

- Mechanism for mobilizing and channelling long-term fund for industrial growth
- Financial instruments for priority sectors.

### 3. International Trade

Research in the field of international trade should be organized into import-policy, export-policy, and the linkage between them. Trade policy should have several objectives including trade balance and the promotion of industrial and agricultural development.

Thailand never had an import policy, except for certain products. It is suggested that a comprehensive research program on import-policy be carried out. This program should include growth, pattern and direction of imports.

#### 3.1 Import Policy

For the next five years, it is necessary for Thailand to slow down the growth of imports, so that the balance of trade and the current account can be restored to a reasonable level. Apart from the adoption of a more realistic exchange-rate, the government may want to adopt other measures that make importation more difficult. The measures should be applied to products in general, so that there is no discrimination among products. Research should be to identify these measures. In addition, the government may want to consider using import-policy for export promotion, or for agricultural and industrial development. For each of these objectives, an instrument is required. For example, a counter-trade type of measure may be required for export promotion.



And for industrial and agricultural development, import-policy may be used for their promotion provided that local competition is fully permitted. The formulation of such a policy requires a considerable amount of research work.

### 3.2 Export Policy

Research on export policy is more extensive. A program can be organized along product-lines and along the product's countries of destination. Depending upon the availability of resources, the program should include at least the major export products and the major export markets. Issues to be investigated should include demand and prices, and how Thailand can influence these.

At present, since exports are subject to various restrictive measures imposed by the importing countries, there should be a research program on how to make the best use of the existing international mechanism such as the GATT-MTN and the GSP for our exports. And similarly to industrial development, finance for export is a major issue which should also be studied.

### 3.3 On Economic Cooperation

Finally, subregional cooperation is expected to play a more important role in the future trade of Thailand. For this reason, there should be a research program on economic cooperation among the ASEAN countries, and another program on economic cooperation among the Pacific Basin countries.

### 3.4 Summary

Research in the field of international trade should include:

### Import policy

- Strategy to slow down import growth
- Import policy for industrial promotion
- Import policy for agricultural promotion

### Export policy

- Export policy for major commodities
- Export policy for major trading partners
- GATT-MTN and GSP for export
- Financing export growth

### Regional cooperation

- ASEAN economic cooperation
- Pacific Basin economic cooperation

## III ISSUES OF DISCUSSION

## 1. Sectoral Development

Comment 1: Some high value-added export products do not have enough protection. It is felt that Thailand is developing and supporting industries with rather low value-added. It is recommended that research projects be done for high value-added sectors that cater to domestic market and/or export market to countries with low protection.

Comment 2: On studies of priority sectors, emphasis should be on the following:

- energy
- construction
- pharmaceuticals.

Comment 3: There is an urgent need for studies on productivity improvement. The cost of production can be substantially lowered by promoting modernization of plant and equipment to save energy and raw material.

Comment 4: Studies on service industry is lacking in our country.

## 2. Integrated Industrial Development Strategy

Comment 1: A question was posed whether industrial subsectors should be looked at, as a complete system or each subsector will develop leading toward a complete system.

Industry studies should take into account the interaction among all industrial subsectors emphasizing the forward and backward linkage effects. For example, agro-industry, engineering industry and chemical industry are all inter-

related, and each can support the other to provide a definite development pattern.

In response to the comment:

The above approach cannot be undertaken within the near future since a great deal of effort will be required to carry out such a study.

Comment 2: TDRI was asked to look at the "total path" approach to industrial development as a whole, starting from

- Inputs
- Production
- Outlet,

and whether these three components should be developed in relation to each other.

For Input : Development policy should make sure that the three major input components to industry must be at comparable status so that one does not drag down the other. These are:

- . Man
- . Money
- . Material

For instance, if there is a policy to develop the chemical industry, then the obvious questions would be: have we the manpower equipped with the technical knowledge and skill for the industry? If not, do we have a policy to develop it? What about money, what sort of financing opportunities are available? Do we have the required local raw materials at an economic price, or do we have to import? Do we have strategies to develop raw material sources?

For Production: Once we have the input or at least a policy about the inputs, do we have suitable technical infrastructure in our country for production? Or do we have policies to develop the technology in this particular area, if so, how? Policies should also cope with rules and regulations for production control such as safety-regulations and environmental-regulations. Are these regulations impeding the development of the industry?

For Outlet: It is obvious that there must be policies at the national level on marketing strategies, incentives, tax etc., to support the marketing of the products. Are the import/export policies in line with production and marketing? Inputs, production and outlet in the development of each industry must be in line with each other.

And to go a step further from each subsector, such as agro-industry, engineering industry or chemical industry, which were emphasized, consideration must be given to the interrelationship among these three subsectors. There should be policies to develop these subsectors in accordance with and, in support of each other. For instance, should the engineering industry have a policy to produce products in support of the agro-industry or, the chemical industry to reduce the imports of some engineering parts in the latter industries?

That is to say, when approaching industrial development, the country's policy should emphasize the interrelation of various subsectors so that they can develop as a system maximizing on the interrelationship and the common factors. This can be achieved by a proper "integrated" planning.

### 3. Technology

Comment: When discussing technology, one often mixes "technique" with technical "know-how". These two aspects are different. For instance, when cooking tempura, it is necessary to know what the ingredients are, but if the proportion of the ingredients mix and the right temperature of cooking oil are not known then it is likely that the end-product will not be a good tempura. This analogy can be applied to industry as well.

Related to industry, energy is a critical component in production, and research should be done on policies and techniques of energy-saving.

### 4. Finance

Comment 1: A thorough knowledge about a venture to be undertaken must be obtained. It must be feasible technically, marketwise, and financially, so that one will not have to pay for the product of ignorance.

Comment 2: The present situation that discourages equity-financing vis-a-vis loan financing should be corrected.

### 5. The quality of manpower for industry

Comment: There should be policies to highlight upgrading the quality and skill of manpower for industry.

It is possible to import technology or capital goods, to satisfy the industrial need, but manpower is something we must produce. Thailand lacks quality manpower who know how to work. There should be some kind of a national policy to train and equip people with technical know-how in

high-technology for industrial needs.

## 6. Import/Export

Comment 1: Import/export policies should go hand-in-hand. In international trade, most countries will regard buying and selling simultaneously, and a tactical use of import policy as a bargaining chip to promote export should be investigated.

Comment 2: It is recommended that research should be done to recommend import/export policies. This should be a concerted effort calling for a close cooperation with various government sectors to work hand-in-hand with researchers to set the right priority.

Comment 3: Studies on

- the future inter-regional import/export policy, and
- export policy and legality problems in both local and international trade,

are recommended.

In response to the comments:

Suggestions on import/export policies should certainly be incorporated in a study program. Time and effort will be greatly spent on compiling relevant information. This area of studies can be funded by the Ministry of Commerce from the "Export Development Fund".

Comment 4: TDRI should monitor import/export markets in order to supply information for government decision-making.

## 7. Counter-Trade

Comment 1: Issues on counter-trade, trade with Japan and trade with

the EC etc., are being contemplated by the government. A great deal of relevant data and information have been gathered and made available to interested researchers.

Comment 2: Export faces a lot of legality problems both locally and internationally such as, the US tuna import case. Our export policy should include counter-moves to maintain our international market. In each market negotiation, a great deal of study and preparation will be needed, but so far, it would appear that not sufficient preparation has been done prior to each negotiation.

## 8. Monopoly

Comment: The monopoly of industries supplying raw materials and intermediate products for other industries has rendered exportable goods uncompetitive. For instance the plastic industry: the cost of our plastic bottles is twice as high as that in Singapore due to monopoly pricing. Monopoly in various fields within the government is very costly such as the telephone, electricity etc.

It is very important for TDRI to pursue studies on monopolized markets in order to prevent shortsighted policies and measures that give rise to monopoly in the supply of raw material and intermediate products, particularly those used by exportables. Effort should be made to convey the recommendation to politicians, and decision-makers.



"Development Research and National Development"

Position Paper No.4

NATURAL RESOURCES AND ENVIRONMENT

by

Anat Arbhabhirama  
Anek Chandarawongse  
Kasem Chankao  
Sunt Rachdawong  
Sopon Chomchan  
Surin Setamanit  
Theodore Panayotou

ABSTRACT

There are altogether 3 papers that constitute the paper on Natural Resources and Environment. The land, water and forest resources have been combined and treated as agricultural resources while mineral resources and environment have each been treated as 2 separate topics. In the Agricultural Resources paper, it was recognized that the remarkable performance of the agriculture sector attributed to the expansion of the cultivated area would have to stop because the country is now facing limits to its land frontier. Water supply must be balanced with water demand through water management so that the abundant water in the rainy season can be stored for domestic agricultural use during the dry season. And because of its role in the quality and availability of water in agriculture, industry and transportation, the state of the watersheds should be protected. The combined land problems mainly as a result of destructive practices, ownership-status and inefficient legislation; the water problems of quality, quantity and availability; and, the forestry problems of deforestation and encroachment into watershed areas will certainly threaten the past productivity of the agricultural sector. It was recognized that measures to arrest these problems would have to be more policy and management-oriented. In reacting to these issues, TDRI outlines research and policy issues on land, water and forestry for its intervention.

The second paper on mineral resources stresses the economic importance of the mineral industry as a source of government revenue, as a source of foreign exchange and, as a source of employment. Because of this economic significance, the industry must be afforded with well-defined guidelines and policies that will address the role of the government in developing the mineral industry, in promoting the industry, in

enforcing taxation measures and, in curbing illegal activities. TDRI's role in these various contexts is defined by way of studies that would formulate strategies for mineral resource development, recommend measures to acquire land for mineral development and investigate the types of minerals to be processed and for other appropriate purposes.

The last paper on environment classifies two main issues that are of environmental concern to Thailand into: industry and human settlement in nature, and natural resources in nature. Contrary to research by government agencies, past attempts at research in environment by universities indicate a tendency to merely gather information or, develop methods and technologies completely lacking the theme for policy and planning. Although there have been several such researches undertaken, these research works lack the integration that would have otherwise been useful for policy and planning. TDRI seeks to fill in these gaps, which are outlined and centering on natural resource conservation, intensified environmental impact assessment, improved environmental education and training and, strengthened research capability.

"Development Research and National Development"

Position Paper No.4

AGRICULTURAL RESOURCES

by

Anat Arbhabhira  
Anek Chandarawongse  
Kasem Chankao  
Sopon Chomchan  
Theodore Panayotou

I ABSTRACT

Over the past 20 years, agriculture grew at a remarkable rate of 5% per annum. This growth, however, has been the result of the expansion of land for cultivation rather than higher yields although substantial investments have been given to irrigation and agricultural research. With the recognition that the limits to the land frontier are now being approached, future agricultural growth would have to come from productivity improvement. The paper starts by a discussion of the present state of agricultural resources in Thailand, viz., land, soil, water and forest resources and continues by discussing the emerging policy research issues. Current land problems, as pointed out in the paper, have been the result of poor and destructive land use practices, the absence or lack of a coherent land classification and land use schemes, land policies, proliferation of government agencies involved in land policy-making and ineffective legislation. Severe encroachment into reserved forests especially in watershed areas, disincentives to land improvement because of insecure ownership and inadequate water control have led to severe erosion, general deterioration of land quality, nutrient leaching, floods, droughts, salinization and sedimentation of irrigation systems. The catastrophic effect is one side of the coin; the other side is the changed position of Thailand from a log exporter to a log importer.

In a predominantly agricultural economy, water control and storage is crucial in order to balance the supply of water with demand for water. The abundant waters in the rainy season can be stored for use in the dry season through a combination of watershed management and irrigation development. While irrigation is important for higher cropping intensity, its efficiency has been a low 15% compared to a potential of 40 - 70% attributable to poor maintenance of facilities, lack of institutional arrangements for water management, and the provision of water, free-of-charge. Poor water quality as a result of

agricultural/industrial pollution and soil erosion is another serious problem because of its detrimental effect on inland fisheries and aquaculture. But of more crucial importance is the state of the watershed areas because of their strategic location, their role in the availability and quality of water, their seasonal distribution and their effects on the efficiency of downstream irrigation, transportation, industry etc. Figures reveal that, the second-generation effects e.g. erosion, flooding etc., will start to outweigh increased production through added land. The common property status of forest lands has also discouraged the necessary investments in preventive practices such as agroforestry. There is an urgent need for research to determine the optimum area under forest and to formulate cost-effective policies to attain it. The last two portions of this paper outline possible research areas for TDRI under the 3 main classifications of land, water and forest resources. The role of TDRI in the design and management of this research is also briefly discussed.

## II THE PAPER : AGRICULTURAL RESOURCES

### 1. Introduction

Thailand continues to be a predominantly agricultural economy despite the rapid industrialization in recent years and the steadily-declining relative contribution of agriculture to the national economy. Agriculture (including forestry and fisheries) still produces a quarter of the GDP, employs over two-thirds of the labor force and is the major earner of foreign exchange. Over the past 20 years, agriculture grew at the impressive rate of 5 per cent per annum. However, most of this growth has been accomplished through an expansion of the land area rather than higher yields, despite substantial investments in irrigation and agricultural research. It is generally recognized that the limits to the land frontier are now being approached and that future agricultural growth would have to come from productivity improvement. However, productivity improvement require effective water control and efficient management of irrigation systems, as well as on-farm investments in land improvement and the use of purchased inputs such as fertilizers, pesticides and high-yielding seed varieties. Efficient use of irrigation water is currently hindered by the lack of both effective water-user organizations and appropriate water-pricing. On-farm investments and

the use of high-yielding inputs are hindered by the insecurity of land ownership which affects as much as 50% of the country's agricultural land, and deprives the farmers of both the means (credit) and the incentives to invest.

It is also recognized that the uncontrolled deforestation and rapid expansion into watershed areas and marginal lands has brought about second-generation problems such as, soil erosion, floods, droughts and sedimentation of irrigation systems which pose a threat to the resource base and hence, to the sustainability of the Thai agriculture. As new land is brought into cultivation through forest encroachment, old (and new) land is lost to erosion, salinization, nutrient-leaching and flooding, precipitated by the denudation of the watersheds, the mismanagement of irrigation systems and, the inappropriate land use and cropping patterns. Moreover, the lack of land use planning results in mis-allocation of land between uses and a socially-suboptimal distribution of crops, industries and human settlements.

Not only are critical watersheds denuded with catastrophic effects on water and land resources and hence on agriculture, but also production forestry has declined to a point where Thailand, from a major net exporter of tropical wood, is now a net importer. Equally alarming is the increasing scarcity of fuelwood in rural communities which have traditionally relied on the forest for energy and cannot yet afford imported fuel.

The advancing deterioration of agricultural and rural resources (land, water and forests) coupled with the approaching limits to the land frontier threatens to arrest Thailand's agricultural growth if trends continue, to reverse the impressive gains of the past 20 years. Clearly, new policies are called for but, to manage and conserve Thailand's agricultural base, little information and analysis exist on which to base such policies. In-depth policy research is a prerequisite to effective policy formulation for long-term resource management. The Thailand Development Research Institute is well-positioned to

undertake such in-depth policy research because of its long-term perspective, analytical capability and linkage to the policy-making process.

## 2. The State of Agricultural Resources

### 2.1 Land and Soil Resources

Thailand has an area of about 320 million rai of which 100 million are classified as unsuitable for agriculture, 84 million rai as suitable for paddy, 68 million rai for upland crops such as maize, sugarcane and cassava and 16 million rai for perennial crops. The balance of 50 million rai are marginal lands generally unsuitable for agriculture but potentially-useable for special crops if appropriate measures are taken (Land Development Department).

In 1980, of a total cultivated area of 147 million rai, 83 million rai were under paddy, 49 million under crops and vegetables and 15 million under perennial crops (TURA, 1980).

The national forest reserve covered an area of 123 million rai while another 50 million rai was unused low-lying land, pasture and water-bodies. While a comparison between aggregate figures reveals no land misallocation, in fact, over 13 million rai of paddy and over 14 million rai of upland crops were planted in land "unsuitable" for agriculture. Moreover, about 4 million rai of forest with a slope above 35% were encroached for crop cultivation. In total, 33 million rai of the national forest reserve of 123 million rai and, another 30 million rai of forest in line for reservation were found to be encroached in 1983 (Social Science Institute 1983). At the same time, land suitable for agriculture is being used for other activities such as housing and industry. As a result of the uncontrolled expansion of agriculture and encroachment of the forest reserve, there is at least one million households settled in forest reserves without proper titles to the land they occupy and cultivate (World Bank). Even

outside the forest reserve where land is occupied legitimately, there are 40 million rai of untitled land. According to a study by the World Bank, "only 50% of the total land area under agriculture can be considered to have 'secure' ownership rights (acceptable for medium and long-term loans)." The lack of security for the remaining areas constitutes an important abstacle to farm investments ... necessary for increased intensification of agriculture". A move in the right direction is the new land "reclassification" scheme under the Structural Adjustment Program to provide farmers in encroached forest areas with special certificates (Sor Tor Kor) to establish their "right" to farm at least, part of the land they now occupy.

Partly for historical reasons and partly because of availability of open-access to land frontier for expansion, neither land-tenancy nor landlessness have been extensive in the past. With the approaching limits to the land frontier, the increasing commercialization of agriculture and the continuing population growth, both tenancy and landlessness have been increasing in recent years and are expected to accelerate with the intensification of agriculture. It is believed that urban land holders are accumulating rural land for speculation while farming households are losing land to mortgages, drought and soil erosion. (According to the World Bank, there are no less than 500,000 families of landless farmers). This situation has created demands for the government to legislate and enforce limits on land ownership. The Fifth National Economic and Social Development Plan (1982-86) provides for a limit of 50 rai to private individual landholdings for agriculture, but it is still legitimate for individuals to hold unlimited areas of land. Land taxes are regressive and bear no relationship to the use of land or, to the cost of infrastructure provided by the government.

The uncontrolled expansion of agriculture into watershed areas and marginal lands, the disincentives to land improvements arising from insecure ownership, the lack of land use planning and management and, the inadequate water control have all led to severe erosion over

extensive areas and, to the general deterioration of the land quality such as, nutrient leaching, salinization and alkalinization of soils. According to the Land Development Department 30 million rai of agricultural land are 'very severely' eroded, 43 million rai 'severely' eroded and 26 million rai 'moderately' eroded. The Fifth Plan calls for the improvement of 48 million rai of saline soils in the Northeast and 2.3 million rai of acid sulphate soils in the Central Region. Soil erosion is cumulative in nature and intimately related to deforestation in the watersheds. For instance, in the Nam Pong watershed, (11,500 km<sup>2</sup>) soil erosion is predicted to reach an annual rate of 11.83 million tons of soil when the forest area is reduced down to 2,000 km<sup>2</sup> which is expected to occur by 1987 (Mekong Committee 1982). Soil problems limit the range of uses to which the land may put and reduces its productivity in any given use. Inappropriate land use leads to soil degradation and the shifting of land to inferior uses such as shrubs, grassland and complete idleness. Shifting cultivation, practiced mainly in the highlands of the North, is particularly damaging, especially as the fallow cycle is increasingly shortened due to population pressures. Because of the poverty of the upland farmers and the downstream effects (i.e. erosion, flooding etc.) on other lowerlying land, erosion has become an issue of public concern which calls for government intervention. There is considerable scope for reducing erosion through changes in land use patterns, introduction of land use planning and, provision of incentives for on-farm land improvements as well as through creation of alternatives to shifting cultivation and high-slope agriculture.

An equally-important factor responsible for the country's land-related problems is the lack of a coherent land policy, and the proliferation of government agencies involved in land policy-making. There are today as many as twenty-four government agencies and several committees with overlapping responsibilities over land. There are seven different laws on land including Revolutionary Orders concerning land and various cabinet resolutions and several ministerial decrees.



## 2.2 Water Resources

Thailand's climate is governed by monsoons with the rainy season running from May to October but in fact, the distribution of rainfall is bimodal with its bulk concentrated in the tail ends of the rainy season, in contrast to the demand for water which is more or less even throughout the year. These features make water-control and storage crucial to the balancing of water demand and supply especially in a predominantly agricultural country. The flash floods of the rainy season may be controlled and the water stored for the dry season through a combination of watershed management and irrigation development. It is estimated that 130 million cubic meters of water or 25% of the annual rainfall flow through Thailand's rivers which include: in the Central Plain, the Chao Phraya with its Northern tributaries Ping, Wang, Yom, Nan and Pasak; in the Northeast, the Chi and Mun rivers which empty into the Mekong; and, in the West, the MaeKlong and its tributaries Kwaie Yai and Kwaie Noi.

