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9. ABSTRACT

This study identifies Thailand's principal problems in health and socio-economic development. It emphasizes those problems influenced by or amenable to change between the Thai government and the international assistance agencies. No specific plans for action were developed, though recommendations for further study are offered. The report opens with brief examinations of Thailand's general characteristics, people and culture, education, and economy. More time is spent on an analysis of health status and planning perspectives. Four major areas of concern relevant to health are discussed: 1) rapid population growth, 2) sanitation and environmental hazard, 3) nutrition, and 4) resource adequacy, allocation, and utilization within the health sector. Although much progress has been made in Thailand's health care system, there still are great problems in delivering care to the rural areas. Both the money allocations and the manpower resources are inadequate to meet the need, and the rural population's cultural beliefs, attitudes, and values still are barriers to using the available services. The discussion here offers three planning perspectives; sectoral, inter-sectoral, and policy planning. Recommendations are made for each of the planning prospectives with examples of appropriate interventions at various levels of social organization. They are not meant to be definitive but rather are only a first step.

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An Analytic Series on the Interactions
of Health and Socioeconomic Development

XII: THAILAND

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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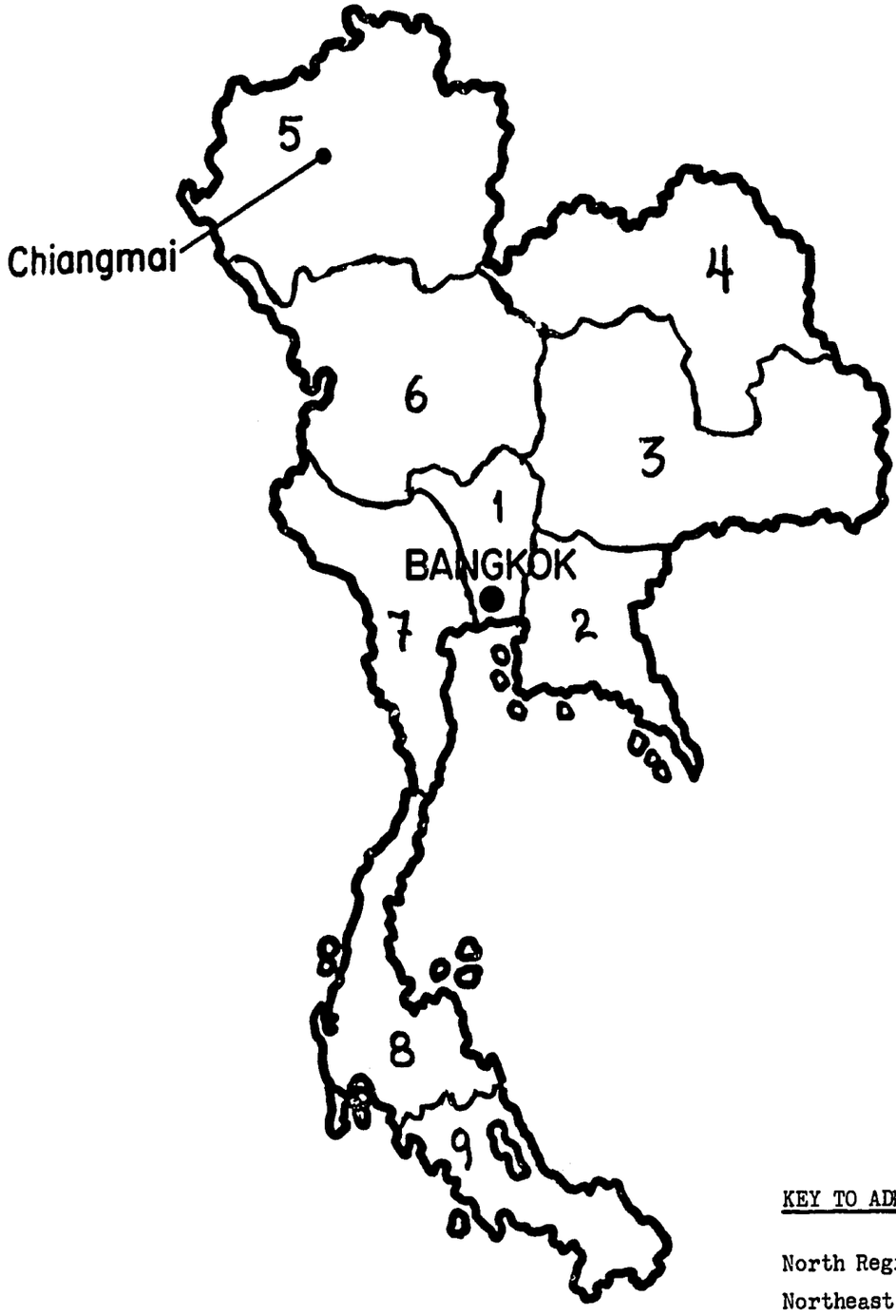