As we have already seen, Thailand's watersheds have not been properly managed and many of them are largely denuded by the combined forces of commercial forestry, shifting cultivation, upland agriculture and fuelwood collection. The destruction of critical watersheds accounts for the increased frequency and severity of floods and droughts. For example, the damaged area of paddy in non-irrigated areas has increased from less than 10% of the planted area during the 1960's and early 1970's to about 20% (over 6 million rai) during the last 1970's (Royal Irrigation Department).

During the Fourth Plan, for which detailed data are available, the development expenditure on irrigation reached 15 billion baht. While irrigation has contributed significantly to higher cropping intensity and, to higher crop yields in the irrigated areas, its efficiency has been very

low due to poor maintenance, lack of appropriate institutional arrangements for water management (e.g. water rights and water-user organizations) and the provision of water, free-of-charge. According to the Asian Development Bank, "The total area of second and third crops is estimated at no more than 25% of the area irrigated... the early investments in large-scale irrigation projects did not yield the planned return, mainly because of 'low efficiency' which was estimated at 15 percent compared to a potential of 60 to 70%."

Moreover, the provision of water free-of-charge has distributional consequences which are out of line with the national objective of reducing socio-economic disparities: the cost of irrigation infrastructure is financed from the general taxation of agriculture (and other sectors) including non-irrigated areas but the benefits are enjoyed free-of-charge by the already better-off irrigated areas of the Central Plain. This amounts to a net subsidy of the irrigated areas as a tax on rainfed agriculture. There is currently a shift towards small irrigation and water control projects in the Northeast and emphasis on better maintenance and improved utilization of existing irrigation systems in the Central Plain, but the analytical base for a new irrigation policy and water pricing and management is lacking.

The utilization and efficiency of existing irrigation systems can also be improved by making better use of their multipurpose design to increase the hydropower output which help conserve some of the scarce foreign exchange spent on imported fuel. However, because of water scarcity and consequent conflicts with the agricultural use of water during the dry season, appropriate trade-offs must be determined based on government objectives and policy analysis. Similarly, there is a need for the development of a set of rules for the allocation of water to regions deficient in water resources and, to regions whose demand for water is rising such as the Eastern Seaboard, since there are clearly opportunity costs to such transfers.

There is also a need to pay special attention to water quality which

has suffered in recent years from agricultural and industrial pollution and soil erosion, with severe consequences for inland fisheries and agriculture. For example, a water-quality related epidemic in late 1980-early 1983 has caused damage of 120 million baht to 5,600 fish ponds and a flood in late 1983 devastated 7,900 fish farms, an estimated damage of 200 million baht (Bangkok Bank 1984). Regulation of pesticides use in agriculture and influent standards and charges for industry need to be established. Policy research can help determine the appropriate types of rules and levels of charges as to achieve the desired level of water quality with the minimum reduction in efficiency.

However, the most urgent and crucial policy and research issue in the area of water resources relates to the state of the watersheds because of their strategic location and role in the availability of water, its seasonal and spatial distribution and quality and, the economic life and efficiency of downstream irrigation systems. The annual flash floods during the rainy season, the drought during the dry season, the chronic water-control/water-shortage problems of the Northeast and the reduction in the economic life of many irrigation dams have their source in the uncontrolled destruction of the watersheds. Chunkao and Ronysuynern (1982) report that the sediment yield in the Mae Tang River in Northern Thailand increased from 1,000 kg/ha in the late sixties to more than 3,000 kg/ha in the late seventies; while the Mekong Committee (1982) predicts that sedimentation in the Nan Pong reservoir in the Northeast will reach a maximum of 2.4 million tons per annum by 1987.

The rehabilitation and management of Thailand's watersheds are not easy tasks because of their remoteness and, the ethnic and cultural diversity, political sensitivity and economic poverty of the areas involved. Effective policy formulation calls for a careful study of the state of upland resources and their downstream externalities as well as the socio-economic conditions of the local communities and the political implications of government intervention. Unless water,

land and forest are looked at as a system (rather than as individual resources) and, unless human resources are seen as part of the same system, any policy would be either ineffective or prohibitively costly to enforce.

### 2.3 Forest Resources

Of the three agricultural resources, land, water and forests, the latter seems to be the least relevant, and perhaps inimical to agriculture; yet, it is the most strategically-located resource of the three, when it comes to watershed protection. True, forest is crowding out agriculture and deforestation expands the cultivated land, but beyond a certain point, the second-generation effects of deforestation in critical watersheds (e.g. erosion, floodings etc.) begin to outweigh the increase in production from the added land. Thailand has reached or, is about to reach this point.

According to the Royal Forestry Department, the forest cover as a percentage of the total land area of the country declined from 72% in 1938, to 66% in 1958, 43% in 1973 and 31% in 1982. The depletion rate was estimated at 3 million rai per year. These figures however, underestimate deforestation and overestimate the forest resources because they do not take into account the selective encroachment within the forest and the degradation of the forest stand. A more realistic figure for the effective forest cover would be closer to 25% of the country's total land area.

Thai log exports have virtually dried up (and more recently, banned altogether) and Thailand is becoming increasingly dependent on inputs of logs (204,000m<sup>3</sup> in 1979). Yet, deforestation continues as a result of illegal logging, fuelwood consumption (25 million m<sup>3</sup> in 1980), shifting cultivation and clearing of land for permanent agriculture. The selective-cutting practiced in Thailand for many years has contributed to a rapid degradation and depletion of forest resources by allowing concessionaires to overcut in concession and adjacent areas

and, illegal loggers to operate undetected. A possible change from selective to clear-cutting requires further research.

Deforestation per se is not a problem unless the cleared land is degraded or, put to inferior uses or the clearing of forests has adverse effects on the environment on other sectors of the economy such as, agriculture, fisheries, and industry in excess of related benefits. This indeed, appears to be increasingly the case today in Thailand as watersheds and marginal lands are cleared for cultivation. The low agricultural productivity of steep-slope land and its rapid deterioration in the absence of land improvements (inhibited by insecure ownership) results in quick abandonment and eventual conversion into unproductive grasslands. Even where land is suitable for trees and perennial crops and agroforestry can be profitably practiced, the common property status of forest lands has discouraged the necessary investments.

The government has been fighting an uphill battle to conserve and protect Thailand's forests. As far back as the early sixties when 60% of the country was covered by dense forest, the First National Development Plan (1961 - 1966) declared a national forest reserve of 156 million rai or 50% of the land area. In the early 1970's when the forest cover fell to 50% of the total land area, the Royal Forestry Department adjusted the national reserve figure to 40%. Presently, with the forest area down to 30%, the "40% forest cover" remains a distant goal. Of course, there is nothing magic about this figure. A recent NESDB-funded study (CUSRI 1982), arrived at the figure of 48% (31% protection forest and 17% commercial forest) by including areas having a slope greater than 35% and high-erosion potential, declared national parks and wildlife reservations. More appropriately, the determination of the optimum forest area should also take account of long-term economic factors and the interdependence between agriculture and forestry. This would result in a more flexible and dynamic definition of optimal forest area that would allow adjustments to changes in social and economic conditions.

However, such considerations require considerable amount of physical and economic information and analysis. Once the optimal forest area at a given point in time and place is determined, there arises the question of the most cost-effective means to attain it and protect it from encroachment. Forest laws as a tool of forest protection have been introduced in 1941 and revised in 1948, 1960 and 1964, and supplemented with the Wildlife Preservation and Protection Laws and the National Park Laws in 1961. However, in practice, the enforcement of forest laws and regulations has been prohibitively costly and has not been very effective. The effectiveness of forest laws as a tool of forest protection in Thailand and, the possible alternatives is another area requiring close attention and research.

In contrast to the rapid deforestation, reforestation and the introduction of forest plantations have been slow because of the long gestation period, high interest rates, the uncertain status of forest lands and, the inability of the forest owners to cash on the social and environmental benefits of their forest investments. High protection cost and insufficient funds and lack of incentives have also limited public investment in protection and production forestry.

Most imaginative and successful (on a small-scale) has been the concept of the forest village (implemented by the Royal Forestry Department and the Forest Industry Organization) whereby the farmers in the forest and the shifting cultivators are paid a wage to plant trees and a bonus for servicing trees and are, at the same time, allowed to plant their crops among the trees stands during the first few years. Unfortunately, the system is too land-intensive to support the entire population engaged in shifting cultivation. Research is necessary to modify the system or, design alternative systems with appropriate incentive structure, which can accommodate a larger population, and can be applied on a larger scale.

Research is also necessary into the economics of other reforestation schemes and agroforestry projects, with the purpose of identifying

and reforming forest laws and regulations and modifying administrative procedures and structure to attract more involvement from the private sector.

Last and foremost, there is a need to formulate a coherent and consistent national forest policy consonant with overall national development objectives. In the past, seventeen Director-Generals of the Royal Forestry Department have set policies and regulations which are not widely-known nor understood outside the forestry circles. The formulation of a national forest policy requires analysis beyond the domain of forestry with due consideration to its interactions with the other sectors such as, agriculture, fisheries, industry, energy and mining and its role in the national economy. Moreover, the effects of macroeconomic policies on the forestry sector, though indirect, are often significant and should be taken into account in formulating a national forest policy.

### 3. Research and Policy Issues

From the foregoing review of the state of agricultural resources in Thailand, a number of issues emerge as priority areas for research and policy. Ideally, the three resources, land, water and forest should be studied as a system by a multi-disciplinary group which should include, among others, soil scientists, water engineers, foresters, agronomists, economists, sociologists and legal specialists, environmentalists and, political scientists. However, for exposition purposes we divide these issues into three groups according to the dominant resource. (The issues are not listed in terms of priority but in the sequence of appearance in the text).

#### 3.1 Land Resources

- Land use planning
- Land reclassification and titling

- Land tenancy and landlessness
- Land legislation and taxation
- Soil problems (erosion, salinity etc.)
- National land policy and administration

### 3.2 Water Resources

- Rehabilitation, protection and management of watersheds
- Improvement of irrigation management and utilization
- Water pricing
- Distributional impact of irrigation investments
- Small-scale irrigation and water control (Northeast)
- Rules for allocating water between areas and activities (irrigation, hydropower, transport, industry etc.)
- Water quality improvement
- On-farm water management
- Flood and drought management
- Groundwater resource development and management

### 3.3 Forest Resources

- Switching from selective to clear-cutting
- Determination of critical watersheds and watershed-zoning and classification
- Economics of forestry
- The causes and consequences of deforestation
- The effectiveness of forest laws as protection tools and possible alternatives
- The economics of reforestation and plantation forest



- The forest village and possible improvements
- The usufructuary certificate grant (Sor Tor Kor) policy
- National forest policy

#### 4. The Role of the Thailand Development Research Institute

The policy research issues we have just identified are critical to the preservation of the resource base and to the sustainability of Thai agriculture and, by implication, to the country's future economic growth. As such, they are long-term policy issues requiring a long-term perspective and a strong and lasting linkage to the policy-making process, independent of the day-to-day politics. Moreover, they are diverse and complex issues requiring a comprehensive data base and a rigorous analysis cutting across several disciplines. The need for a systemic approach to diverse, yet interdependent, issues with long-term implications underlines the importance of research management and continuity within an integrated institutional framework.

The Thailand Development Research Institute has a comparative advantage in designing and managing such research by virtue of its own analytical and integrating capacity, its flexibility and access to outside analytical capability, its long-term perspective and sustained support and its autonomous management and strong linkage to the policy-formulation and implementation processes.

The flexible set-up of TDRI allows it to operate as a foundation in bringing together scientists and policy analysts from several universities, research institutes and government agencies, as well as foreign expertise to analyse issues that no single institution can address on its own. The institutional framework of TDRI affords the researchers a long-term perspective and sustained interest, an integrating mechanism and an efficient research management and, an advanced Information Center and modern research facilities in the future.

The Institute's neutrality and autonomy allows the scientist to address policy issues without being entangled in politics. At the same time, TDRI's strong linkage to the National Economic and Social Development Board and other government agencies ensures access to information and dissemination of the research findings, and policy recommendations to policy makers. Even after the research is completed and policy decisions are made, the Institute has in place tools and mechanisms such as seminars, workshops, training programs, and continuing education activities to diffuse these policies in all sectors of the government and the public and, to assure their effective implementation.

## 5. Appendices

## APPENDIX A - Land Resources

## 1. Introduction

Land is fundamentally an important natural resource for the socio-economic development of any country, especially those dependent upon agricultural production such as Thailand. During the past twenty years, the increasing agricultural output has been achieved largely through a rapid expansion of the area under cultivation. Moreover, the government policy in this regard has not been conducive to the planned expansion of cultivation. It is estimated that the land suitable for agriculture has now been almost completely utilized. Sporadic, unorganized migration has been the rule that resulted in encroachment into the national forest reserve and the indiscriminate deforestation. This has, not only, resulted in the wastage of valuable national assets but has also been the cause of social tension. As a consequence of uncontrolled land use, Thailand is facing increasingly serious problems in land management and development in varying degrees in all regions.

The overlapping of responsibilities among government agencies engaged in solving these problems means that no specific institution could be responsible for recommending an overall policy.

The above-mentioned problems, if left unattended, could lead to serious political, economic and social implications. Therefore, there is an urgent need to establish a national policy and to enact concrete measures on land use and development.

## 2. The Present Land Status

Thailand has an area of 320,696,950 rai, based on a soil map at a scale of 1:500,000. The land suitability for agriculture can be classified as follows:

- Area suitable for upland crops - 67,683,529 rai or 21.11%
- Area suitable for paddy - 84,469,300 rai or 26.33%
- Area suitable for perennial crops - 16,359,806 rai or 5.10%
- Area generally unsuitable for economic crops but potentially-suitable for cultivating special crops if there are provisions for appropriate measures - 49,828,820 rai or 15.53% (Table 1)
- Area unsuitable for agriculture - 99,876,685 rai or 57.1%

In 1980, the total cultivated area is 146,942,786 rai which can be classified by the following types of land use:

- Paddy - 82,783,756 rai or 57.1%
- Upland Crops - 48,462,508 rai or 32.9%
- Vegetables - 88,061 rai or 0.06%
- Fruits and Perennial Crops - 14,608,433 rai or 9.04%

In addition, there are 123,394,201 rai of national forest reserve plus another 50,351,991 rai of unused low-lying land, pasture for livestock-raising, communities and water resources.

From a comparison of the present land-use with the land suitability, it has been found that a substantial amount of agricultural land was misused especially the cultivation of paddy on unsuitable soils which amounts to 13.48 million rai and, the growing of upland crops on unsuitable soils which amounts to 14.58 million rai. Another type of land misuse is the encroachment and destruction of forests having steep slopes, especially those exceeding 35%. The total encroached area nationwide reached 3,949,392 rai; and 1,895,712 rai of these was found in the North. Most of the encroachment is for cultivating upland crops with no soil and water-conservation practices whatsoever.

Another kind of prevalent land misuse is the use of land highly suitable for agriculture for non-agricultural activities such as housing and factories.

#### Land Policy (Past and Present)

In spite of the lack of a coherent national mechanism that would enable efficient and concrete implementation of land development during these past years, guidelines underpinning the administration of the national land use based primarily on the various policies have been formulated by various National Economic and Social Development Plans accordingly:

- The First National Economic and Social Development Plan (1962 - 1966), emphasized the classification of land types and land allocation for settlement.
- The Second National Economic and Social Development Plan (1967 - 1971), emphasized the improvement of land-ownership for agriculture, land-leasing system for agriculture and the capacity of land use for agricultural productivity including the land development essentially by conservation.
- The Third Economic and Social Development Plan (1972 - 1976) emphasized ownership, land-holding for agriculture by supporting farmers to own land, preventing or eliminating the loss of land-ownership for agriculture, accelerating the maximum use of land including the conservation of land resources.
- The Fourth Economic and Social Development Plan (1977 - 1981) emphasized land reform as a primary component for agricultural development by improving the right of land-holdings for agriculture, the improvement of resources and production inputs, including improvement in the efficiency of the modes of production. Additionally, the appropriate land use regulations responsive to the economic, social, political and natural environment were to be encompassed.

- The Fifth National Economic and Social Development Plan (1982 - 1986) emphasizes on the following:
  - accelerating land use policy formulation
  - holding limit not to exceed 50 rai for private individual landholder for agriculture and the establishment of the land bank.
  - accelerating land reform, emphasizing the central and the lower northern regions.
  - surveying fertile soils in deteriorating forest areas to be allocated for settlement to farmers.
  - improving legislation to regulate the rate of land-leasing.
  - improving problem areas, e.g. saline and alkaline soils, ground water podzol soil, and land erosion in the North.
  - improving legislation for the protection and preservation of the land area for agriculture.

Apparently, each plan covered broad perspectives of land management. Likewise, different government-designed projects based on relevant current problems pertaining particularly to the government's land policies, could be categorized as follows:

### 3.1 Policy on Land-type Classification

The First National Development Plan stated explicitly that it was necessary to reserve 156 million rai of forests as national forests, there were then 187 million rai of total forest area of which 62.5 million rai was designated as watershed area. The plan allowed for a possible decrease of forest area to 125 million rai to accommodate the increase of the population. (Government Gazette, Special Issue No.77, Section 85, October 20, 1960).

The Ministry of Interior set up the implementation of the land type classification by establishing the Center attached to the Land Department

in 1961 to conduct surveys and evaluation. Later in 1964, the Cabinet transferred the task to the Land Development Department.

Since their implementation from 1962 to 1966, several types of land have been classified, locating a total area of 162,209,668 rai to be kept as forest areas (Office of the Land Type Classification Committee, 1977) whereas, the declared figure of the Forestry Department was 123,394,201 rai for National Forest Reserve until the end of December 1971, (Forestry Department, 1972).

### 3.2 Policy on Land Allocation for Settlement

The clause that partial land should be allotted to landless citizens for cultivation in the first National Development Plan, was supported by succeeding governments through legislating laws and regulations. This, provision however, resulted in the existence of 14 different government agencies engaged in allocating land for settlement, and functioning with different operational goals.

### 3.3 Policy and Land Rights

Land rights legitimately concern citizens and the government has earnestly tried to solve related matters of issuing title deeds of proprietary right by the Land Department as well as the improvement of land rights and holdings for the relocation of settlements in the national forest reserve areas.

### 3.4 Policy on Land Development

Since its inception in 1963, the Land Development Department has systematically developed the process of land survey techniques, classification of land suitability, land improvement and land reservation, but there was not as yet any legislative for system support. In 1983, the Land Development Act was passed to formulate policy directives for the Land Development Committee to carry out surveys, classifications,

census, planning and development of land.

Another explicit policy was on Land Consolidation, an Act which was passed for enforcement in 1974.

### 3.5 Policy on Land Use and Rights

Due to the above-mentioned lack of specific land policies which voids the necessary linkages in the planning and policy formulation, several accumulated consequential problems have subsequently emerged. The Subcommittee on Land Development appointed by the National Rural Development Committee studied the matter and set up the policy on Land Use and Rights which was approved by the Cabinet in June 1984. The Policy is essentially determined to:

- make land classifications more realistic according to prevailing conditions.
- issue title deeds of proprietary right by the Land Department allowing for permanent settlement to inhabitants in the forest areas to be reserved but encroached under the condition of fertile soils suitable for cultivation; the conditions for reservation should then be removed.
- organize projects for the right of settlement by the Forestry Department in the case of trespassing in forest reserve areas.
- restrict forcefully the reservation in areas where there remain a perfect condition for forestry.

### 4. Conditions Deriving from Past and Present Policy on Land

Due to the lack of a coherent plan in the past affecting several other natural resources as well as the economic and social problems, the following conclusions can be made.

Land administration is made complicated because of the existence of 24 government agencies concerned with land (Table 5). There are



several agencies with overlapping capacities, for example, there are 14 agencies involved in land management, and as many as 10 committees formulating policies on land use. There are 7 laws on land including Revolutionary Orders concerning land, Cabinet Resolutions, as well as several ministerial decrees. Population growth and the lack of a coherent administration have created a serious problem of forest encroachment for settlement. No matter how government agencies would have attempted, they simply could not respond to the population demand. A recent study revealed that, out of the 123 million rai of forest reserve, a total of 33 million rai have already been encroached (Social Science Institute, 1983) and an additional 30 million rai of forest on line for reservation have also been encroached. Moreover, the problem on land ownership fall under 3 categories:

- The problem of legitimizing land ownership to those who have legally-settled. At present, the Land Department has issued various types of deed of proprietary rights for approximately 90 million rai (Kavalinsarit, 1981). There is still a remaining 40 million rai yet to be untitled. Under the World Bank Loan, The Land Department is accelerating this process, which would be completed within 20 (twenty) years.
- The problem of inhabitants already settled in the forest reserve as well as on-line reserve areas. The World Bank has approximately estimated not less than 1 million households settled in the forest reserve areas. Even the Forestry Department's projects on Rights for Settlement in these areas, could only address short-term problems.
- The problem of land rights where inhabitants trespass public estate without holding rights. When government agencies such as the Office of the Land Reform attempt to address the problem, they become immersed in several difficulties.

Under the present law, it is still legitimate for an individual to own

an unlimited area of land. This factor contributes to the practice of inappropriate holding of land. Most major land holders are land speculators who hoard land for future profits. They leave blocks of land unused waiting for development or sale. This contributes towards the problems of cultivation and shortage, for people with lesser purchasing power.

The present land tax-collection is not being based on the amount of land-holding, the use of land and the cost of infrastructure for which the government has substantially invested. Even for the value-estimate of land and housing for tax assessment, the present system is rather inadequate and certainly not standardized. The large land holders are not required to pay progressive tax; the tax rate remains the same for small holders as well as for large holders.

Though, there has never been a serious study on land for cultivation, the evidence is that the loss of land comes from such causes as the breaking of the family, the losing of land to the mortgagee, drought and soil erosion. According to the World Bank Report estimate, there are no less than 500,000 families of landless farmers.

The absence of an efficient government control over the use of land, has resulted in many types of land misuse such as, cultivation of crop on steep-slope areas, building houses and factories on fertile land which is more suitable for agriculture. The latter can be found even in irrigated areas.

As a consequent effect of the land misuse and carelessness in land preparation, an accelerated soil erosion has, thus, resulted.

In the assessment of the 1982 Budget Bill, the House Budget Committee made the following remarks on the land problems:

- Government should allocate land for cultivation for farmers as fast as possible to reduce the encroachment of public

lands and of national reserve forests, and

- The government should pool all concerned agencies dispersed within various ministries, departments and divisions such as the Land Department, the Land Development Department etc. under a single organization so that cooperation will be effected and the people will benefit fully.

## 5. The Implications of the Present Land Policy

If nothing is done to solve the land problems reflecting the present lack of land policy, the harmful implications will continue unabated. Land for agriculture has reached a critical state due to the rapid expansion of the area under cultivation. The land suitable for agriculture is almost completely utilized. Whatever is left, can be found only in forest area. If there is no clear-cut policy line drawn between agricultural and forestry areas, the crisis of land needed for agriculture will result in encroachment into the national forest reserve. Its damage will be even more severe than the present state of deforestation. Land erosion is the result of land misuse and improper management especially on areas with steep slopes. Both the area and the quality of productive land will be further reduced. Due to the lack of land control law, the land misuse i.e., area of land suitable for agriculture presently-serving residential and industrial purposes, will continue to increase.

## 6. Past Land Policy Studies

The past studies on land policy were considered moves in the appropriate direction . The study of land policy and land use by the Thai University and Research Association (TURA) conducted in 1980, included four topics:

- Natural Resource: Land, Forestry and Land Use
- Land Preservation

- Land Reform and Land Management
- Land Right

A portion of this study recommendation concerning forestry and land rights was incorporated into a national policy which was approved by the Cabinet on July 22, 1982. The "Policy Study of Agricultural Development and Related Activities" of the Regional Research and Development Center, Asian Institute of Technology in 1983, provided the following suggestions;

#### 6.1 Land Use Policy

- Set appropriate guidelines and control measures for various land uses prohibiting misuse of land where substantial investments have been given by the government in the form of basic infrastructure and accelerate the establishment of land-use plan at the provincial level throughout the country.
- Formulate appropriate agro-economic zones by taking into consideration the soil capability and yield of each of crop in line with production policy. Measures are needed to assist farmers who cultivate the recommended crops and to provide marketing facilities for those who cultivate in controlled areas.

#### 6.2 Soil Erosion

Set up plans for the conservation of soil and water at the national level together with establishing measures for soil and water conservation to prevent and correct soil deterioration. The government should classify by area, the type of the problem and the assistance sought to remedy the problem.

#### 6.3 Special Problem Soils

Set policies which promote and accelerate research on improving areas

with problem soils such as, saline and alkaline soils, acid sulfate soil, sandy texture soil, ground water podzol soil, vertisols soil, hard pan and skeletal soils, so that these areas can be used as efficiently as possible.

#### 6.4 Land Right

- Accelerate the solution of problems on land ownership in areas where the people acquired the ownership legally and, on areas where the people acquired possession illegally through encroachment in forest reserves.
- Limit the land holding for various activities by using the regulations governing land holding stipulated in Section 34 of the Land Code of 1954 which was revoked by Revolutionary Order No.49.
- Overhaul the land taxation system so that taxes are collected at a progressive rate according to the size of land holding.
- Speed-up the completion of the land allocation project of the various agencies and halt the expansion of the project area in the future.
  - Amend the various laws, orders and resolutions related to land so as to be consistent with each other and reduce the restrictions in implementation.
  - Institute measures which prevent the fragmentation of land into small plots.

#### 7. Issues for Future Research on Land Policy

Five main issues have emerged out of the past history on land policy study and these issues could be good bases for future studies:

First, finding the solution to end the conflict between land use for agriculture and land use for forestry reserve. The lack of clear-cut long-term national land policy to specify which part of the country

should be the forest reserve area and which part should be for agriculture and other activities, often creates conflicts, both among government organizations themselves and between government officials and the public. Other questions that need to be answered are; how much land should be reserved for forestry and for other purposes, i.e., for watershed protection or for timber production? And, what should be the criterion for slope, elevation or forest? The study should also map out areas to be used for agriculture, industry, recreation and housing.

Second, is how to develop the agro-economic zone. The early principles used in formulating the present 16 agro-economic zones were too unclear. Further study is needed to revise (these principles) to make it more effective. The study could cover the physical aspects, e.g., soil capability, the present land use and water resource, as well as other economic and social aspects, namely land-holding, marketing and related industries.

A division between advanced agriculture -- those areas using water from irrigation, and rainfed agriculture areas must be delineated. The study should look into the measures that could provide development assistance to each area according to crops be it agricultural technology, or, the provision of production factors such as seeds, fertilizer and insecticides.

Third, is the mechanics involved in formulating the optimum farm size. Farm size has become smaller, as a result of the population increase and the tradition of dividing land between inheritors. Therefore, the land holding per person and family could easily become too small for efficient cultivation. There is a need for a measure to formulate the optimum landholding within each economic zone -- with recommendations on the acreage, as well as on the management and the cropping pattern that will be sufficient for a family.

Fourth, is the scattered information on land because of the number of organizations working on this subject. This makes it difficult to

obtain a balanced information normally required for wise policy decision. Computerized information system is then, recommended to organize the scattered information on land resources.

Fifth, is formulating guidelines to improve land administration and land law. The proliferation of agencies working on land problems causes an overlap of responsibilities. There are 10 policy-making organizations, 24 field-working organizations and 7 land laws. On top of these, are numerous resolutions from the Cabinet and the ministries. A study is needed to streamline the body administration, which may maintain certain organizations, and amalgamate others. Numerous laws concerning land should be unified.

## 8. Work Plan

The possible sources of funding for the land policy projects are the following:

Asian Development Bank (ADB), Australian Center for International Agricultural Research (ACIAR), Australian Development Assistance Bureau (ADAB), Canadian International Development Agency (CIDA), German Foundation for International Development (DSE), Food and Agriculture Organization (FAO), International Board for Soil Research and Management (IBSRAM), Japan International Cooperative Agency (JICA), Soil Management Support Service (SMSS), United States Agency for International Development (USAID) and International Bank for Reconstruction and Development (IBRD - World Bank).

The sources of manpower could come from:

Government Agencies (Table 5), The academics such as Asian Institute of Technology, Universities and Research Institutes e.g. TURA, NIDA, CUSRI, Private Companies such as TEAM, REDECON, TESCO, HUNTING, SEATEC, Svendrup & Parcel and Associated Inc.

The personnel involved by categories are as follows:

- Soil Classification
  - . Dr. Santhad Rojanasoonthon K.U
  - . Dr. Apisit Eiumnoh K.U
  - . Dr. Samarn Panichapong DLD
  - . Mr. Pisut Vijamsorn DLD
  - . Dr. Irb Kheoruenromne K.U
  - . Dr. Jitti Pinthong C.M.U
- Soil Chemistry
  - . Dr. Soraith Vacharotayan K.U
  - . Dr. Tasnee Attanandana K.U
  - . Dr. Paiboon Prabuddham K.U
  - . Mrs. Nualsri Kanchanakool DLD
- Land Use Surveys
  - . Dr. Satit Wacharakiti K.U
  - . Mr. Arporn Promprasit DLD
- Land Use Planning
  - . Mr. Sopon Chomchan DLD
- Land Settlement
  - . Mr. Somvong Vongvoransaeng DPW
- Land Right
  - . Dr. Jamlong Atikool NIDA
  - . Mr. Chao Ratanasoodchai DLD
- Soil Conservation
  - . Dr. Somchet Jantawat K.U
  - . Dr. Chaitat Pairintra K.U

KU - Kasetsart University

DLD - Department of Land Development

DPW - Department of Public Works

NIDA - National Institute of Development Administration



Table 1 Land Suitability for Agriculture

	North	Northeast	Central	East	South	Total
Area suitable for upland crops	20,036,318	30,694,340	11,485,471	5,306,758	160,642	67,683,529
Area suitable for paddy	16,434,526	40,520,643	14,873,477	5,583,579	7,057,075	84,469,300
• No limitation	16,434,526	39,054,014	9,904,130	5,111,964	7,057,075	77,561,709
• Acid sulfate soil	-	-	4,732,250	471,615	-	5,203,865
• Saline soil	-	1,074,778	237,097	-	-	1,311,875
Area suitable for perennial crops	-	-	702,428	960,385	14,696,993	16,359,806
Area generally unsuitable for economic crops but can be suitable for cultivating special crops if there are appropriate measures	14,724,446	21,250,255	3,355,121	5,565,186	4,933,812	49,828,820
Area unsuitable for agriculture	54,241,443	12,092,402	12,847,168	3,988,102	16,707,570	99,876,685
Water body	590,947	976,323	186,838	83,802	640,900	2,478,810
Grand Total	106,027,680	105,533,963	43,450,503	21,487,812	44,196,992	320,696,950

Source: DLD

Table 2 Present Land Use

Land Use	North	Northeast	Central	East	South	Country
	Rai	Rai	Rai	Rai	Rai	Rai
Agriculture Land	33,392,953	60,238,388	23,405,110	11,719,206	18,187,101	146,942,788
(%)	31.49	57.06	53.89	54.54	41.13	45.83
National Forest Reserve	58,889,437	30,120,394	11,454,051	8,548,848	14,381,471	123,394,201
(%)	55.54	28.54	26.36	39.78	32.54	38.47
Water body	590,947	976,323	186,838	83,802	640,900	2,478,810
(%)	0.56	0.93	0.43	0.39	1.45	0.77
Others	13,154,343	14,198,858	8,404,504	1,135,956	10,987,520	47,881,181
(%)	12.41	14.37	19.34	5.28	24.85	14.93
Total	106,027,680	105,533,963	43,450,503	21,487,812	44,196,992	320,696,950
(%)	100	100	100	100	100	100

Source: ATT (1983)

Table 3 Agricultural Land in 1980

Land Use	North	Northeast	Central	East	South	Total
	Rai	Rai	Rai	Rai	Rai	
Vegetables	32,572	-	55,489	-	-	88,061
Fruits and perennial crops	701,920	64,798	1,520,107	1,542,817	10,779,291	14,608,433
Upland crops	11,591,523	21,553,899	8,454,289	6,692,885	259,962	48,462,508
Paddy	21,156,938	38,619,691	13,375,225	3,484,854	7,147,848	83,783,756
Total	33,392,953	60,238,388	23,405,110	11,719,206	18,187,101	146,942,758

Source: TURA (1980)

Table 4 Government Land Administration Policy Level

---

Agencies
National Land Allocation Committee
Land Consolidation Committee
Agricultural Land Reform Executive Committee
Board of Land Development
National Environment Board
The Committee on Real Property (Rachaphatsadu Land)
The Land Allotment Control Committee
The Committee on the Leasing of Land for Agriculture
Land Allotment Control Committee of the Ministry of Interior
Land Sub-Committee, National Rural Development Committee

---

Table 5 Government Land Administration Agencies: Implemented Level

Agencies	Responsibilities							
	Land Registration, Land Titling, Land Valuation	Soil Survey & Classification, Soil Conservation, Soil Analysis	Land Use Control	Land Allocation	Land Holding Survey	Land Allocation for Housing	Land Business	Land Consolidation
Dept. of Lands	*							
Dept. of Public Welfare				*				
Office of Accelerated Rural Development				*				
Office of Interior Policy and Planning				*				
Provincial Committee				*				
Dept. of Town and Country Planning			*					
National Housing Authority						*		*
Office of Agricultural Land Reform				*				
Cooperative Promotion Dept.				*				
Royal Forestry Dept.				*				
Dept. of Land Development		*		*	*			
Forest Industry Organization				*				*

Agencies	Responsibilities									
	Land Registration, Land Titling, Land Valuation	Soil Survey & Classification, Soil Conservation, Soil Analysis	Land Use Control	Land Allocation	Land Holding Survey	Land Allocation for Housing	Land Business	Land Consolidation		
Royal Irrigation Dept.		*						*		*
Office of Land Consolidation										*
Office of Economical Agriculture					*					
Department of Agriculture		*								
Office of National Environment Board			*							
EGAT				*						
BAAC								*		
The Government Housing Bank								*		
Treasury Dept.			*							
Religious Affairs Dept.			*							
National Security Command								*		
War Veterans Organization								*		

## References

1. Keiwalinsrit, S., "Land Problem in the Northern Agriculture," Chiangmai, Thailand, Appendix 1, 1981, p .5.
2. Royal Forestry Department, "List of the National Forest Reserve at the End of December 1981," 1982, p .205.
3. Land Development Department, "Soil Map of Thailand at a scale of 1:1,000,000," 1982.
4. Chomchan, Sopon and Panichapong, S., "Land and Agricultural Policy," 1984.
5. Office of the Land Classification Committee. "Summary of the Land Classification Activities at the end of September 1976," 1977.
6. Thai University Research Institute "Land, the Policy, Part 1: Natural Resources, Soil, Forest and Land Use," 1980.
7. Chulalongkorn University Social Research Institute, "Forestry Development Project, Part 3 Land Classification for Forestry Development," Final Report for NESDB Fifth Five-Year Plan, 1983, p .40.
8. Asian Institute of Technology, "Policy Study on Agricultural Development and Related Activities", Final Report, Vol.3 p .63.

## APPENDIX B Water Resource

## 1. Background: Review of Water Resource Development in Thailand

Thailand has an area of 514,000 square kilometers and a total population of approximately 50 million people. The country is divided into six regions: the northern region, the northeastern region, the central part, the southern region, the western and the eastern portions.

The climate of Thailand is governed by monsoons. The typical monsoons are of two main types, one that flows from the southwestern part during mid-May to September and another that flows from the northeastern part during November to February. As a whole, Thailand has two seasons, a rainy season that starts in May and ends in October and, a dry season that starts in November through April. This is true to all parts of the country except the southern region. The seasonality of Thailand's rainfall affects the rise and fall of the country's major rivers. The amount of water that flows through the rivers in Thailand is nearly 130,000 million cubic meters, constituting 25% of its annual rainfall. The mountain ranges form the principal basins that are drained-off by the Ping, Wang, Yom and Nan rivers. At their lower reaches, the rivers join together and form the great Chao Phraya river. In the central plain at Ayuthaya, the Chao Phraya river is joined by the Pasak river. In the northeast Plateau, the wavy land forms several small watersheds that drain into two principal rivers of the Chi and the Mun emptying finally into the Mekong river. On the western side, the rivers that drain into the Gulf are the Mae Klong and the Petchburi rivers. The Mae Klong river rises in two tributaries, Kwaie Yai and Kwaie Noi. The combined stream then flows towards the Gulf. Traversing down south, the mountain ranges extending from the north as the backbone of the peninsula form continuous watersheds from which rivers flow eastward and westward towards the Gulf of Thailand in the Andaman Sea.



## 1.1 Water Resource Development

Water becomes the most vital natural resource of Thailand's economic and social development with the country's economy being basically agricultural. In response to the need to develop the water resources of the country, the Royal Thai Government is committed to develop the water resources of the country to provide sufficient water supply to meet the basic minimum requirements of the rural population and to develop the water resources to facilitate the growth of the various sectors in the economy, e.g., agriculture, industry, energy etc.

In the Fifth National Economic and Social Development Plan for the period 1982 - 1986, the overall objectives set out in the area of water resources development as follows were meant to:

- solve the problem on social and economic inequality.
- increase agricultural production.
- satisfy the basic water requirement of the population.
- assist in meeting the country's domestic energy requirements.
- supply communities and industries.

As a step to solve the problem of social and economic inequality, an attempt should start by developing various types of small water sources. Funds would be allotted to districts in order of priority in the rural agricultural sector and the local bodies; the target beneficiaries would be encouraged to participate in these activities to ascertain that maximum potential is derived from the projects. To increase agricultural production, the steps laid out would be to implement the extension and improvement of irrigation areas. The private sector should be encouraged to participate in irrigated agricultural areas. In order to satisfy the basic water requirement of the population, safe and adequate domestic water sources must be developed. The development of ground water sources and the training of local people for operation and maintenance of water supply projects are seen as essential. The development of several multipurpose dams parti-

cularly in the Mae Klong river basin and the installation of hydroelectricity generators in existing dams at increased capacities of 900 - 1000MW should be developed. This will augment a part of the country's energy requirement. To assist in developing urban centers and industries, a sufficient supply of raw water should be made available to urban centers and industries and, the massive Eastern Seaboard Development Center.

The achievement of these objectives is generally determined by the institutional, the administrative and the management aspects of water resources development, as enumerated below:

- Many Ministries, government agencies and committees are involved and their activities are scattered and often uncoordinated and the development of independent projects have started to affect the total system.
- There is a felt absence of a full-time secretariat office to coordinate the total program and handle the staff work for the decision-making policy-level body.
- There is insufficient attention given to the management and operation of already-developed systems.
- Increased demand for water have led to conflicts; the resolution to this problem should be based on the principle of allocation for meeting the social objectives and for improving the efficiency of supplying water.
- The erroneous concept that water is a free commodity has resulted in the government-benefactor attitude of subsidizing irrigated areas. The government does not charge for the use of water which is inefficiently used and mostly wasted.
- The evaluation of the performance of developed irrigation system is minimal and plays no role in guiding the succeeding programs.
- The information system for water resources needs more improvement.

## 2. The Water Resources Development Policy

The guiding principle of the water resources development policy is to emphasize maximizing the utilization of both the medium and the large-scale projects for which substantial investments have been provided by the government in developing the associated infrastructure. This will ensure that these projects are able to yield the full economic benefit as well as assist in the planning of long-term water projects. For the small-scale projects, the stress on meeting the basic water requirement and the stress on improving the operation and maintenance by the water-users should be continued. Some guidelines have been drawn-up in line with the above-mentioned policies and they are enumerated below:

- Increasing the efficiency of water utilization of water resources development projects.
- Establishment of water-user organizations in order to maximize the utilization of the resources.
- Issuance of regulations regarding water right.
- Formulation of water resources development policy by regions.

### 2.1 Increased Efficiency of Water Utilization through Improved Institutional Base

The government has invested large sums of money in water resources projects that consisted mainly of irrigation projects under the supervision of the Royal Irrigation Department. But studies reveal that the efficiency of these projects is low and the potential to improve this inefficiency come in various forms such as; expanding the cultivated area, increasing the dry-season cultivated area and providing the required amount of water at the right time to irrigable areas.

The government is partly a contributory factor in the low-efficiency of projects because of the institutional setbacks as reflected in the

presently-existing structure of project management, the administrative structure of water resources development projects and, the policy of the executing agencies.

The kind of project management for water resources projects so far, is still not appropriate; there is still a lack of proper coordination and cooperation between those directly responsible for the project and those who are associated with them. The information which has been periodically collected in the past, points to an important problem which has a significant effect on the efficiency of water use from the water resources development project. It is believed that one way to improve the efficiency of these projects is to establish organizations at the various levels that would include provision of responsibilities and freedom to manage the utilization of water resource within their respective levels. The main reason cited for this problem is the past attitude of attaching minor importance to project management by concerned authorities. This attitude must be rectified in the form of policies in order to support such a change.