KEY TO ADMINISTRATIVE REGIONS:

North Region = 5 & 6
Northeast Region = 3 & 4
Central Region = 1 & 2 & 7
South Region = 8 & 9

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The Dynamics of Health

An Analytic Series on the Interactions
of Health and Socioeconomic Development

THAILAND

Paul O. Woolley, Jr., M.D., M.P.H.

June 1974

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ACKNOWLEDGMENT

This analysis of the relationship between health and socioeconomic development is another in a continuing series of studies on selected developing countries. It was prepared at the request of and made possible through the support of the Agency for International Development and the Office of International Health, USDHEW. The purpose of these individual country reports is to assist the international agencies and AID in the identification of the relationship of health to socioeconomic development, and potential areas of high impact.

The best available data, though often incomplete, has been utilized for analysis and judgment. The selection of data and the judgments derived therefrom is the responsibility of the author. Particular gratitude is expressed to the Royal Thai Government for assistance in obtaining the data used in this study. As new data of significance become available, revisions will be made.

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Paul O. Woolley, Jr., M.D.
University Park, Pennsylvania
June, 1974

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LIST OF ABBREVIATIONS

CRH	Comprehensive Rural Health Project
DAG	Development Advisory Group
FHP	Family Health Project
GDP	Gross Domestic Product
GNP	Gross National Product
ICNND	Interdepartmental Committee for Nutrition in National Defense
MCH	Maternal and Child Health
MOI	Ministry of the Interior
MOPH	Ministry of Public Health
NEDB	National Economic Development Board
NFPP	National Family Planning Program
NMEP	National Malaria Eradication Program
RTG	The Royal Thai Government
SEADAG	South East Asia Development Advisory Group
UNDP	United Nations Development Program
USOM	United States Operations Mission, Agency for International Development
VHS	Village Health and Sanitation Project
WHO	World Health Organization

PREFACE

This country case-study is an attempt to identify important problem areas in health and socio-economic development for Thailand. Particular attention has been devoted to the definition of those problem areas influenced by or amenable to change by cooperation between the Royal Thai Government and the international assistance agencies. Since the purpose of this study is to identify potential areas of high impact, it represents only the first step in the planning process. Consequently no attempt has been made to develop a specific plan for action, although a set of recommendations has been offered for further study.

This study is based upon a deep respect and appreciation for the Thai culture, the Thai people and the progress that has been made in the last decades. It is based upon the hypothesis that there are unifying socio-cultural forces that influence the operation of the economy, the government, the education and health care systems etc. Health and disease in this context are as much the results of the way in which the population deals with the environment as the presence of a disease causing agent. From this perspective, the assertion is made that the problems that can be identified are conditioned by the culture, that they are multi-causal and that therefore the potential solutions are also multiple. The suggestion has been made that interventions for problem resolution should be made within the context of the Thai culture in order to minimize disruption and maximize self-sufficiency and effectiveness.