Ideally, the administrative structure (see Fig.1 for description of job responsibilities) of water resources development projects should comprise three organizational levels, viz. project-level organization, water-distribution level organization and farm-level organization.

With respect to the policy of the executing agencies, past practices reveal that these agencies concentrated more on the design and construction aspects of water resources projects. This situation must change since the success of achieving efficient water utilization depends a lot on project administration and, on the introduction of appropriate technology. These executing agencies should start modifying their policies by stressing more on the 'project management' aspects rather than continuously confining themselves solely on the design and construction aspects.

## 2.2 Increased Efficiency of Water Utilization through the Development of Water-User Organizations (WUO)

The water-user organization will perform the role of the manager and the caretaker of water users under its area of jurisdiction. In which case, the membership to the Water-User Organization should include the water users and the government officials (from both the technical and the extension service agencies) as advisers and promoters in certain cases. Such organizations exist at present but the capability and the coverage-area is still not substantial. The policy issue here include the setting up of water-user organizations in areas with irrigation systems and, drawing up policies that will delineate their responsibilities.

To achieve the intended objective of maximizing water utilization, the water-user organizations should assume certain duties and responsibilities, both to the users and to the government. With respect to the benefits that should accrue to the users, the water-user organizations should check that the quantity of water available from the delivery system is sufficient as agreed and, according to the time required, as planned. At the same time, control should be exercised on the allocation of water for the users in a manner which is fair and evenly-distributed. On the benefits that must accrue to the country as whole, the organizations' responsibilities should consist of maintaining and repairing the various irrigation structures at the farm-level, e.g., irrigation and drainage ditches, irrigation pipe, water gate and farm road. These efforts should be done without utilizing the government budget. The expenses would be paid by the water-users themselves and according to the benefits received and can either be in the form of labor or cash that would be accumulated as a revolving fund for use in maintenance expenses of each WUO area. In order to promote the strength and the capability of the water-user organizations in administering the work efficiently, the duty of the government lies in its support for providing technical capability and improving competence such as, organizing training for water users, introducing appropriate technology, advisory assistance, promotion of better crop-varieties as

well as marketing agricultural products and, monitoring/evaluating the users' performance.

At present, though the executing agencies responsible for constructing the projects are still carrying out the operation and the maintenance of these projects, the maintenance budget is still quite difficult to obtain and is often insufficient. With this constraint, it is anticipated that the maintenance work of the project may encounter problems of obstruction and delay which will in turn, directly affect the farmers. Thus, in projects which have complete water-distribution systems, an agreement should be reached that, maintenance fees be calculated and collected according to the cultivated area and the type of crop. The money collected will be used by the water-user organizations for repairing the structures and, for creating a revolving fund or, sustaining other activities which will likely assist in increasing agricultural production.

### 2.3 Increased Efficiency of Water Utilization through the Issuance of Regulations regarding Water Rights

Since there has been no clear-cut regulation regarding the utilization of water resources, the problem of competition for the use of water especially among upstream and downstream users has arisen and will be intensified in the future because the demand for water by agriculture, industry and other sectors is continually rising. There is, therefore, a need for regulations and laws on the rights, duties and responsibilities of those utilizing the water in order to ensure fairness to all users. These regulations and laws should consist of:

- Rights and responsibilities of water users from natural watercourses or other water sources.
- Priority of water use for various purposes in cases where water from the same watercourse or water resource, has competing uses.

- Standards and procedures for requesting the use of water and the agency to enforce these measures.
- Amendments of registration requiring both the people (chonprathan rat) and the government (chonprathan luang) to be in line with the regulations to be established.

The development of water resources at present is carried out by many agencies, each having its own policies and plans thereby lacking the necessary coordination and integrated planning. In particular, if there is lack of joint planning of development projects in the same river basin, then adverse impacts on these projects are bound to occur. These impacts will, not only result in underachieving the planned benefits, but will also cause a great waste on the investment made by the government. There should be set policies on the development of each river basin in order that these policies may serve as master plans at the national level for every concerned agency to follow, that will consist of: ascertaining the types of projects that must be developed in the river basin; quantifying the size of these projects and the amount of water requirement; the government units or organization that should be responsible for each river basin project.

## 2.4 Increased Efficiency of Water Utilization through the Formulation of Water Resource Development by Regions

Since the geographical features vary from one region to another, the policy for water resource development should be set up according to the topographical and environmental characteristics of each of the six regions as mentioned in the 'Review of Water Resource Development in Thailand'.

### 2.4.1 Northern Region.

Based on its distinct physical characteristics, the Northern region, can be divided into 2 sub-regions -- Upper North and Lower North. The distinct features of the Upper North are the mountain lands and highlands. These mountains are the watersheds of the important water courses of the Ping, Wang, Yom and Nan river basins which have now been almost completely developed through the construction of storage

reservoirs in the upstream regions. These development projects are multi-purpose in nature. The Lower North consists of land sloping down from the Upper North and is connected to the flat plains of the central region with the exception of the western and the eastern parts which are still highlands, being linked to the mountain ranges and plateaus of the Northeastern region, respectively. The policy for water resources development in the north should consist of the following:

- Promote only small and medium-scale water resources development projects which do not pose any adverse impact on the downstream projects. This is because the North is like a roof for collecting water vital to the central region which include large irrigation projects. Thus, the development of new projects in this region will mean competition for water with projects in the central region for which the government has already substantially invested.
- Initiate the water resource development projects between countries, e.g. the Salween river between Thailand and Burma and, the Mekong river between Thailand and Laos, so as to convey the water for use in the Central plains.
- Promote the cultivation of crops which consume less water such as upland crops and fruit trees in developed agricultural areas.

2.4.2 The Central Region. The Central region, which starts from Uthai Thani province to the Gulf of Thailand, is mostly characterized by large stretches of flat land whose topography seems ideal for agriculture purposes. The major rivers in this region are Sa-Kae-Krung and Pasak rivers which flow to join the Chao Phraya river, respectively, from the west at the lower portion of Uthai Thani province and from the east at Ayuthaya province. With these inherent characteristics, the central region should consider the following policies for water resource development:



- Accelerate large-scale water resource development projects in the Pasak and Sa-Kae-Krung river basins as multi-purpose projects and for flood control since the flat plains of the central region experience regular flooding which is mainly due to flood waters from the North.
- Emphasize improvement in the efficiency of water and land use. This should be accomplished by means of developing the irrigated area so as to have a more complete irrigation system.

2.4.3 The Western Region. The Western region, which begins from the right side of the Nakhon-Chaisri river to Prachuab Khirikhan, is characterized by wide reaches of flat plains in the upper portions while the lower portion consists of flat coastal areas. This region is abundant in water resources due to the presence of 3 major river basins, namely, Mae Klong, Petchburi and Pranburi river basins. The Mae Klong river basin is the most important river basin in this region because it covers the agricultural area in the upper part of the region which is connected to the lower portion of the central plain. This river basin is the result of two sub-basins namely, Kwae Noi and Kwae Yai, which are now almost fully developed. The Petchburi river basin also has its headwater origins in the Ta Nao Sri mountain ranges and flows through Pethburi province into the Gulf of Thailand. At present, the development of the basin is nearly complete. The Pranburi river basin also has its origins in the Ta Nao Sri mountains and drains across Prachab Khirikhan province and empties into the Gulf of Thailand. The development is now almost complete as well. Since the western region has abundant water resources and has been developed to a great extent, the policy regarding water resource development should:

- Emphasize on increasing the efficiency of land use in the wide stretches of the flat plains in the region especially in the Mae Klong river basin by means of completing the irrigation systems.
- Assist in improving the management of water from the Mae

Klong river basin to assist agriculture in the Central region and to serve as a source of water for the Metropolitan Water Works Authority.

2.4.4 Northeastern Region. The general physical characteristics of the Northeastern region consists of high plateaus with the exception of the northern section which is composed of many mountain ranges. The important river basins in this region are the Mekong river basin in the north, the Chi river basin in the middle and the Mun river basin in the south. In general, the amount of rainfall is heaviest along the Mekong river and will steadily reduce to a minimum in the southwestern part of the region which forms the watershed of the Chi and Mun rivers. Since this area is regularly influenced by depressions, rapid run-off occurs and floods the cultivated areas, causing frequent losses in the low-lying places especially in the downstream section, the following policies should serve as the guide in the development of water resources in this region:

- Emphasize the development of large and medium-scale multi-purpose water resource projects that are still lacking in the Chi and Mun river basins.
- Implement the improvement and expansion of the irrigated area by using water from the existing medium and large projects to achieve maximum benefits.
- Encourage the farmers to cultivate crops which consume less amount of water in the irrigated areas and promote rainfed agriculture and livestock-raising in the rainfed areas.
- Initiate river basin development between Thailand and Laos, especially the Mekong river basin, in order to bring water for multi-purpose use.

2.4.5 Eastern Region. The Eastern region covers the province of Chonburi and the provinces along the eastern shore of the Gulf of Thailand to the Kampuchean border. The physical features of the eastern portion of

the region consist of large flat plains, the upper section joining the Khao Yai National Park and the rest of the area being composed mostly of flat plains alternating with mountains. The important river basin is the Bang Pakong river basin originating from the Khao Yai area. The other river basins are small and drain into the Gulf of Thailand, for example, the Prasae and Chanthaburi river basins. The Eastern region is therefore limited in water resources and may not have sufficient quantity of water to meet future requirements granting that a certain portion of the region has been designated as a major industrial zone. The development of water resources will then require policies that will clearly define the projects and the areas that should be used for agriculture and industry. To be in line with the Eastern Seaboard Industrial Development Plan, the water resource development policies for this region should:

- Aim at developing the large water resource in the upstream regions of the Bang Pakong river basin for agriculture and irrigation and designate as zones for cultivating rice and economic crops with systematic planning.
- Emphasize water resource development along the coast from Rayong, Sattahip, Pattaya, Laem Chabang to Chonburi for major industrial, deep-sea port, tourism and community development activities which include the following projects:
  - (1) Nang Kho reservoir and nearby water resources for Laem Chabang port activities and Laem Chabang industrial settlement.
  - (2) Bang Phra reservoir and nearby water resources for water supply and electric power in Chonburi and Sriracha municipalities.
  - (3) Mab Pra Chan reservoir and groundwater resources for use in Pattaya City, Amphoe Bang La-mung and Jomtien beach.
  - (4) Pra Sae reservoirs and the Chantaburi and Trat river basins for planned orchards.

Southern Region. The geographical features of this region consists of the Andaman Sea on one side and, the Gulf of Thailand on the other side along the entire length of the region. There are mountain ranges running down the middle with inclination towards the West along the entire length. The water courses in this region originate in these mountains and drain into the sea. Thus, the water resources in the South are composed of small river basins and short rivers and since the annual rainfall in the region is high, flooding due to runoff and high-tide occur frequently. At present, since the important river basins such as Tapi, Phum-duang and Pattani have been well-developed, the guiding policies to develop water resources in the South should:

- Emphasize the development of medium and small-scale water resources along both coasts as protection against flooding caused by runoff from the various river basins.
- Carry out projects as a means to counteract salt-water intrusion and improve the coastal areas for cultivation, including drainage of water from low-lying areas.

### 3. Research Priorities and Strategies

In order to fulfill the policies discussed in the previous section, various types of development research and/or policy research are needed. Research in these areas has been traditionally conducted by various government research units and research institutes such as the RID, AIT, and the NESDB. In the past, research has been conducted on a project-by-project basis. However, the research lacked the necessary approach for an integrated program to make it more useful for national decision-making process. The research priorities and strategies presented in this report will serve as a program approach for focusing policy research for the country's water resource development. This research can be classified into four major categories:

- . water resource information systems
- . water resource planning and strategies

- . water resource projects operation and management
- . research for specific policy

In Thailand, tremendous amount of water resource data have been collected by various government agencies. RID, the Meteorological Department, NEA, and EGAT as well as various research and academic institutions that regularly collect water resource data. As a result, although much data exists, it tends to be scattered throughout the various agencies. This creates difficulties in retrieving data rapidly when it is needed and raises questions as to whether some data are actually "lost" as far as utilization is concerned because the people who need these information would not know where to find them. In addition, several kinds of data are collected more than once by the overlapping of activities of these agencies and, the duplication of their effort tends to create more confusion and inconsistency. Researchers or policy-makers dealing with water resources have to spend a large percentage of their time gathering the needed data from various agencies concerned, therefore limiting the time available for the more important tasks of analysis and planning. To optimally develop our country's water resources requires that various kinds of water resource information be gathered and analyzed for both the planning and the management of various water resource development projects. The development of a water resource information system to support the national development process is thus, greatly needed. Some attempts have been made by the NESDB toward this end, but these attempts have not been successfully completed. Further studies that could lead to formulating the design of a water resource information system for the country is recommended to be made through the TDRI mechanism of working with academic institutes and the agencies concerned. It is expected that, as the secretariat to the National Committee on Water Resources Development, the NESDB would be interested and willing to serve as the responsible agency for this project, utilizing the financial support from its potential donors.

An overall policy for planning water resources must embrace river basin modelling, regional area water resource planning and the groundwater resource development.

3.1 River Basin Modeling. As mentioned earlier, river basin management is one of the areas where an overall policy approach, as against the project-by-project basis approach must be adopted by the government. As a means to achieve effective management of the river basin, river basin modeling should be adopted. This procedure would allow simulation of the behavior of the resources in a particular basin in terms of water quantity and water quality. The economic modeling of river basins would be needed to simulate the social and the economic behavior of the basins for purposes of planning that will entail a long period of simulation activities to complete and to establish an operational model. The amount of financial support for this program will have to be substantial and programmed over a sufficient span of time. The river basins to be simulated should be prioritized with the Chao Phraya and the Mekong river basins likely to be the first selected. It is advisable for TDRI to recommend that the government should seek long-term assistance from various donor countries for this project.

3.2 Regional Planning and Strategies. As far as water resource development is concerned, each of the six regions in Thailand possesses unique problems and inherent characteristics. In the past, some attempts have been made to make a strategic plan for the Northeast by AIT for the NESDB. It is therefore recommended that regional planning on water resource development in each of the six regions in the Central, Northern, Northeastern, Western, Eastern and Southern regions be conducted. These regional studies can be jointly conducted by TDRI in collaboration with local institutions and foreign experts. Funding for these studies should be possible by way of donations from development agencies of the various donor countries.

3.3 Groundwater Resource Management Study. For the past fifty years, groundwater resource development in Thailand has been utilized without sufficient data collection and analysis for policy and planning purposes. The lack of appropriate data for analysis and eventual policy input has allowed several adverse situations e.g., land subsidence in the Bangkok area, an improper water-utilization program in the Sukhothai Groundwater Development Project, and the saltwater encroachment along the coastline and in the northeastern part of Thailand, to continue. Groundwater resource data collection has been made by the Department of Mineral Resources, however, the formulation of the strategies through an analysis of this data will be necessary for future groundwater utilization policies. It is strongly recommended that preliminary groundwater management studies should be conducted to serve as the basis for strategic planning for the country's groundwater development. TDRI, working jointly with AIT and DMR and in cooperation with NESDB, can work on these studies. It is envisioned that financial support for this project should pose no problem.

Over the last two decades, the government has invested more than 200 billion baht in water resource development in terms of infrastructural development such as, the building of dams, reservoirs, canals and on institutional support in its land-consolidation project. However, the efficiency of the operation and the management of these projects is still far from optimum in terms of socio-economic benefits. Serious attempts should be made in order to improve the efficiency of the operation and maintenance of the Water Resource Projects. As a means to this end, the following studies are seen as necessary:

3.4 Reservoir Operation Study. Several large dams and reservoirs have been constructed over the last two decades e.g. Bhumipol Dam, Sirikit Dam, Chao Phraya Dam, Sri Nakarinthara Dam, Vachiralongkorn Dam etc., and most of these dams and reservoirs have been operated by EGAT using the water demand for irrigation as the constant and optimizing power benefit as the objective function. The reservoir operation and the mode of operation of these reservoirs and all the other reservoir systems should

be reviewed. TDRI may serve as the coordinating body in the reservoir operation studies in cooperation with various important agencies such as EGAT and RID etc.

- 3.5 Irrigation System Operation Study. The International Standard on farm efficiency for a good irrigation system ranges from 60 - 70%. But, research conducted by AIT revealed that in Thailand, the efficiency obtained from a typical reservoir ranges between 15 to 20% only. Through a policy study, it is hoped that this serious inefficiency in water resources could be improved. At present, the Royal Irrigation Department is trying to come up with various ways and means to improve the situation and similarly, the Japanese Government is helping out the Water Resource Management Center. It is therefore recommended that the Thai Government, in cooperation with TDRI and other research institutes, makes use of the available facilities at the Royal Irrigation Department, to conduct a study on the irrigation system operation in Thailand as an input to the formulation of the overall national policy
- 3.6 Irrigation Project Management. Equally important with increasing farm efficiency, is increasing the efficiency of agricultural production in order to obtain better social and economic benefits. At present, the Thai government adopts the functional approach through various departments working in the same irrigation area. This practice is in conflict with efforts to raise the farm efficiency where maximum benefit from agricultural production is desired. Several attempts have also been made by the Ministry of Agriculture and Cooperatives (MOAC) to remedy the situation, e.g., the Integrated Rural Development in the Nam Un irrigation project in Sakon Nakhon province under the USAID loan. The result however, was not very satisfactory as to allow for the efficient functioning of the single-command type of operation or the presently-pervading, centralized system in Bangkok. A careful study in order to obtain a national policy on irrigation project management is therefore recommended.



- 3.7 On-farm Water Management. In order to increase farm-efficiency through improved water utilization, the aspect on on-farm water management should also be considered. There are several factors affecting this efficiency such as, the agricultural condition, the demographic character, the culture and the income-structure of the people. These factors affect the farmers' behaviour and in turn, affects the overall farm-efficiency.
- 3.8 River Basin Management. The approach on water resource management in Thailand has been carried out on a project-by-project, suboptimization basis. This approach may not be suitable for the overall optimization of the several sectors under consideration. River basin management is so complex and requires the operation of a large river basin model to assist in the decision-making process of the government for water allocation, water utilization, water quality control, power production, irrigation, navigation and other benefits. In fact, this condition is also shared by other countries and most of them realize the importance of the concept of "single-authority" to manage the river basins. This concept should be introduced to the various important river basins, e.g., the Chao Phraya, Mekhong, Chi, Mun etc. Management studies on the organizational structure, budgetting, the allocation of human resources and the integrated development programs are seen as necessary. Moreover, this organizational restructuring has to be equipped with the socio-economic modelling of the river basin for operational purposes. This whole process will mean conducting long-term, capital-intensive studies by various government agencies with the technical assistance to be provided by TDRI.

#### 4. Other Issues on Water Resources

Thailand is in possession of considerable coastline and estuaries that are in need of careful management. Salt-water intrusion, land utilization program along the coastal area and, effect of tidal-fluctuation are fine examples of coastal and estuary management problems. In this aspect, TDRI can serve as the technical unit to assist in specific

studies to tackle these problems as may be defined by the various concerned agencies.

Another interesting problem is the issue on flood management since flooding in Bangkok and the metropolis has been the most talked-about problem of the country. The existing capability of the government agencies for flood-forecasting and control, for analyzing flood forecasts, flood characteristics, and pattern for studying relief areas is still not adequate. Together with other local institutions, TDRI can develop the capability of these agencies by assisting them in the above-mentioned aspects.

If floods are disastrous to the socio-economic conditions, drought can be equally-devastating too and sometimes, their aftermaths can be even more serious than floods. Since drought normally affects huge areas and even more people than floods, a common consequence of such an event would be the deterioration of the country's socio-economic conditions. To counteract these unfavorable after-effects, an effective strategy for drought-management should be a part of the government program.

## APPENDIX C Forest Resource

## 1. Introduction

Thailand's location is in the tropics characterized by a high humidity, heavy rainfall, high temperature and long periods of sunshine. Such conditions are the factors conducive to nurturing a dense and healthy forest otherwise termed 'tropical' forests. Whereas forty years ago, about 70% of the country's land area was covered with forest, such is no longer the case now where the current situation reveals that the forest depletion rate is 3 million rai/year from 1938 to 1982 and 400,000 rai in 1983. The forest coverage of the whole country as estimated by the Royal Forestry Department was about 72% in 1938, 6% in 1958, 53% in 1961, 43% in 1973, 39% in 1976, 34% in 1978, and 31% in 1982. The pattern of forest-depletion process are of three types:

The first type includes clearing forest land after logging operation whereby forests are cleared by land squatters immediately after the logging companies have accomplished their activities. The second type include clearing the dense and healthy forests in remote areas for crop cultivation by the land squatters. The third involves clearing forest land in the highland area by the hilltribes, particularly in the north and the northeastern part of the country.

The main factor cited as the cause of forest depletion is the growth of population. The poor and not-so-poor opt to cut timber in exchange for their basic needs or, to cultivate crops. The latter approach has dominantly increased the crop lands and rapidly decimated the forest. Consequently, the country is now facing flood problems in the wet period and drought in the dry period, together with decreasing agricultural productivity and deteriorating environmental quality that has spread out in all parts of the country.

Another factor cited was the absence of a proper system for land use planning that would serve as the basic principle for environmental

conservation among planners and developers. The main reason for the misuse of agricultural land of the country (e.g., mountainous land should be kept as headwater supply area but it is used instead for cultivation; fertile paddy lands are converted into residence and industry purposes etc.,) is that, very few programs are actually implemented. The government does realize that land use planning is the first priority for environmental conservation. Unfortunately, the planning policy has never been effective, especially where forest-protection measures and law-enforcement measures were concerned. The details of such planning must be concentrated on the use of land for agriculture, forestry, urbanization, industry, outdoor recreation, water resources, and communication. The plans must be applicable to the social welfare and the economic improvement. In general, land use must be approached as a multipurpose project encompassing considerations for water resources, fisheries, hydroelectric power, flood control, and tourism. Such planning will involve forestry work as a common factor. Unavoidably, forest land conservation must co-exist with national land use planning.

For a tropical forest area such as Thailand, the forest serves as the basin for all environmental resources. For this reason, protection measures become important issues that should be given top priority. The basic concept underlined is not simply confined with protection; but should also cover planning for timber and non-timber products for domestic and export purposes. This is the main reason why there is a need for the government to divide forest areas into protective forest and commercial forest. The protective forest is supposed to be kept green at all-times. Since this area serves as the headwater supply for watershed, any form of harvesting, hunting, and clearing should not be permitted. The commercial forest would allow harvesting activities but must follow strict conservation control at all times. Unfortunately, such basic measures do not seem to work well in the country because of the poverty and greed of the people. In order to plan well for more effective forest protection, several measures have to be established such as, classification and delineation of watershed, issuance of Sor Tor Kor (Usufructuary Certificate Grants), instituting Forest-Village program,

National Park and Wildlife Conservation program and Biosphere Reserve program.

In conclusion, the main issues confronting Thailand's forests must seek to answer the problems of forest degradation, consequential environmental pollution, decreasing agricultural productivity, and socioeconomic problems. Laws and policies for forest management and development should be oriented to solve grassroot problems, especially in the cutting system, reforestation, conservation measures, forest village Sor Tor Kor program, private forest policy, and others.

## 2. Future Prospects and Areas Requiring Attention

In accordance with the degradation of the forest cover, the Royal Forestry Department has set a policy to increase the total area of the country reserved as forest to 40 percent. To accomplish such a policy, five factors must be given priority attention:

2.1 Protective Forest and Conservation Plan. In setting the goal to increase the forest cover from 31% up to 40% of the country's total area, the Royal Forestry Department has divided this percentage into equal acreage between protective forest and commercial forest. Areas requiring attention would be to make sure that on-going programs of on-site monitoring protective units are well-distributed in all parts of the green forest areas in the whole country. Indirect plan for forest protection should focus on Watershed Classification Conservation Policy on National Parks, Wildlife Sanctuary, Reserve Forest, Biosphere Reserve, Nature Conservation, Seed-Orchard Conservation, and Sor Tor Kor. Both direct and indirect strategies are expected to include firm measures on how to keep the forest green and how to convert swidden areas into living forests.

2.2 Sustainable Commercial Forest and Alteration of Cutting Systems. In the past, Thailand possessed the richest forest resource in Asia. With the overexploitation of timber in the past, timber production has gone

down in recent years and the import of such products from neighbouring countries has become inevitable. The main culprits for this unfortunate situation were the concessionaires who did not follow the rules after having been granted the concessions. Overcutting in the concession area and illegal cutting from adjacent forest areas were widely practiced. Also, land encroachers took over the logging areas after all the first-grade timber was harvested from the concession sites. Because of this, commercial forests nowadays could no longer provide nor, directly sustain the benefits of the forest to the community. A lot of research in Thailand indicate that the long-term application of selective-cutting is the main cause for the reduction of the forest coverage. The research also suggested that the cutting system should be altered into a clear-cutting system since clear-cutting seems a more promising approach for keeping the commercial forest capable of providing sustainable yields. Another method would be to emphasize on drawing up protective measures for commercial forest and overseeing the economics of logging operation.

2.3 Economic Forest Zoning. It is clearly understood that the forest land of the country is under the jurisdiction of the Royal Forestry Department. If individuals or departments desire to use the forest land for any development project, they must first obtain permission from the Royal Forestry Department. This process causes delay in some other activities, for example, the mining operation, private forest plantation fishery, industry, urbanization, hydroelectric dam construction, agro-economic crop cultivation and communication. Such delays are due to the lack of area-zoning of forests for economic uses. As a conservation measure, the zoning of economic forest i.e., classifying areas by economic activity will certainly help resolve these conflicts and delay. Policy research in this area becomes mandatory.

2.4 Usufructuary Certificate Grant (Sor Tor Kor). In August 1969, the Cabinet approved the project Sor Tor Kor to provide land titles to the poor people who have occupied land and illegally resided in the National Reserve Forest area. The basic principle of Sor Tor Kor is quite acceptable as means to provide land for the poor people and also to

protect the green forest. However, in practice, there are doubts among the planners. After two years of implementation of about 50 reserve forests granted Sor Tor Kor, there have been varied opinions about its pros and cons. Some regions seem to have met the basic requirements but the others did not. In order to meet the goal of implementation, an Environmental Impact Assessment (EIA) of Sor Tor Kor program vis-a-vis forest depletion would be an interesting area for study. Policy research on this area would be able to provide us with some useful information in order to make better decisions on the future of the Sor Tor Kor project.

- 2.5 Forest Laws and Policy. The Royal Forestry Department has been established 88 years ago in 1896. Forest laws as a tool for forest protection was promulgated in 1941, with the first revision made in 1948, the second revision in 1950, the third revision in 1960 and, the latest revision in 1964. There are two other laws, e.g., Wildlife Preservation and Protection Laws (1960) and National Park laws (1961). In theory, these laws could help conserve the forestry but law enforcement has so far, been ineffective. The effectiveness of forest laws as a tool for forest protection is another area that requires attention. As a pilot project for a future forest management plan, research is needed in order to collect all the necessary information.

Seventeen Director-Generals of the Royal Forest Policy have set forestry policies, because there was no policy set by the government on National Forest. These policies are not widely-known nor, understood in the forestry circles. Therefore, an area requiring attention would be the setting up of a National Forest Policy. With such a guideline for forest management and development in existence, the national goals are also expected to be met.

### 3. Research on Forestry Resource (An Outline)

#### 3.1 Priority Research Areas

- (1) Watershed Zoning and Classification (5-year research)

- (2) Alteration of Forest Cutting System Policy (3-year research)
- (3) Sor Tor Kor Policy Guidelines (2-year research)
- (4) Private Forest and Government Policy (2-year research)
- (5) Zoning the Forest Area for Economics.....Para-Rubber Plantation, Mining Activities, Urbanization, Industries, Fisheries (5-year research)
- (6) Forest Laws and Forest Protection Measures (5-year research)
- (7) National Forest Policy as the Basic Guideline for National Environmental and Resources Planning (3-year research)
- (8) Forest Protection and Land Use Planning (5-year research)

### 3.2 Proposed Work Plan

- (1) Review existing information of concerned agencies such as the Royal Forestry Department, Forest Industry Organization, Thai Plywood, Faculty of Forestry (Kasetsart University), National Environmental Board, and others.
- (2) Analyze this information for evaluating gaps and designing a research program.

### 3.3 Proposed Mode of Operation/Funding

- (1) Research operation will be conducted by National Research Institutes and Universities.
- (2) Ad-Hoc Committee will be formed to manage research, including all concerned institutions and universities.
- (3) Funding will be available from the
 

Government	:	Bureau of Budget, Forest Industrial Organization and the National Research Council.
Thai Society	:	Siam Society, Forest Society of Thailand, Bank Society, others.



Foreign Agencies : USAID, FAO, UNESCO, JSPS,  
JICA, IDRC

#### 3.4 Proposed Dissemination Strategy

Research projects will be distributed to concerned agencies, especially research institutes and universities such as Kasetsart University, Chulalongkorn University, Thammasart University, Thailand Development Research Institute, Royal Forestry Department, and others.

Figure 1 Administrative Structure

Manpower

Project Manager  
Extension Officer  
Local Administration Officer  
Irrigation Officer  
etc.

Water Master  
Technical Officer  
Local Administration Officer  
Extension Officer  
etc.

Zone Man  
Agriculture Officer  
Local Administration Officer  
Head of Water-User Group  
Representative of Group

Organizational Level

Responsibilities

Project - Level  
Organization

Set Policies  
Prepare Integrated Plans  
Supervision & Monitoring  
Maintenance  
Coordination

Water-Distribution Level  
Organization

Determine Type of Crop  
Set the Planting Period  
Prepare Water Delivery Plan  
Monitoring & Evaluation  
Maintenance of Water  
Distribution System

Farm-Level  
Organization

Fix Cultivation Period  
Prepare Water Delivery Plan  
Supervision & Maintenance

### III ISSUES OF DISCUSSION

#### 1. The State of Agricultural Resources

The importance of the three agricultural resources namely, land, water and forestry is paramount in an agricultural-based country like Thailand. Even if the agricultural sector has been expanding at the rate of 7-8% during the past 20 years, there is reason for concern over the dormant growth being recently experienced by this sector during the past 2 years.

Comment 1: Although proud of the fact that it is one of the six food-exporting Asian countries in the world, Thailand is yet to cope with its low agricultural yield when compared with the higher yields of other Asian countries. Moreover, the present practice of increasing productivity through increased agricultural land area has to stop. As a move in a better direction, studies on the possibility of promoting other crops such as vegetables, fruits and flowers or, new technology for grain cultivation which may provide better returns or ways to utilize the country's natural resources instead of just concentrating efforts on field crops which carry negative implications such as tapioca, sugarcane, soybean, maize, etc. must be initiated.

Response to the comment:

It is a well-known fact that tapioca could ruin the productive capacity of the land which poses an environmental threat to the land under cultivation. Studies on how to solve this plaguing problem must be carried out.

Comment 2: A major advantage posed by Thailand over other countries is its rich and abundant natural resources viz., land, forests and water, and its location in the tropics.

Comment 3: It is difficult to assess the policy on the use of natural resources because unlike other policies, (e.g., the baht devaluation where repercussions are quicker and more widespread), the repercussions or the after-effects of this policy could hardly be seen in a reasonably short time. For instance, many laws concerning forestry and forest encroachment have already been passed but still, the impact or, the after-effects of these laws, both beneficial and detrimental, are yet to be felt, seen and finally, evaluated. Perhaps what matters more is the cooperation in many aspects, social, economic, etc.

## 2. Present Land Status

Comment: Of a total area of 320.7 million rai, out of which, the area suitable for agriculture is 168 million rai; for paddy, 84 million rai; for upland crops, 68 million rai; for perennial crops, 16 million rai; for marginal crops, 50 million rai. The present land use figure of 48 million rai for upland crops, 120 million rai for forestry and 50 million rai for others looks alright, but by real standards, this is not yet ideal because there is actually a grave misuse of a 30 million rai devoted to the cultivation of upland crops.

Response to the comment:

1. There are these questions of, how practical would the research on land use planning be and, how wide should the scope of the same research be, because it has been observed that similar research and policy on land use seemed to have just been stacked in the shelves as mere documents.

There has not been any measure taken to implement them. The government should consider taking full responsibility over the implementation of these measures once laws and regulations are made public, or else, all efforts would simply go to waste.

2. Another recommendation made was to conduct a study on agricultural zoning with particular reference to the relationship of the elevation capacity (slope) in relation to water resources.

### 3. Land Use Planning

**Comment:** In terms of research and policy, land use planning must be vigorously pursued within a two-year period since land resources and soils are the country's priorities.

The suggested land use planning should extend to cover implementation measures that would be under the responsibility of specific agencies. Moreover, this plan should include drawing a specific land use classification vis-a-vis crop species and recommended type of agricultural system based on the interrelated factors of soil property, slope of land, altitude, water supply, integrating the planning of agriculture that would best serve agricultural production.

### 4. Land Right

**Comment:** A high figure of 2.5 million families having land right problems is a big problem for the government at the moment that involves three groups of people: the first group are the poachers of natural forest reserves but who are not landholders, the second group are the landless farmers who have to sell their labor in the paddy fields or, in the sugarcane fields and the third group are the families

who farm on rented land.

With reference to the Certificate Grant Policy or the Sor Tor Kor, the government or TDRI should take a closer interest on this policy so that proper policies concerning forestry development could be developed accordingly.

#### 5. Forest Protection

**Comment:** There is a recommendation for a study on the man-made practices that contributed to the fast rate of forest depletion particularly on the destructive practices made by the hilltribes and the accompanying recommended measures to alleviate such practices because of the highland's potential for fruit orchard cultivation and development.

#### 6. Protective Forest and Conservation Plan

**Comment:** There was a recommendation specifying that there should be a study treating the catchment area as a unit of study of the entire basin and its ecosystem and, should be made more superior to the 'management only' approach.

The policy which will govern the determination of critical watershed and the zoning and classification of watershed areas, must be a decisive one.

Response to the comment:

1. The main idea would be not only to lay down policies, but also to manage the water resources as well.
2. Each water basin could be used as a place of study because the conservation of forest is very much concerned in this issue. Therefore, there is a need to look at the whole thing as a system. If management alone is considered,

then, the project will be shorter and will need to incorporate various other factors.

## 7. Economic Forest Zoning

**Comment:** The past attitude towards conservation should shift to a more commercialized approach whereby the forests, with the exception of the identified critical watershed, must be offered to the private sector. However, it is important to draw hard-line regulations before people are allowed to move into this area. The program should seriously consider moving towards real afforestation to allow the private sector to assume a larger responsibility.

**Response to the comment:**

Given the fact that forestation is the duty of the Department of Forestry, TDRI should carry out research in order to find ways of promoting forestation since this has a very wide coverage. In this same recommendation, the public sector must actively participate and incentives must be created in order to speed up the forestation practice.



"Development Research and National Development"

Position Paper No. 4

MINERAL RESOURCES

by

Sunt Rachdawong

I ABSTRACT

The mining industry in Thailand has been experiencing a state of depression as a result of the worldwide economic recession. But, improvements in terms of mineral production and exports, and the rising price of several minerals indicate that the situation in the industry is getting better. This picture should continue as economic recovery gradually takes place in other developed and developing countries.

The paper presents: a review of the present status of mineral resource development in Thailand viz., status and performance, governmental role in the promotion of the industry, governing legislation, present mining policy, and offshore mining; a discussion of the current problems such as falling prices and marketing, technology, institutional, infrastructural, the irregularities involved, the prospects of mineral resource development such as estimating potential mineral reserves, exploiting minerals for industrial and economic development, reorganizing the mining industry by instituting policy guidelines and structural changes etc., and a discussion of 3 priority areas for research viz., 3-year study on strategies for mineral resource development, a 3-year study on land use for mineral development, and another 3-year study for utilizing these minerals. A plan of research operation in the area of mineral resource development, the methodology to conduct research with an accompanying funding mechanism are proposed for TDRI.

A review of the role of the government in this sector reveals that, the government has been taking a positive stance in terms of promoting and initiating mining ventures and encouraging local and foreign investment through legal and technical means. For exploration, mining, mineral processing and smelting, certain promotional privileges were granted such as, exemption from import duty and business tax on machinery and equipment and waivers on relevant regulations. These clearly indicated a policy reform that stressed on minerals as a source of income and thus, dictated that its development should therefore be encouraged. Since then, the industry has been expanding. But in recognizing that the industry is economically significant, i.e., as a source of foreign exchange,

as a source of government revenue, and as a source of employment, the mining industry should be able to draw up well-defined guidelines that are based on a review of policies and organizational directives, and addressing the following: role of the government in mineral resource development, promotion and initiation of mining projects, taxation of the local industry, indigenous minerals, curbing illegal mining activities etc., in order to close existing gaps and effect structural changes. The paper closes with a recommended strategy on how to disseminate the findings of the research proposed for mineral resource development.

## II THE PAPER : MINERAL RESOURCES

### 1. Introduction

Mining industry is regarded as an important economic sector contributing substantially to the national economy. Exports of minerals and certain metals bring in annually much-needed foreign exchange earnings. For example, the total export value in 1980 was 14,900 million baht (of which 11,170 million baht or 75% from tin), as compared with the value of 6,666 million baht for 1983 (5,225 million baht or 78% from tin). Direct revenues to the government in the form of royalties and other taxes reached a record-high of 4,100 million baht (3,587 million baht from tin) in 1980, falling to 1,500 million baht (1,307 million baht from tin) for 1983. Comparing the state of the industry between the two different periods under review, it can readily be surmised that the country's mining industry is, to some extent, vulnerable and subject to outside influence with regard to demands and prices in international markets.

It is only fair to mention that the decrease in export-value and government revenue is, by no means, an indication of a decline in productive capacity or of the mineral potential in the country. The extremely depressed state of the mineral market has actually been brought about by worldwide economic recession, not experienced for several decades. Since the country's industrial establishment presently has relatively small requirements for economic minerals such as tin, tantalum, tungsten, lead, antimony and fluorite, minerals are exported to earn foreign

exchange. Reduced demands and low prices during the years of deep recession have had direct repercussions on the local mining industry. The tin price dropped to the floor level (M\$ 29.15 kg.) set by the International Tin Council. Had the price not been defended by support-buying through the ITC Buffer Stock Fund, the tin price would have fallen much further. However, production and exports of tin have been subjected to export restrictions since April 1982 when producing member countries were forced to curtail their tin exports according to the quotas given during control periods. The decrease in export-value of tin is thus, due mainly to the cut-back in export tonnage according to the control measures, apart from the previously-mentioned situation. Other minerals, e.g., tantalum, tungsten, antimony, lead and fluorite were also adversely affected in varying degrees. In all, the local mines produced more than 30 minerals of different types and grades for commercial purposes.

It is noteworthy, however, that the performance of the mining industry during the first six months of 1984 has shown a definite improvement on mineral production and exports including an increasing price trend for several minerals. This turnaround should be firm and continuous since economic recovery has gradually taken place in developed and developing countries alike.

## 2. Role of the Government in the Promotion of the Mineral Industry

The Government of Thailand is committed to the development of the mineral industry through the private sector. Apart from the administration of mining laws, regulations, etc. by which all activities relating to mining must abide, the Government through the Department of Mineral Resources has the duty to promote, and sometimes initiate, mining ventures. The Government encourages private investments from both local and foreign sources, by providing the necessary facilities in

terms of legal and regulatory aspects as well as on various forms of technical assistance needed for the conduct of operations. The existing state mining enterprises, namely, Mines Organization and Offshore Mining Organization, carry out their own operations in the same manner as the private sector's and with no special privileges whatsoever.

With regard to foreign investment, the Government strongly promotes and supports foreign involvement where high and advanced technology and large capital investment are required. Thus, foreign participation is considered an integral part of the overall planning strategy in this sector. There are certain government policy guidelines covering mining activities in offshore and onshore areas with respect to foreign-Thai ownership. However, a waiver from such a policy for certain cases is possible subject to the approval by the Council of Ministers.

In addition to fostering and bringing about a steady and healthy growth of the mineral industry, the Government also, has a duty to seek ways and means to safeguard the due benefits of the mineral industry with regard to market price stability of minerals. In this respect, the Government supports international schemes for market stabilization arrangement that ensure remunerative returns to producers and yet, fair to the consumers.

## 2.1 Governing Legislations

The main instrument of legislation affecting the mining sector is the Minerals Act B.E. 2510 as amended by the Minerals Act (No.2) B.E. 2516 and the Minerals Act (No.3) B.E. 2522. The Minerals Act B.E. 2510 and its revision governs onshore and offshore exploration, mining, selling, dressing, transport and export of minerals. The main concept of the law is that, minerals are vested to the Crown, therefore, the owner of

the land is not entitled to ownership of the minerals underneath. No one shall explore for, or undertake mining in any place, regardless of the right over the area of which any person may have, unless he obtains a prospecting license or mining lease. Further details of the Act is prescribed elsewhere.