Many kinds of data have been employed in this study, most supplied through the assistance of the Royal Thai Government. These data uniformly suggest that despite external similarity to the problems and programs of other settings, the Thai setting is unique. The sections of this study, therefore are meant to illustrate the nature of the problems that exist and programs that have been designed to deal with these problems. By illustration and inference it is possible to develop criteria predictive of future success. The aim of these chapters is to present the manifestations of a social system which is more than a social system; it is the political, economic, health and educational systems as well. The study is consequently not a comprehensive view of the health sector as such, but is a survey of the various influences that combine to produce the conditions found in the health sector. It should be noted that no discussion of the political system is included. Since a new constitution is being developed at this time, it seems inappropriate to discuss a setting undergoing such rapid change. Although the study is modest in scope, it should provide the basis on which effective planning for action can be developed.

As with many studies of developing situations this one suffers from the lack and/or unavailability of data that would have aided in its preparation. Nevertheless, the Thai Ministry of Public Health has clearly sought to develop data appropriate for programmatic decisions and has also sought to develop an understanding of the needs and attitudes of the population. Thailand has made great progress in the control of disease and promotion of the health and well-being of its population in the past decades. The country is now busily engaged in continuing this trend. It is with appreciation for this progress and recognition of the rich cultural heritage that this study is offered. It is hoped that the international assistance community will find these perspectives of value in their future decisions.

SUMMARY

General Characteristics

The Kingdom of Thailand is an independent constitutional monarchy occupying close to 200,000 square miles in the center of continental Southeast Asia. The country has a unique history for it has never been a colony. Thailand is divided by natural barriers into four geographical regions, which have economic, social and political implications as well. These regions are the Central, Northern, Northeast and Southern regions. The climate is of the monsoon type with a three season cycle. The country is primarily agricultural, though at least half of the land is covered with forest.

The Thai government is strongly centralized. The Kingdom is divided into 71 provinces, each headed by a governor who is appointed by the Minister of the Interior. A province is on the average divided into eight districts which are, in turn divided into tambons and villages. Most (85%) of the population live in rural areas. The main focuses of rural life are the family, the wat (the Buddhist temple complex) and the village school. Seventy-five percent of the labor force is engaged in agriculture, fishing or forestry. The percapita Gross National Product is $179.

People and Culture

The Thai are highly homogeneous. The people originally lived in Southern China and migrated centuries ago to Thailand. Most identify themselves and speak one of the Thai dialects. At the base of the culture is the predominant religion, Buddhism. Over 93% of Thai identify themselves as Buddhists. The religion, social structure and language are basically synonymous, each variations on a theme. The basic precept is one of individual responsibility for spiritual growth. The principle of karma guides present and future actions. It is the spiritual world which takes precedence over the physical or social reality of the present. The Buddhist principles incorporated into the culture strongly influence the role of government and community in individual life, and the acceptance of and utilization of services.

Education

Thailand has a growing educational system. The literacy rates is approximately 70%. About 95% of all children are now in four year school systems, though there is now expansion to a seven year school system. This has created a great demand for teachers which as yet is not fully satisfied. The student population is 18% of the total population.

The Economy

Thailand has a strong economy. Although predominantly agricultural, strongly based on rice, it is also becoming somewhat industrialized. About 75% of the labor force participates in agriculture. About 28% of the land is under cultivation. The agriculture sector accounts for about 30% of the GNP and most of this is rice and maize. Thailand is known as the granary of Southeast Asia and exports large volumes of these two grains. These and other exports account for about 20% of the GNP. Thailand has had two Development Plans, the first Six-Year Plan from 1961-1966 achieved an overall real growth rate of 8% per year. The Second Five-Year Plan covered the period 1967-1971.