Mineral revenues are collected by the Government through Royalty Rates Act B.E. 2509 as amended by the Royalty Rates Act (No.2) B.E. 2520 and Royalty Rates Act (No.3) B.E. 2522. Royalty is not considered a tax but rather, as a compensation to the Government due to the fact that minerals are deemed to belong to the state. The main rationale behind the application of royalty rates on production is that, there is no other system which can be as equally effectively enforced.

Other legislations affecting the economics of mining operations are the Revenue Code, whereby income tax and business tax are levied; the Customs Law and the Investment Promotion Act, whereby duties on imports are levied and promotional privileges are granted, respectively. Promotional privileges are available for exploration, mining, mineral processing, and smelting. Benefits include exemption from import duty and business tax on machinery and equipment, and a waiver for normal immigration regulations to enable foreign technical experts to be brought into the country. Income tax holidays may also be granted to a promoted industry for a minimum of 3 years and a maximum of 8 years.

Income tax is levied at 30 per cent for companies registered with the Security Exchange of Thailand, otherwise, it is normally levied at 40 per cent. Apart from royalty and company income tax, mining companies are also subjected to business tax. The tax is levied on the export of metallic ores at a rate of 4 per cent, and an additional surtax of 10 per cent of the business tax is collected as a municipal tax.

## 2.2 Present Mining Policy

For many years the contribution of the mineral industry has been static until about 1960. Since then, the expansion of the mineral industry has been taking place. This was the result of a policy reform which placed emphasis on encouraging mineral development by recognizing minerals predominantly as a source of income. Accordingly, the exploration and exploitation of mineral resources has been actively promoted.

- 2.2.1 The government has formulated the policy into two lines. One is the Government, through the Department of Mineral Resources, who takes up the activities in geological mapping and economic geology study, as well as, providing technical advice to the mining sector. The other is the private sector who is left with the detailed exploration and development of accessible mineral resources. However, there is an exception in some circumstances where the Government, through its state enterprise, carries out the development program by itself.

In the past, mining by private interests was confined to the isthmus of Thailand with the rest of the country (above 11th Parallel) being closed by a Royal Decree to protect the farm land from the destructive practices of certain mining methods. Subsequently, the law was modified and currently, the main restrictions are that, a mine owner above this parallel must be a Thai national, and that, a mining company must be controlled by a Thai national, i.e. a foreign company may not own more than 49 per cent of the total share. However, the policy may be relaxed in cases where modern technology and substantial foreign capital are needed. In such a case, the Council of Ministers can pass a resolution that will allow foreign shareholders to hold more than 49 percent of the total share.

- 2.2.2 Since domestic consumption of the minerals produced is very limited, and Thailand has to rely on foreign mineral markets, the Government has considered it necessary to play a role in stabilizing mineral prices to the full extent by seeking membership in International Agreements. Thailand has joined the International Tin Agreement that commits both producers and consumers since the inception of the agreement in 1956. It is deemed beneficial to Thailand to join other producing countries in such international commodity agreements with due regard to mutual benefits of producers and consumers.
- 2.2.3 The present policy on mineral industry emphasizes on accelerated development of economic and export-oriented mineral resources to attain more foreign exchange earnings. Also of national urgency is the development of natural gas and alternative fuel resources to substitute to a certain extent for the imported oil. Another area of importance concerns the development of fertilizer minerals such as potash and rocksalt in the northeastern region of Thailand. To help achieve these aims, it is necessary to stimulate and attract the interest of foreign investors who possess sufficient capital and technical expertise, so that productivity can be achieved with efficiency and benefits to all concerned. In this connection, the Thai Government is prepared to open up new potential areas of sizable magnitude to such ventures. Special regulations and concessions may be considered in line with this new development policy. The minerals presently concerned are lead, zinc, copper, tungsten and potash and perhaps, tin.
- 2.2.4 To better organize the local mining industry, the Government is considering the setting-up of independent mining institutions in the form of a Chamber of Mines and a Mineral Resources Development Corporation. The Chamber of Mines will be instrumental in relieving some responsibilities presently attached to the Department of Mineral Resources. It will also exercise some degree of control over mine operators so that those miners conform more strictly to the laws and regulations. The Chamber will, at the same time, be obliged to give advice to technical problems and

to other problems involving other governing agencies.

## 2.3 Offshore-Mining

The drastic changes in the international economic scene, together with the change in public attitude towards mining during the past few years, make it necessary for the Government to reconsider the structure of participation in mineral investment. Thailand, like most other developing nations, feels that a larger share of the benefits resulting from the exploitation of minerals should be allocated for its nationals.

In 1978 and later in 1980, the Government declared a policy concerning offshore tin-mining operations which has long been controlled by foreign companies. The objective of the policy was to provide greater Thai participation in the existing offshore-mining companies. The policy has been formulated into 3 areas as follows:

- 2.3.1 Foreign company that has been undertaking offshore tin-mining operation for a long period of time must establish a new company which shall be incorporated and registered in Thailand. Non-Thai shareholders cannot hold more than 30 percent of the issued shares in the new company.
- 2.3.2 New offshore-mining investments can be carried out by foreign companies provided that non-Thai shareholders hold not more than 49 percent of the issued shares at the early stage and later on, decreasing to not more than 40 percent within 5 years from the commencement of the operation.
- 2.3.3 For offshore-mining investment in areas where the water-depth is greater than 200 feet, a 100 percent foreign-owned company is still allowed to carry out the operation provided that not less than 60 percent of the issued shares are sold to Thai nationals within 10 years from the commencement of the operation.



Foreign companies undertaking offshore-mining operations under categories 2.3.1 and 2.3.3 must furnish special advantages to the State in addition to the royalty payment. The Ministry of Industry is authorized to set up appropriate rules and procedures with regard to special advantages payment.

### 3. Problems of the Industry

In spite of the progress attained through efforts by both the government and the private sectors, it is evident that there are certain problems and obstacles facing the mining industry of the country.

These problems and obstacles may be identified as follows:

#### 3.1 Pricing and Marketing

The recent worldwide recession has had a major impact on demands for minerals in industrial production. The demands have been drastically reduced causing a surplus of minerals in the market. As a result, the prices of most minerals fell to lower levels. The exports of Thailand's important minerals, in quantity and value, decreased substantially during this period. For instance, exports of tin have been curtailed according to the export quota allocated by the International Tin Council to keep the price up, at the floor level. Tantalum prices are depressed due to the present low demand. Signs now indicate that prices of certain minerals are firming up and improving as a result of economic recovery in certain industrialized countries.

Marketing of minerals has long been a distinct weakness of the industry and the miners in particular. Information on mineral markets is in some cases, lacking. The miners have the task of only producing the minerals, without adequately knowing the demand-supply situation for the individual minerals that they are producing. There is, as yet, no proper government agency assigned to monitor the market information for the benefit of the miners.

### 3.2 Technical

Problems of technical in nature have contributed to low-productivity, higher production cost and even, failure of the mining venture. These problems may be cited as follows:

- 3.2.1 Information on reserves and deposits exploration has not been carried out properly to establish the nature of deposits and ore reserves before commencing mining operations. This lack of knowledge of the mineral deposit has caused failure to many mine operators in the past.
- 3.2.2 Mining and exploration conducted by certain mines are not adequately planned and properly conducted and renders the operation inefficient and wasteful of mineral values. Thus, the minerals produced could only sell for a marginal profit because of higher production-cost incurred, together with quality problems.
- 3.2.3 Processing of minerals to higher-value products is progressing somewhat slowly, due to lack of required technology together with marketing capability on the part of local processors/proprietors.

### 3.3 Institutional

Acquisition of land for mining purposes has been the main, sometimes the most difficult, effort by miners. Several land areas of high-mineral potential are controlled under the jurisdiction of the Forestry Department and designated as reserved areas for wildlife national parks, etc. If part of these areas could be allowed for exploration to determine the ore-value and the priority of development, more mineral land would be available for mining. There is a need for better coordination among agencies concerned such as the Office of the National Environment Board, the Tourist Organization of Thailand, the Forestry Department and the DMR including the Army on the priority of developing the natural resources in certain reserved areas.

### 3.4 Infrastructure

The infrastructure, especially in the form of transportation by road, rail and waterways, has to be improved significantly to allow for a better and more efficient movement of mineral concentrates. Port facilities are yet, to be greatly improved to reduce the cost of handling the bulk shipment of minerals and to enable ocean-going ships to take delivery of the material directly. Transportation and handling costs have been an obstacle or constraint to the development of low-priced minerals for export.

### 3.5 Illegal Activities

Recently, these activities have shown to produce detrimental effect to the mining industry and to the country as a whole. Laws and regulations are frequently violated and punishment is relatively lenient compared with the damage done. The illegal activities may be summed up as:

- 3.5.1 Violation of another person's right over a mining concession by a group or groups of people or "mob" to dig or mine for minerals illegally. The incidents worth mentioning are: the offshore illegal tin-mining in the South, the Khao Soon wolfram case, Doi Ngom wolfram case and the Doi Mok scheelite case. In all these cases, the mining areas have been breached and worked by mobs in a wasteful manner, which were found to be dangerous to the country's environment. The legitimate concessionaires have, in effect, been deprived of the rights to conduct mining legally. Besides, the government has done very little to mitigate the situation.
- 3.5.2 Smuggling of minerals out of the country has been a major problem for some time since the beginning of illegal offshore mining in Phang-nga. Tin ore is the mineral which has been taken out in big quantities. Losses to the country include royalty, business tax and income tax, apart from the foreign exchange due to the exports. The activity still continues unabated at the present time. Thailand bans the export of tin ore unless it is transformed into tin metal. This metal, in turn, must be exported under quota allocations only.

#### 4. Policy Issues to Develop the Mineral Resource Industry

It is the understanding of the parties concerned that Thailand is fairly well-endowed with mineral resources, some of which can be regarded as of world-standing. These minerals include tin, tantalum, tungsten and fluorite. Other minerals of economic importance are also found in quantities which warrant commercial exploitation. Given the required and suitable direction and guidelines from the government, it is believed that the mineral resource will play a significant role in the economic advancement of the country.

##### 4.1 On Mineral Resource and Potential Reserves

Several minerals have been exploited for a long time and yet, the production of these is still proceeding well. Tin production has been going on for almost 100 years and its production has shown no signs of declining except for the current period under export control. Geologically speaking, the environment in the country is favorable for the occurrence of such minerals as tin, tungsten, tantalum, fluorite, other base-metal minerals such as lead and zinc. With the presently-available information, it has been considered that substantial reserves of these minerals exist to justify further development. It should be noted that individual mines have a fair idea of their mineral reserves for their own purpose. On a country-wide basis, however, the determination of the mineral reserves has to be considered at a national level, requiring cooperation from certain other agencies.

##### 4.2 Policy Directions

Exploitation of minerals constitutes an important sector of economic development. The mining industry should be regarded as contributory to providing the following benefits to the country.

- Source of foreign exchange, to help the balance of trade of the country;

- Main source of revenue to the government in terms of royalty and taxes;
- Source of employment to create jobs for the people, apart from setting up new communities and infrastructures;
- As raw material base for local industry, to utilize more indigenous minerals to produce semi-or finished products for exports or local consumption.
- Besides for economic purposes, certain minerals of Thailand which assume world predominance may afford significant leverage to the country in international dealings.

In order to derive fuller benefits as indicated above, the mining industry must be given well-defined guidelines. Policy as well as organizational directions should be reviewed and further formulated so that past shortcomings and gaps could be corrected and closed so that the government could take up certain initiatives to effect certain structural changes.

### 4.3 Incentives

Minerals as raw materials for local industrial development should be seriously pursued on a continuous basis. Minerals are almost entirely exported in the raw or concentrate form, fetching less prices than, if they have been processed first. It is a big question as to whether a policy directive should be established requiring all export-intended minerals to be subject to government control. By such a measure, the government will have to make sure that the local industry has sufficient mineral raw materials for their use before allowing the export of these minerals. Other incentives should be offered to those using local minerals in their production. They should be given promotional benefits/ incentives for exportation of products. The government may acquire the necessary technology for setting up more sophisticated processing plants or else, actively participate in the project concerned. In short, the government has the duty to, somehow, promote the industrial development in the country based on local minerals, since the beneficial effects are fairly obvious.

## 5. General Issues for Research

The previous discussions about the mineral industry has brought to light the following issues.

### 5.1 Exploration to determine reserves and mineral potential

As a prerequisite, exploration should be conducted to determine the reserves and potential of the minerals in the country. The information is necessary for both short and long-term planning.

### 5.2 Reliable, accurate and obtainable information on mineral reserves

Mineral reserves in many active mines should be obtainable, though some mines may not have an accurate information of their reserves. Guidance or assistance of some kind should be given so that a reliable information could be obtained. Reserves outside concession areas are obviously not readily available. Although the law requires the holder of an exclusive prospecting license (EPL) to conduct exploration within a certain time limit, the information obtained for most cases is not satisfactory. This is due to the financial and technical constraints on the part of license holders, together with the time-factor permitted. Ways and means should be found to resolve this lingering problem.

### 5.3 Determining true mineral reserves in economically-important areas

Establishing mineral reserves in potential areas of the country is even more difficult. Several potential areas are located in reserved areas under the control of the Forestry Department. As of the present, the Department does not, under any circumstances, allow any form of exploration for minerals within the wildlife and national park reserves. Thus, it is now impossible to determine the true reserves and potential of minerals, and hence their economic importance, in these locations. Indeed, it is hoped that some form of compromise could be formulated to relax such strict rules so that the country's best interest can be served.

#### 5.4 Organizational and policy reforms

Better organization of the mining industry vis-a-vis updated policy guidelines and structural-institutional changes are considered necessary so that the industry and the country as a whole, in the longer term, can benefit from the exploitation of its non-renewable natural resources.

The strategy for the proposed changes should address the following issues:

- 5.4.1 Role of the government in developing mineral resources in terms of exploration, mining venture, mineral trade: Should the government choose to play a more active part in the mining and mineral activities, or should a separate mechanism or entity be envisaged to act on behalf of the government to all pertinent matters? Under this scheme, the planning, implementation and operation of activities in the exploration, mining, and mineral trade would be conducted in a systematic and well-devised manner.
- 5.4.2 Promotion and initiation of new mining projects through public participation by the government: If new, large mineral areas are released for mining, the government would proceed to form a publicly-participated company to undertake mining operation in the designated area. Planning and mining operations would be designed and implemented in the best possible way to satisfy the requirements under modern practice.
- 5.4.3 Review of taxation in the mining industry: Taxation in the mining industry should be reviewed with the objective of studying whether the existing system fits in with the presently-prevailing economic environment, inside and outside the country. Presently, the minerals produced are subject to royalty payment in varying rates for individual minerals of which tin has the highest rate. Apart from royalty, miners have to pay business and municipal tax upon the exportation of minerals, and a special fee of 5 percent of the royalty payment and income tax.

- 5.4.4 Strengthening of efforts to utilize indigenous minerals for local industry: This means that the government should take an initiative by devising appropriate incentives and regulations that offer favorable benefits to the processing industries, as well as, to the producers of the suppliers of minerals.
- 5.4.5 Reviewing and amending existing laws and regulations that may impede development consistent with the desired objective, with emphasis on the drastic action towards illegal activities.
- 5.4.6 Consideration at the national level of priority, of developing natural resources occurring/existing in various areas of the country and under the responsibility of different organizations.

## 6. Priority Areas for Research for TDRI

Having reviewed several problems facing the country's mining industry and in order to overcome these, it is considered necessary that certain structural-institutional changes should be studied, together with possible provision of updated policy guidelines. As a result, a number of priority areas has been delineated that would constitute the bases of research for TDRI.

Should certain areas be justified for research implementation, a more detailed work plan, budget and personnel requirements shall be prepared for approval by TDRI.

### 6.1 Area I: The Strategies for Mineral Resource Development (3 years)

For the study of this area, a thorough conceptual consideration will be made including implications on the practical aspects of the strategies in question. To serve such purposes, one or more of the issues cited may form individual projects of research under Area I.

Setting up a new, independent entity may be conceived and implemented in line with the formerly proposed Mineral Resource Development Cor-



poration (MRDC) to assist the private sector with the exploration, the mining venture, the capital, and the marketing. A broader authority should be considered for MRDC to act on behalf of the government with respect to expanded mineral activities (promotion of new projects, mineral market-trade & stockpiling, etc.).

Restructure the roles of existing state enterprises, whether these enterprises should be strengthened and given a new, broader role, instead of establishing the new entity as mentioned earlier.

Study on taxation in the mining industry should include the possibilities of adopting/adapting other systems such as, profit/production-sharing, resource-rent system, or the system based on turnovers of a particular operation or company. The idea is to have a system which is reliable and yet, fair to investors.

Review of existing, relevant laws and regulations governing the conduct of all mining activities and to revise and amend these laws, where necessary, so as to serve the needs of the industry under the prevailing environment. Emphasis should be placed on the provision of stricter control on illegal activities.

## 6.2 Area II: Use of Land for Mineral Development (3 years)

The issue will be taken up and studied by a joint research team comprising of personnel from the agencies concerned with the subject. The objective of the study is to investigate the possibilities of developing the natural resources in the reserved areas for the benefit of the country. The land under study should include the areas reserved by any government agency and the military intended for any particular purpose. The study should come up with a recommendation on means and measures to be taken to achieve the land acquisition policy for mineral exploitation.

The issue is deemed an urgent matter because it affects the work responsibilities of several government organizations in their development efforts.

### 6.3 Area III: Mineral Utilization (3 years)

As earlier mentioned, the processing of locally-produced minerals to obtain added-values must be seriously and urgently promoted, because the semi-products or finished products would bring in much higher values than the original raw minerals.

The research would investigate what type of minerals to be processed or utilized for what purposes, taking into consideration the state of the market, the industrial requirement and capabilities existing in the country so that a utilization plan could be rationally formulated, with provision for enacting the necessary laws and regulations in order to achieve the objective.

## 7. Work Plan

### 7.1 Overall Concept

The plan of research would be designed, based on the results and information obtained from past performance and experience, regarding aspects of the mining industry so that the formulation of the research plan could be appropriately evolved to achieve the national objective.

The plan of operation for particular projects will be set up and considered among specialists from concerned agencies, institutions and/or universities in order to obtain a broadly-based support.

The operation of research would be conducted by competent personnel well-versed in their respective fields of expertise to ensure that the results obtained will be of high-quality. TDRI and the concerned agencies would provide the necessary facilities for conducting the research.

### 7.2 Methodology and Funding

The proposed methodologies for conducting research should consist of the following considerations.

- Upon formulation of the research plan, consideration will be given to organization of the operation team which should include specialists of relevant disciplines from government agencies, institutions and universities.
- Members of the team would be assigned to carry out research work in accordance with their expertise. The results of the work from the team members will be assembled, collated and edited into a final report.
- The results of research shall be thoroughly studied by TDRI and certain concerned agencies for comments and/or suggestions before the final publication.
- Funding could be obtained from:
  - Outside sources-- bilateral arrangements, UNDP, independent donors, etc., through TDRI.
  - Government budget.
  - Others

### 7.3 Strategy to Disseminate Results of Study

Because the results of the proposed research projects will be obtained through a serious and combined efforts of various concerned parties, their findings and recommendations must be submitted by TDRI, through NESDB, to the government for consideration and approval. If the recommendations show positive signs, they should then be forwarded to the concerned agencies for further implementation.

Seminars and/or conferences may also be organized to present the results of the research on the projects. Publication of the results in journals or periodicals would be advisable to inform the public thereof.

### 7.4 Manpower Requirement

A tentative list of researchers intended for the various areas:

Sunt Rachdawong	Ph.D
Quanchai Leepaopan	Ph.D
Vichien Plod-pradit	Ph.D
Keerasak Chan-Charatwatna	M.A.
Somkiat Poothongchairit	M.S.
Sinthurak Saowana	M.A.

Apart from these researchers, a number of specialists from government agencies and universities will be invited to participate in certain projects as required.