Analysis of Health Status

From an analysis of the morbidity and mortality statistics, a review of the general living conditions and demographic factors four major areas of concern relevant to health predominate: 1) rapid population growth, 2) sanitation and environmental hazard, 3) nutrition and 4) resource adequacy and the allocation and utilization of resources within the health sector. Thailand is a developing country characterized by a young population, high fertility rate, high rate of population growth (3.2%), high infant death rate and a high prevalence of preventable infectious rather than chronic diseases. The current population is estimated at 37 million, with a youth dependency ratio of 88% and the median age of 16. The average number of births for Thai women is 6.5. The functioning of the Family Planning Program is discussed. It should be noted that the MOPH ruling utilizing auxiliaries had a remarkable effect on meeting the planned targets.

With the control of major epidemic diseases, and more recently the downward trend for malaria, the "filth" diseases have emerged as the major causes of morbidity and mortality. Eighty percent of all illness and 40% of all deaths are attributed to these causes. A WHO estimate for 1970 reports that 89% of rural areas and 56% of Bangkok are without potable water. The major projects dealing with water supplies are discussed.

Although Thailand is largely self-sufficient in food supply and can export large volumes of grain, there is still significant malnutrition in selected populations. The issue is largely one of quality rather than quantity, especially the lack of animal protein. The high prevalence of parasites and certain food customs further complicate the problem. The manifestations of undernutrition are observed in high infant mortality rates, high lethality of childhood illness and retardation of growth. Likewise the causes are many. The problem is seen to effect primarily the child and the pregnant and lactating woman.

The Ministry of Public Health is responsible for the organization and functioning of the governmental health care system. Although much progress has been made there are still major

problems in the delivery of care to the rural areas. It is a big task to accomplish with scarce resources. Both the money allocations and the manpower resources are inadequate to meet the need. Further the manpower and facilities are all heavily concentrated in Bangkok. There is a significant "brain drain" that costs Thailand these precious resources. Another major issue is the set of cultural beliefs, attitudes and values of the rural population. In the face of great need only 17% of the rural population use the available health services at least once per year. Some of this may be a barrier of "social distance". The MOPH has attempted to deal with this through the training of traditional practicioners and of para-professionals and expansion of its network of health centers. The MOPH is clearly sensitive to the needs of this population and is exploring a series of alternative programs.

Planning Perspectives

A summary of relevant planning assumptions for Thailand is offered and a discussion of three planning perspectives: sectoral, inter-sectoral and policy planning to deal with the basic issues which have been defined in this study. A series of recommendations is offered for each of the planning perspectives with examples of appropriate interventions at various levels of social organization. These recommendations are not meant to be a definition plan, but rather the first step in identifying areas that are likely to be of high impact and amenable to joint action by the Royal Thai Government and the external assistance agencies.

THE GENERAL CHARACTERISTICS

The Kingdom of Thailand, formerly known as Siam is an independent constitutional monarchy occupying close to 200,000 square miles (500,000 sq. km.) in the center of continental Southeast Asia. With the shape of a profiled elephant head, it is roughly equivalent in size to Spain, or 3/4 the size of Texas. On the southeast, Thailand is bounded by Cambodia; on the east and northeast by Laos; on the west, north and northwest by Burma; on the south by the Andaman Sea and the Gulf of Siam. The Mekong River, a rich natural resource, flows between Thailand and Laos for 50 miles on the north and 450 miles on the east. A chain of mountains fills the northern province and extends down through the isthmus acting as a border with Burma on the west.

Thailand is conveniently divided by natural barriers into four geographical regions, which have economic, social and political implications as well. These regions differ significantly with respect to population density, economic activity and accessibility, exemplifying the relationship between physical environment and socio-economic factors. The four regions are as follows: Central, Northern, North-East, and Southern (peninsular).

Central Thailand, the basin of the Chao-Phraya River, covers 62,000 square miles. It is the economic as well as geographic center of the nation and includes the capital city of Bangkok. Seventy percent of Thailand's urban population resides here (the average density is 258 persons/ sq. mile). It should be noted however that only 11% of the total population is urban.