## 8. Tables

Table 1 Mineral Production for 1982 and 1983

Mineral	1982		1983	
	Ton	Value-million Baht	Ton	Value-million Baht
Tin Concentrate	35,644	7,950.6	27,226	5,958.3
Final slag	2,383	349.4	1,483	150.0
Lignite	1,963,764	320.1	1,866,083	393.0
Gypsum	753,433	270.0	760,361	296.8
Fluorite				
. Metallurgical grade	176,084	257.7	159,959	231.1
. Acid grade	81,024	196.8	46,689	102.7
Columbite-Tantalite	39	17.1	549	227.2
Limestone (for cement industry)	6,370,973	159.3	8,937,693	223.5
Lead	43,718	269.1	49,446	217.0
Barite	330,948	291.8	187,437	164.4
Tungsten				
. Wolfram	1,257	222.6	815	111.9
. Scheelite	404	71.6	277	38.1
Feldspar	19,326	9.8	47,908	63.0
Antimony	1,567	27.7	2,808	42.3
Struverite	10	1.4	275	26.6
Kaolin	17,846	12.5	36,350	25.4
Shale (for cement industry)	1,248,443	25.0	1,199,607	24.0
Other	-	66.2	-	73.9
Total		10,169.3		8,219.2

Table 2 Mineral Exports for 1982 and 1983

Mineral	1982		1983	
	Ton	Value-million Baht	Ton	Value-million Baht
Tin				
. Tin metal	26,013	7,985.5	17,656	5,224.7
. Tin-lead alloy	747	131.1	1,203	202.0
. Final slag	2,444	358.3	1,577	159.6
Lead concentrates	37,636	174.0	42,738	202.7
Fluorite				
. Metallurgical grade	127,689	190.1	140,540	197.7
. Acid grade	52,303	124.5	42,277	90.0
Gypsum	380,112	149.5	469,764	160.5
Barite				
. Lump	255,251	216.6	140,715	123.3
. Ground	47,724	101.0	29,507	69.1
Tungsten				
. Wolfram	1,108	165.0	792	87.6
. Scheelite	272	47.6	350	41.2
Antimony	2,043	35.7	2,977	42.2
Feldspar	3,849	6.0	12,331	12.0
Xenomite	120	12.0	82	7.6
Columbite-Tantalite	33	14.0	38	7.5
Dolomite	5,160	3.8	7,009	5.6
Pyrophyllite	3,619	4.4	5,153	5.5
Struverite	60	8.4	87	5.0
Quartz				
. Ground	1,986	3.3	2,604	4.6
Other		12.3		28.4
Total		9,743.1		6,666.8

Table 2.1 Exports of Minerals for Jan - June 1983 - 1984

Mineral	Jan - June 1983		Jan - June 1984	
	Ton	Value-million Baht	Ton	Value-million Baht
Tin				
. Tin metal	9,584	2,862.6	9,929	2,801.5
. Tin-lead alloy	536	96.4	355	57.0
. Final slag	284	20.8	503	51.2
Lead concentrate	20,400	97.5	22,706	100.3
Fluorite				
. Metallurgical	57,948	86.9	92,519	129.8
. Acid	24,074	53.0	26,630	52.2
Gypsum	188,155	66.6	395,794	124.3
Barite				
. Lump	69,865	61.5	62,399	50.2
. Ground	16,271	33.3	9,424	18.9
Antimony	989	14.5	2,653	50.1
Feldspar	6,934	6.9	1,708	2.5
Columbite-Tantalite	15	5.0	60	22.4
Dolomite	3,877	3.0	3,252	3.0
Pyrophyllite	1,093	1.5	2,982	1.9
Xenomite	30	2.6	53	6.5
Tungsten				
. Wolfram	415	47.2	828	93.1
. Scheelite	139	16.6	233	30.0
Other		21.5		23.0
Total		3,497.4		3,617.9

Table 3 Mineral Consumption for 1982 and 1983

Mineral	1982		1983	
	Ton	Value-million Baht	Ton	Value-million Baht
Tin Metal	705	212.3	703	209.1
Dolomite	10,600	2.1	7,465	5.4
Feldspar	11,352	5.9	28,433	39.3
Fire Clay	1,000	0.7	2,078	1.4
Gypsum	432,749	167.7	346,413	135.7
Iron	39,608	6.3	30,058	4.8
Kaolin	14,492	10.2	34,963	24.5
Lignite	1,969,902	321.1	1,837,627	389.5
Limestone	5,484,114	137.1	8,222,634	205.6
Manganese	3,160	8.3	8,824	23.3
Marble	8,402	3.7	14,304	6.4
Shale	1,083,354	21.7	1,216,306	24.3
Silica sand	85,248	10.2	129,540	15.5
Diatomite	146	0.1	525	0.5
Barite	-	-	1,330	1.2
Phosphate	730	0.3	1,436	0.6
Pyrophyllite	10,600	2.1	8,800	1.7
Quartz	-	-	2,030	0.5
Talc	567	0.4	510	0.3
Ball clay	2,330	0.5	960	0.2
Rock salt	11,300	3.0	8,679	2.3
Barite (ground)	12,000	25.9	1,780	3.7
Total		939.6		1,095.8



## APPENDIX A Royalty Rates

Royalties on minerals are normally levied as a percentage of posted prices except for tin which is levied on a progressive rate basis. In the case of tin, royalty is collected at different rates on eight parts of a posted price which is based on Kuala Lumpur Tin Market (KLTM). It is collected on actual tin content of concentrates produced per 60 kilogram.

The tin royalty structure described below is currently enforced with effect from September 1983.

On the fines	3,000	baht	ad valorem	nil
plus on the portion	3,000 - 7,000	"	"	5%
plus on the portion	7,000 - 9,000	"	"	10%
plus on the portion	9,000 - 11,000	"	"	20%
plus on the portion	11,000 - 14,000	"	"	30%
plus on the portion	14,000 - 17,000	"	"	40%
plus on the portion	17,000 - 20,000	"	"	50%
plus on the balance	over 20,000	"	"	60%

In addition to royalties, tin miners are subject to payment of special fee at the rate of 5 percent of royalties paid for the tin concentrates produced. This special fee will be kept by the Department of Mineral Resources as an expense budget for restoration of mined-out area, for prevention and suppression of offences prohibited under the Minerals Act and for use as local development funds in the mining provinces.

The following rates are a few examples of royalties for minerals produced in Thailand which have become effective since 9 July 1980:

Antimony	- ore	10%
	- crudum	10%
Barite	- lump	7%

	- ground	2%
Fluorite	- metallurgical grade	7%
	- chemical grade	4%
Gypsum		4%
Lead	- metal	2.5%
	- ore	10%
Rock salt		4%
Zinc	- metal	2.5%
	- ore	10%

## III ISSUES OF DISCUSSION

## 1. Technical Problem

**Comment:** Observations about the mineral industry indicate that the use of inappropriate sub-standard technology and the lack of proper ones are some of the industry's biggest problems. Surveying is also another problem which accounts for the scarcity of information on reserves and mineral potential, even though a variety of good minerals exists in the country. To improve the productivity and income from these minerals, there should be a national-level study which will aim at finding the most appropriate technology.

## 2. Pricing and Marketing Problem

**Comment:** An observation was made that only the price of tin is currently being protected whereas the prices of other minerals are not. The lack of protection measures for the other minerals requires attention. The policy on mineral protection must be regulated in order to create a proper kind of investment inside and outside of the country.

## 3. Policy Directions for Research

**Comment 1:** A policy on how to make the best use of land for mineral development must be studied.

**Comment 2:** There should be a national-level study related to protection value-added since the country relies on foreign markets. And being rich in mineral resource, this study should also aim at finding the proper technology to improve the productivity and income from these minerals.

Response to the comment:

Different mineral specialists normally produce different forecasts or studies according to his own specialization or interest. These different approaches would result in contradictory results with other government policies which will most likely, have repercussion on other policies. In order to avoid conflicting results, there is a proposal to draw up a national plan (policy) that will integrate all the research plans with due consideration to the aspects of utilization and conservation. TDRI was mentioned as the body that could best serve the purpose of conducting such a study.

"Development Research and National Development"

Position Paper No. 4

ENVIRONMENT

by

Surin Setamanit

I ABSTRACT

The environment in Thailand became an issue for public debate when public concern gave rise to the enactment of Thailand's first environmental law, the National Environmental Quality Preservation and Promotion Act 1975. In this context, the paper addresses two main issues of environmental concern in Thailand at present viz., those of industrial and human settlements in nature and those related to natural resource depletion and degradation. In the context of natural resources, the decision on whether to exploit or, to conserve continues to be a perplexing issue to tackle, but recent developments and modes of action taken indicates a leaning towards the latter by government agencies, universities and institutes of higher learning, research institutes and organizations. And while past research by universities was mainly concerned with gathering information and developing new knowledge or technologies devoid of any theme for policy and planning, research by government agencies sought to find answers to issues before them through research which proved to be of more use to planning and decision-making. In the final analysis, the paper concludes that there are numerous studies on the environment, but they lack the integration necessary to make these pieces of information useful for the decision-making and policy formulation processes. In this paper, the gaps, the main environmental issues, are outlined for TDRI to tackle for the next seven years. The first of these issues concern the basic concepts underlying the 'environment' syndrome in the country such as people's perceptions and their levels of awareness. The 'systems approach' or, the interrelatedness among living and non-living organisms is another issue. Yet, a more interesting issue is the central theme of resources policy, i.e. discovery, development and exploitation of resources and afterwards, the sudden shift to the conservation movement which heralded the need for more public planning/regulation of resources use. On the subject of energy, the key issues concern the development of energy resources and control of pollution associated with it. While on the issue of ecosystem management and land use control, a recurring question is on, where the responsibility for land use policy decision should rest. Laws and regulations on environmental problems concordant with traditional culture and beliefs and aiming for a sustainable development seems to be the theme of the juridical issue. Two other issues of equal importance in these programs are the status and the roles of

the present administrative and organizational set-up, and the international institutions and agreements. The present status of the environment calls for intensifying environmental impact assessments (EIA) and further explorations on nature conservation, improvement of environmental education and training, strengthening the capability of research and research facilities and enhancing coordination and linkage among research institutes and industries as parts of a vigorous activity for research in the environment program. The paper further recognizes that, in order to successfully attain the objectives envisioned, resources, both financial and human, are required and the needs described above must be prioritized accordingly.

## II THE PAPER: ENVIRONMENT

### 1. Introduction

Thailand places much reliance on industrialization as a means to achieve rapid economic development and this has been quite successful in broadening her industrial base and increasing the output of her manufactured products. But problems also arise from unplanned location of these industries and from industrial pollution. Besides, the characteristics of these industries are quite different from those in developed nations. They may be termed as informal industries, and more often than not, they do not follow the organized pattern of the industries as those in the West. For instance, they are smaller in size, and concentrate mostly in the already-congested capital cities or big towns where they have access to a large market.

There are several problems that have prevented the effective abatement of pollution from these small industries. Being small, they are incapable of taking advantage of the "economies of scale" and tend to maximize profits by minimizing overhead and "unnecessary" expenditures. Any requirement for capital investment on "non-productive" items such as pollution-control equipment would upset the cash flow of the company.

Although the technology for pollution-control is already available, strict enforcement of the laws is necessary for the effective control of population. These laws, however, are largely based upon foreign models and

are sometimes questionable as to their suitability for enforcement in countries that are so different politically, socially and culturally. More important problems rest with our ability to develop our own "environmental jurisprudence". Law is an important tool to be used not only to control pollution, but also to preserve and enhance the quality of the environment.

Environmental degradation in urban areas is another urgent problem that requires attention by the government. In the metropolitan areas, the rates of population increase have been higher than the national average due to a steady stream of rural-urban migrants. By the year 2000, Bangkok will probably double the present figure of 5 million. Even with the present condition, the cities are experiencing a widespread shortage of housing which leads to the expansion of slums and other forms of marginal settlements. This, in turn, has sharpened the glaring social and economic disparities since urban, industrial and commercial activities cannot generate enough jobs for the largely unskilled rural migrants.

The congested sub-standard living places, coupled with inadequate facilities in terms of water supply, drainage, sewerage and sewage treatment and refuse collection and disposal help create real environmental health hazards. The productivity of the city's economy is also reduced by traffic congestion that gives rise to the problems of air-pollution and flooding during the rainy season and compounded by the problem of land subsidence due to heavy extraction of underground water.

Turning away from the environmental problems created by industries and human settlements to another form which is also in need of urgent attention is, the problem of natural resource depletion and degradation. Thailand is well-endowed with natural resources such as tropical rain forest, fisheries, mineral deposits, water resources and fertile land. But these resources are threatened and endangered by both mismanagement and, by the sheer increase in population.

Poor rural inhabitants are forced to cut and burn down trees in the forests to acquire lands for cultivation. Illegal logging for commercial purposes help aggravate the problem further. Marine fish resources which have helped increase Thailand's gross domestic product by 4 percent are declining in productivity due to over-exploitation and due to pollution from both domestic and industrial activities. Mineral extraction and export of raw mineral ores poses problems of pollution. The pollution problems arising from mining activities are at its peak as the activities move to the coastal zones and to the offshore areas. The government and the country as a whole are confronted with the dilemma of having to make the choice between exploitation and preservation. The choice is, indeed, a very difficult one to make.

The few environmental issues cited above are far from exhaustive, but they should help highlight some of the major issues which are confronting Thailand, and should suffice to indicate that the problems are not purely technical, but also social, economic and political. To tackle the problems more effectively, one need not only deal with the technologies, most of which are in existence, but also with the strategies, the policies and the planning aspects which are virtually non-existent, especially in the area where the need to develop and the need to conserve and enhance the environmental quality in a sustainable manner must be reconciled.

## 2. The "Environment" Consciousness

### 2.1 Government Administration

National interest in environmental problems in the early 1970's at the time of the world's interest in the same problems, resulted in the enactment in 1975 of the National Environmental Conservation and Promotion Act and, the establishment of the Office of the National Environment Board, first under the Office of the Prime Minister and later, transferred to the Ministry of Science, Technology and Energy. The NEB represents the country's first organization charged with the responsibility to deal with environmental problems.



One of the most important duty of the NEB lies in the area of environmental policy and planning. There are five areas in environmental management contained in the National Environmental Policy as follows:

- (1) Natural Resources Management
- (2) Environmental Pollution Control
- (3) Population Distribution and Human Settlements
- (4) Conservation of Nature and Cultural Heritage
- (5) Promotion of Environmental Awareness as well as Environmental Education and Training

NEB has also initiated a program leading to the development of environmental management plans for some selected areas which include the following:

- Songkhla Lake Basin
- Pattaya Beach Resort
- Inner Gulf Zone
- Phuket
- Rural Development
- Forest and Wildlife Protection.

Aside from NEB, there are six other departments<sup>1</sup> and offices whose activities are environmentally-related.

## 2.2 Education

Environmental education probably started earlier at the higher education level if one includes the study of sanitary engineering, the study of ecology and certain courses in botany, zoology, etc., in the field of science. But one must admit that, the aims of these study programs are

more inclined to producing specialists and professionals in the areas mentioned, rather than producing environmentalists who are generally taken to be specialists or professionals who, besides having their own expertise are also capable of utilizing this expertise in an interdisciplinary manner in understanding and solving the problems of the environment. The faculty of Engineering at Chulalongkorn University has been offering a program of study in Sanitary Engineering at the Bachelor's degree and post-graduate levels for more than twenty years, while ecology has been taught in the Faculty of Science of the same University from earlier times. However, it was only in the mid-1970s that the subject of environment came into the picture. Ecological issues have been added into the contents of certain basic college courses, such as introductory sociology, introductory economics, or basic biology. Several courses which have included "environment" in their contents have been revised to embrace more aspects of the environmental issues, and, in the case of the program in Sanitary Engineering, the objectives of the program have been expanded to cover industrial pollution control, environmental planning and management, air pollution, and environmental impact assessment.

At higher-degree levels, there are new programs in environmental studies offered at the various universities operating at the master's degree-level with the exception of the programs of the Asian Institute of Technology which are operated for both the master's and the doctoral levels.

The Faculty of Natural Resources at the Prince of Songkhla University offers program of studies related to conservation and other ecological issues. The same is true at the Maejo Institute of Agricultural Technology, Chiang Mai, under the Department of Landscaping and Environmental Conservation. With respect to creating environmental awareness, it is worth noting the joint courses on environment carried out by the Institute of Environmental Research collaborating with the Institute of General Studies at Chulalongkorn University. As far as programs in environmental engineering and technology are concerned, the program offered at AIT is structured to train students in the broad fundamental aspects of environmental engineering, in fundamentals appropriate to the interdis-

ciplinary nature of environmental problems, and in applied technology relevant to the environment of the developing countries in the region. This program is very much similar to the Environmental Engineering Program at Chulalongkorn and Chiang Mai Universities but with more emphasis being placed on water and wastewater treatment. The objective in laying out a particular curriculum varies with each university. For example, the last 3 universities mentioned intend to produce engineers who have a complete theoretical and practical knowledge in the planning, design and operation of pollution-control equipment and other facilities rather than, in merely producing environmentalists out of the engineers, since none of the courses seem to touch upon the conservation aspect nor, on the impacts of engineering practices upon wildlife and other organisms.

The program at Chulalongkorn University aims to broaden the knowledge of graduates who already understand and who can perform research work in environmental sciences in general. The program at Mahidol, on the other hand, aims to produce better-skilled and competent environmental health personnel to support the expanding public health programs of the country, i.e., health-care delivery system which includes curative, promotive, as well as, preventive approaches. The environmental science at Kasetsart, is offered to specialists who wish to continue to work in his own discipline while utilizing the added knowledge and experience in conservation and management of the environment and natural resources. An interesting feature of the Technology and Environment Program at Mahidol University is the course designed to train environmental planners and managers through interdisciplinary courses in ecological science and environmental management aimed at producing integrationists rather than specialists.

### 2.3 Research and Development

The seriousness of the Thai Government in environment research and development is reflected in some documents such as the Constitutions, the National Institutions for Higher Learning, and from the National Education Development Plan.

Since research is the basic component of higher education required to maintain the effectiveness of the whole educational system, a great deal of insight into research activities especially among institutions of higher learning can be gained by examining some of the schemes and plans in education.

Under the National Schemes of Education B.E 2520 (1977) which is the ninth in the history of education development in Thailand, research in education and the importance of research in the advancement of knowledge were clearly stated for the first time.<sup>2</sup>

The Third and the Fourth National Education Development Plans, B.E. 2515 - 2519 and B.E. 2520 - 2524 stated respectively that, there was to be promotion of education and research in science and technology, and promotion of activities concerning education, research, writing of texts, academic services to the society and, the conservation of arts and cultures.

### 3. Current Efforts on R & D in Environment

An ideal research should, not only, reinforce the country's technical knowledge, of agricultural engineering, industry, water resources and irrigation systems, transportation and the development of various forms of energy but, should also consider their effects on the environment.

#### 3.1 The National Research Council

Under the Fifth Plan, the following topics seem to hold more importance for research: the economic use of energy; the utilization of natural fuels; the research and promotion of local raw material for industry use; the drainage of rain water and sewage; the solutions to traffic problems; the study of and solution to environmental problems.

The Office of the National Research Council, established in 1959, is vested with the responsibility of advising the Cabinet of Ministers on

national research policy and research projects; and of promoting and supporting research works by government departments and organizations as well as, by individuals. The office is also responsible for coordinating research projects especially on matters concerning the setting up of research budget and the granting of research fund. Research activities which directly concern the environment can be found under one of the ten branches of the NRC which is the Engineering and Industrial Research Branch.

### 3.2 University Research

Research in a university can be carried out in several ways, namely, by individual faculty members in areas of their own interests, by groups of faculty members within the same discipline or in different fields, in areas of mutual interest and in connection with graduate study. Research work can be likewise organized whereby, a faculty member independently organizes his own research and arranges his own financial support and other facilities, with his superior's approval. Research could also be organized on departmental and faculty levels, and, in some cases, an administrative framework can be set up as an internal matter within a department of a faculty. Some universities centralize all research activities under the responsibility of the university research center or institutes that will take care of each research area. They have their own staff and budget and some research-support facilities. There are several organizations following this pattern<sup>3</sup>.

It is evident here, that research activities among universities adopt diverse organizational patterns and faculty members enjoy a great deal of freedom in choosing his own area of research as well as in deciding how his research would be conducted. The Academic Division of the Office of University Affairs conducted a survey of research work carried out by faculty members and graduate students of all universities during the academic years 1974 - 1976 and found that, about one percent of the projects had a leaning towards environmental researches dealing

with environmental pollution, environmental planning and rural and urban ecology. The Institute of Environmental Research in Chulalongkorn University, established in 1975 completed about 80 research projects including those dealing with environmental impact assessment of development projects. On an average, it means that the Institute could complete about 8 projects per year. If this figure is assumed to be the average number of achievement of an organization that undertakes environmental research, then the total number of projects on environmental research could be roughly estimated.

### 3.3 Other Organizations

If environmental impact assessments are also considered research activities, then the amount of environmental researches that have been undertaken by government agencies, public enterprises, private consulting firms, and universities would indeed be voluminous.

The National Environment Board supported several projects of national importance such as the investigation of the land-subsidence problems in the Greater Bangkok Area, the Ecology of the Songkhla Lake Basin, the pollution problems of the Inner Gulf Zone and the Pattaya Beach Resort, the presence of mercury and other heavy metals in the Chao Phya River, and many others. The NEB also documented the environmental impact assessment of water resources projects in Thailand and initiated a procedure for environmental impact evaluation as a primary approach in the review, planning and approval of development projects.

The Electricity Generating Authority of Thailand, besides having conducted numerous in-house research projects on its own, has also, contracted out a large number of research projects concerning environmental impact assessment of several multipurpose dam/reservoir construction projects to private firms, as well as, to universities and institutes.

The Asian Institute of Technology has also conducted numerous research projects on environment in line with its environmental engineering and

environmental technology and management programs. With an average intake of 30 graduate students in these programs, AIT could have accumulated the largest number of researches in environment undertaken by faculty members and students.

The Bangkok Metropolitan Authority and the Department of Health, Ministry of Public Health have undertaken research on air-quality monitoring and air pollution and surveys on water quality of rivers and bodies of water in Thailand. In this country, the Ministry of Industry through its Department of Industrial Works and Mineral Resources also conducted a number of research works in connection with industrial and mining pollution that come under its jurisdiction. The Thailand Institute of Science and Technology conducts research in ecology and environment through its Ecological Unit, for instance, the contracted research project awarded by the NEB on Tha Chin River Water Management.

#### 4. Constraints to Environmental Research

Many views have been expressed concerning the models of research organizations among universities, research institutes and government agencies, but the key issues remain the same; motivation, strengthening of capability and adequacy of facilities. For university research, there are also problems concerning the inter-relationship between research institutes, faculties and departments. Motivation and research capability building should be carried out in an integrated manner as follows:

First, would be to develop the awareness that research achievement is the true measure of successful development, since it is through research that new knowledge is gained, solutions and new technology are acquired, that will assist the country to the state of self-reliance. In the academic circle, research achievement should be taken as the sole factor that determines the level of achievement of the faculty in both the academic and the professional fields.

Second, is to recognize that, though majority of the personnel working in universities and research institutes, and government departments involved in research work have gone through some types of graduate study, it must be admitted that it is still desirable to upgrade the capability of these research staff.

Third, is the urgent need to create a better atmosphere in research within organizations, especially in the form of recognizing research achievements. This type of atmosphere also depends very much on the quality of research facilities including the equipment and the time available to be spent on research. Research in science and technology often require sophisticated and expensive equipment. How to achieve this in the face of the present economic situation is a great challenge to any administrator. Centralization of expensive equipment and tools together with supporting workshop has also been suggested and implemented. Chulalongkorn University has established a Research Equipment Center which houses 2m US\$ worth of equipment donated by the Japanese Government. The Center provides services to research workers and graduate students. In this way, it is believed that the limited resources available can be fully utilized in an efficient manner. The Center has been in operation for just under one year.

Another important problem that has to be dealt with, is the interrelationship between research institutes, faculties and departments within a university on the one hand, and the relationship among research organizations themselves, be it a government department or a university research institute, and the relationship between research organizations, industries and implementing agencies, on the other hand. Problems arising from improper coordination are well-known such as, duplication of research efforts and facilities, research projects that are irrelevant to the problems requiring answers and, inadequate information and data exchange.



## 5. Regional and International Cooperation on Environment

Since its inception, the United Nations Environment Program (UNEP) has been playing a catalytic role in promoting regional and international cooperation in environment.

The Asean Environment Program I (ASEP I), inaugurated at the First Meeting of the ASEAN Experts Group Meeting on the Environment in Jakarta in December 1978, drew up priority areas established in accordance with the common interest in the region such as, the Marine Environment (East Asian Seas Program), Environmental Management including Environmental Impact Assessment, Nature Conservation & Terrestrial Ecosystems, Industry and Environment, Environmental Education and Training, and Environmental Information.

ASEP I focuses on action plans identifying common activities, and technical meetings on specific areas. The following are some of the achievements under ASEP I.

- Environmental Information and Environmental Data by establishing national focal points among ASEAN countries to serve as sources of information on environmental data and to maintain the national link with UNEP information network. In 1982, ASEAN selected the theme "Education for Better Environment" as the common theme of the year, and the training of mass-media professionals such as journalists and broadcasters emerged as an important activity. In this context, Thailand initiated a project aimed at providing information directly to the rural people by utilizing mobile units sent directly to remote villages to work with local schools in organizing demonstration courses on environment.

- Environmental Education and Training through a survey on environmental education and research in each ASEAN country, whereby an action plan on environmental education and training i.e., teachers training at the primary and the secondary levels has been formulated.
- Environmental Impact Assessment as a requirement for specific types of projects are currently under vigorous implementation in the Philippines, Thailand, Indonesia and Malaysia.
- Nature Conservation through workshops and action plans and selection of reserve sites.
- Industry and Environment through urban air and water quality monitoring/management, studies on small to medium-scale industries to utilize residues generated from agricultural and industrial activities, and wastewater treatment facilities for small electroplating plants.
- Remote Sensing Technology as discussed in the Fifth Meeting of the Environmental Experts Group in Bangkok in April, 1982, through potential areas of collaboration that could include a systematic dissemination of satellite imageries available, the exchange of expertise in the application of remote sensing to solve environmental problems in land use planning, forest survey, and coastal zone management, and the training of scientists and engineers in the application of remote sensing technology.
- Marine Environment as discussed at the Third Session of its Governing Council in 1975, where the East Asian Seas Water was identified by the Governing Council as an area of high-priority among many others. Priority research areas could include the assessment of oceanographic phenomena, oil pollution, non-oil pollutants, coral ecosystems and information exchange. UNEP and ASEAN countries contribute to a Trust Fund for this Program.

It is envisaged that the ASEAN countries will eventually institutionalize their common activities through the establishment of regional machineries and, as necessary, through regional conventions.

- ASEAN Environment Program II designed to be action-oriented and emphasizing on demonstration projects. It is believed that this will eventually lead to investment-type projects in the future phase of ASEP, which may include full-scale area development that takes advantage of the results of the demonstration projects to be accomplished under ASEP II.

## 6. General Policy Issues for Research (See Table 1)

Understanding the people's concepts of man-environment relationship is essential in the environmental policy formulation. People cannot reconcile their way of life, their traditional beliefs and values, or their technical systems with natural systems unless they recognize the need to do so. Since scientific concepts, scientific-based attitudes, and pre-scientific or traditional beliefs and values are aspects of the human culture, the base of environmental policy, law and administration thus, becomes a mixture of cultural and scientific elements.

### 6.1 The People's Perception to the Environment Problem

There has been no research study to date, into the perceptions of people of differing professions and income-level with, their environment. We have not attempted to measure the degree of awareness of environmental problems and issues that people have, compared with, say, ten years ago when the environmental movement was just starting, in order to assess the effectiveness of environmental awareness programs. We do not know what concepts those politicians and decision makers have of their environment while in their respective administrative capacities.

Environmental degradation has become so apparent in virtually all towns and cities in the country, especially in urban communities and the evidence are so intimately in contact with the day-to-day lives of all the population, but public action has hardly taken place. It becomes necessary to find answers to the following questions:

- Is the environmental movement in Thailand merely a temporary enthusiasm of some Thai academician personnel?
- Will the public support the cost of improving the environmental quality?
- How do attitudes toward the environmental movement in Thailand differ from those in developed nations? If there are differences, what are the reasons? Are they changeable?
- Has "growth" been identified as a major factor in the environmental problem? What are the interpretations of the growth made by the various groups of the population?

## 6.2 The Systems Approach to Environmental Policies

The environmental degradation and the impoverishment of the natural life-supporting system could be considered as the consequences of the failure to reconcile the management of man's technical system with the ecosystems of the natural world. Rapid population growth helped increase the demanding pressure on the natural systems, thereby worsening the effects of misapplied technologies.

Since the interrelatedness of all living and non-living resources with organisms, man and animal, is the most important characteristics of our natural environment, the analysis of the environment has to be viewed in this totality. Besides, environment consists not only of the natural but also of the social resources. The ecosystem has been regarded as having dual roots, firmly established in both the natural and the social sciences.

The systems approach to environmental policies is based upon the concept and the analysis of the general systems theorem.

The question that could be asked here may include:

- How much influence does the systems theory have upon environment policy formulation in Thailand? Are there any evidence of Government interest?
- How may the systems approach be built into the public deliberation and decision-making on environmental-related issue?

### 6.3 Environmental Aspects of Resource Policies

Resources policy had been concerned with the discovery on one hand, and with the development and exploitation on the other hand during the earlier years of industrialization. However, the prospect of resource depletion gave rise to the conservation movement which later shifted toward assessing the impact of resource management upon the natural environment. The necessity for public planning and regulation of resources utilization has become widely accepted.

As in the case with other countries, Thailand is faced with the dilemma between resources development and exploitation and conservation. And depending upon several factors such as abundance/scarcity of resources, different treatments could be given to different resources. The impact of their development and utilization upon the environment and the necessity to exploit these resources for the economic well-being and security of the country must be looked into as in the case of forests, where the policy is centered upon conservation and reforestation.

#### 6.4 Ecosystem Management and Land-Use Control

Land has been viewed as an element of nature until the emergence of the modern industrial society when the whole system began to treat it as a commodity. As a result of this change, the important interrelationship between the land and all the other aspects of the biosphere deteriorated which, in turn, gave rise to land abuse, air and water pollution problems, wildlife-depletion, soil-deterioration, and erosion, and urban-rural settlements and landscape - deterioration.

Since land presents a special difficulty for environmental policy especially in a country that has a strong tradition of private ownership such as Thailand, some leading research questions may include the following:

- Where should the responsibility for land-use policy decisions be vested?
- Considering the traditional attitude of the population towards private property, what alternatives are available to control the use of private land?

#### 6.5 Environmental Implications of the Energy Systems

Energy issues in Thailand can be broadly classified under two categories:

- 6.5.1 Issues concerning the development of energy resources. Ever since the energy crisis following the oil price hike in 1970's, Thailand has been stepping up her efforts in developing indigenous sources of energy, notably, the oil and gas exploration and, the development of her hydro-power potential, as well as, looking into the future through the possible utilization of nuclear power. As in many other countries, controversies concerning the development of the latter two sources arise.
- 6.5.2 Issues concerning pollution is related to the use of energy. The two most important sources of pollution are the emission from industries and

automobiles. NEB has been attempting to set up standards concerning the emission from large-scale industry such as cement factories and automobile exhaust.

Some research questions that could be asked are as follows:

- What are the energy options for Thailand?
- How could the hydro-electric potential be harnessed with minimum damage done to the environment?
- What are the environmental standards and energy policies that Thailand should adopt concerning industries and transportation.
- What are the environmental implications of adopting various energy-environment systems?

## 6.6 Juridical Aspects of Environmental Policies

Laws and regulations concerning environmental problems modelled in accordance with traditional cultures and beliefs on the one hand, and the desire to achieve a sustainable goal in development on the other hand, are urgently needed. The government has began to define and codify the rights of the individual against activities that impair the quality of their environment, as well as the enactment of broader and more fundamental measures for environmental protection. Environmental laws need to be develop to form the basis for governing land use, industrial activities, agriculture, and exploitation and use of the natural resources. Some leading research questions that might be asked here include the following:

- In order to be effective in environmental control, what innovative measures have to be developed? What juridical problems do they raise ?
- To what degree would "risk" be taken into account in environmental problems ?

- Would laws and regulations be of any use in environmental control in Thailand ? Where is the enforcement deficient ? Would persuasion to induce voluntary action be more effective?

## 6.7 Administrative Organization

The earlier environmental movement has resulted in the creation of the Office of the National Environment Board, but the structure of the government and the administrative organization have not been set up to deal with environmental issues in general. These agencies, therefore, experienced some difficulties in trying to accommodate the objectives of the environmental quality movement.

What we have seen are usually the first-stage efforts of an attempt to cause structural change by newly-added units for the control of environmental pollution into the existing administrative structures. NEB is at present the only body in the country responsible for high-level policy formulation and coordination. In various other agencies, environmental policy and planning play very little role, if at all, in executing the works in their areas of jurisdiction.

The few unresolved problems include the following:

- What should be the role of the public in resolving some environmental issues, and how should this role be organized and integrated with the government activities ?
- It is often charged that the government's environmental policy has tended to be prohibitory or regulatory in general rather than being positive or constructive. Is this true ? Why ? Is it necessary to have it in this manner ?

## 6.8 International Institutions and Agreements

Even before the state of the world environment became an object of international policy, there existed agreements and policies that dealt



with particular environmental problems of regional and international characters, such as the International Technical Conference on the Conservation of Living Resources of the Sea, 1955; the UN Conference on the New Sources of Energy, 1961; the UNESCO Inter-Governmental Conference of Experts on the Scientific Basis for the Rational Use and Conservation of the Resource of the Biosphere, 1968; and the FAO Technical Conference on Marine Pollution and Its Effects on the Living Resource and Fishing, 1970. As far as environment is concerned, these conferences culminated in an action by the General Assembly of the United Nations calling for a Conference on the Human Environment which was convened in Stockholm on June 5, 1972. However, after more than a decade, it was found that the modification or the development of international law and policy concerning environmental issues was made complicated by differing stages of development among nations and by the rapid emergence of new and powerful technologies whose effects cannot be easily forecast. Problems were further aggravated by national self-interest such as the issue concerning international control of the high seas and deep-sea bed.

Research questions may include:

- Are there any political issues that have arisen out of differences in national self-interest with respect to environmental policy and administration ?
- What are the already-established principles on international law that may serve as a basis for international environmental policy ?
- In what ways, and to what extent, may international agreements and institutional arrangements be reinforced and be of assistance to national efforts towards environmental protection ?

#### 7. A National Resources Conservation and Management Strategy for Thailand

## 7.1 Areas for Study

Although there are agencies and organizations in Thailand responsible for the particular aspects of living and non-living resources and development and, much has been achieved, there remain a multitude of matters that need urgent attention: deforestation; soil erosion and land degradation; endangered native plants and animals; declining fishery stock; extraction of mineral resources; depletion of coastal zone resources; development of energy and environment; pollution from industrial and agricultural practices; development of infrastructure and human settlements; diseases and pests; and others. To address the above problems, several research and study areas can be undertaken as follows:

- National Conservation Strategy & Policy Concerning the Living Resources.
- Non-living Resources Management Strategy and Policy.
- National Physical Planning: Land-Use Planning and Control.
- Environmental Aspects of Energy Development: Energy Policy and Strategy.
- Environmental Aspects of Human Settlements Development: Infrastructure Planning Policy and Development Strategy.
- Use and Control of Fertilizer, Pesticides and Herbicides in Agriculture: Policy and Strategy.

## 7.2 Plan of Work

- Commissioning special studies on the:
  - aspects of living resources, conservation and management
  - aspects of non-living resource conservation and management.
  - etc.

These papers should be composed of state-of-the-art reviews;

data pertaining to the scientific and technological, social and economic aspects of the study areas; trends and forecast in the context of development of the nation within the next decade; interrelationship with other resources, conservation and management.

- Discussion of these papers at National Seminars to define and delineate problems and issues as well as to formulate guidelines for policy and strategy.
- Commissioning of policy and strategy researches.
- Appointment of steering committees to coordinate and monitor the progress of research activities.
- National seminars to discuss research results and give recommendations.
- Completion of research projects.
- Dissemination of research findings through publications, seminars, workshops and training programs.

## 8. Conclusions

In conclusion, it might be safe to say that researches carried out in Thailand are numerous but lack integration in such a manner where information could be effectively utilized for decision-making, planning, and in formulating policies. Most researches carried out in universities were more concerned with gathering information and developing new knowledge or technologies than, with policy or planning. Research work among government agencies are either concentrated on monitoring or on gathering information with the final aim at giving answers to some specific tasks before them. These types of research have been quite useful in the planning and decision-making. Policy and strategy research appear to be lacking, and there is no single institution devoted for this purpose.

As far as motivation is concerned, much has already been done. The University Academic Service Commission has adopted regulations that require research achievement as a pre-condition for academic rank promotion, and the Civil Service Commission has created special positions within government departments for academic and research services.

In the case of research facilities, the Ministry of Science and Technology, through its three organizations, namely, the NRC, the NEB, and the TISTR could play leading roles in establishing the National Bureau of Standards, on the one hand, and the National Laboratory for Environment Research on the other.

As far as research coordination and the linkage between research institutes and industries, are concerned, again, the Ministry of Science, Technology and Energy can play a leading role through the National Research Council and the National Environment Board in acting as a research clearing-house and a coordinating body for organizations concerned with environmental education and research. A national network in environmental research could be formed, by drawing members from government departments, universities and industries.

This will certainly create a great demand for financial resources as well as for Experts and Consultants especially where research on fundamental and basic issues and, research to achieve technology transfer in the fields of science and technology are concerned. Thailand, being a developing country will need to seed an appropriate model or several coordinated models of research activities that will allow accelerating the process of bringing scientific and technological growth to the level at which this progress will be a companion to national development. Research structure will have to be developed in probably two stages as follows:

- Identification of scientific and technical priorities, both in the interdisciplinary context and, in close relationship with national development goals, and

- Planning and preparing both the human resources and the infrastructure facilities that will make possible, research along specific lines, such as training scientists and engineers to be competent in problem-identification and conduct of research. There will be a need to establish laboratories and to centralize sophisticated scientific equipment and maintenance facilities to avoid duplication and to maximize utilization. Frequent dialogues among universities, government agencies and private sectors will have to be encouraged for their mutual benefit and for the benefit of the country.

## 9. Appendix



Footnote Reference

1 Department of Health, Ministry of Health: Rural water supplies, sanitation, primary health care, environmental quality monitoring (in collaboration with UNEP/WHO/UNESCO/WMO on the Project on Global Environmental Quality Monitoring and with WHO/UNEP Global Air Quality Monitoring Project).

The Bangkok Metropolitan Authority: Drainage, sewerage and solid waste collection, water supply for the Bangkok Metropolis is, however, the responsibility of the Metropolitan Water Works Authority.

The Departments of Public Works; Local Administration; Community Development; and the Office of Accelerated Rural Development: Water supply, drainage, sewage disposal, and public housing.

The Department of Labor: Enforcement of the Labor Act in which there are provisions relating to occupational health hazards.

The Ministry of Agriculture and Cooperatives: Enforcement of pesticides control laws and regulations, production of veterinary vaccine and antigen, cooperation in the prevention and control of zoonoses, irrigation, soil conservation and development, forestry etc.

The Ministry of Industry: Enforcement of Factories Act, Mineral Act which describe respective industrial activities and standards for the control of emissions and discharges of industrial and mining effluents.

2 Article 47: Research and production of texts and other teaching materials shall be supported, especially in institutions of higher learning, with the view to accelerating the advancement of professional development.

3 Chulalongkorn University  
 Institute of Population Studies  
 Institute of Health Research  
 Institute of Social Research

Mahidol University  
 Institute for Population and Social Research

Thammasat University

Kasetsart University

Institute of Food Research and Production Development  
National Corn and Sorghum Research Center

Chiang Mai University, Faculty of Medicine

Anemia and Malnutrition Research Center

Sri Nakharintharawirot University

Institute of Research in Behavioural Sciences  
Educational and Psychological Test Bureau



III ISSUES OF DISCUSSION

1. The Administration and Organization in Environmental Control

Comment: There is an opinion that the role of TDRI on this matter should concern and deal closely with cooperation and coordination with government agencies so that policies could be laid down. The information and data concerning environmental resources must first be collected.

2. Incorporating the Realm of "Environment" in the Economic Models

Comment: After discussions about computer models and recognizing that certain aspects of the environment could not be programmed, there is an opinion that environmental problems should also be included in these models. In fact, there exists a macro environment and a micro one. In which case, the scope of environment being referred to in the main paper should also be defined accordingly.



This work is licensed under a  
Creative Commons  
Attribution – NonCommercial - NoDerivs 3.0 License.

To view a copy of the license please see:  
<http://creativecommons.org/licenses/by-nc-nd/3.0/>

This is a download from the BLDS Digital Library on OpenDocs  
<http://opendocs.ids.ac.uk/opendocs/>