Northern Thailand, drained by Chao-Phraya tributaries, mountainous and forested covers about 42,000 square miles. Villages cluster in the valleys where rice is grown. This is the most sparsely populated area (the average density is 114 persons/ sq. mile).

The North-East regions covers 66,000 square miles and is a low altitude plateau sloping down to the Mekong River. It is the least accessible of the regions. Its semi-arid climate, limited water supply and low soil fertility limit agricultural production to subsistence farming. One third of Thailand's population lives here (the average density is 180 persons/sq. mile.)

The Southern peninsular region is mountainous, with farms and seaports along the east coast. It covers about 30,000 square miles. Rubber plantations and tin mining are the major sources of occupation. The average density is 159 persons/ sq. mile.

The monsoon climate produces a three season cycle. The hot, dry period is from March to May. The rains come out of the southwest from May to October, followed by a cold period from November to February. During the rainy season about 50 inches of rain fall in Thailand, situated in a rain-shadow of the mountains that separate it from Burma, which receives about 100 inches of rain in the same period. The Southern region gets rain year round, accounting for its more tropical climate. Water supply problems, the result of lack of rain in the dry season, limits settlement to valley and flood plain areas along permanent streams. In what is called the cold season, temperatures rarely drop much below 50 degrees. In crop growing areas the average temperatures range between 64-100 degrees F.

In the North, soils are of dark clay. Alluvial deposits are in the river valley areas where most of the population lives, supported by intensive rice cultivation. The North-East's

Khorat Plateau is a sandstone region with fine sandy loam soils low in nutrients and easily leached by precipitation. The Central regions soils are composites of dark clays, fine sands and silty loams which are as rich as any alluvial flood plain area (i.e. in the U.S. the Mississippi River is flanked by a broad alluvial floodplain). Red soils characterize the Southern region as well as do sandy and clayey loams that are fertile.

At least half of the total area of the country is covered with forest. This is roughly 29% above the world average. This includes rubber trees, teaks and the like, all of high value.

The Thai government is a strongly centralized constitutional monarchy administered by the Council of Ministers. The Kingdom is divided into 71 provinces, each headed by a governor who is appointed by the Minister of the Interior. A province is, on the average, divided into eight districts which are, in turn, divided into tambons and villages. The district officer who is appointed by the Ministry of the Interior, is probably the only representative of the central government with whom the village people have contact. The tambon head official acts as registrar and as intermediary between the district officer and the village headmen. These levels of government are relevant with respect to the organization of the health system provided by the Ministry of the Interior and the Ministry of Public Health.

According to the 1971 Area Handbook for Thailand, the main focuses of rural life are 1) the family 2) the wat (the Buddist temple complex) 3) the village school. Four-fifths of Thailand's population live in about 42,000 villages. Villages differ with regional variations in physical environment, but generally, they are agricultural villages operating within the limitations of their environment. Villages may be stretched along a river or road, clustered in mountains, or made up of dispersed farms. The household is made up of the nuclear family averaging six persons. A general description of a Thai village is given in this paragraph:

> 'Most of the Thai people live in wooden houses, or, up country, in bamboo and leaf huts. The simplest consist of a platform some six feet above the ground, on which are set two or three rooms and a veranda, with walls of platted bamboo and a palm leaf thatch. The house is entered by a ladder. Pigs or chickens live beneath, perching on mounds during the wet season; and with them are often water buffaloes, the draft animals of South-East Asia."

Most of Thailand's population is rural, approximately 85%; of the urban populations (those living in cities of 20,000 or over) 75% are located in the Bangkok-Thonburi municipality. Bangkok-Thonburi has a population of about 4,000,000; the second ranking city, Chiang mai, has a population of 90,000. The distribution of municipalities by size (table 21) shows the mode is 10,000.

The Area Handbook defines the urban social structure into three classes:

1. Ruling group (civil and military officials)
2. Middle group (Chinese merchants and Thai-middle ranking government employees)
3. Rural migrants (unskilled laborers and street vendors)

There are, of course, fewer farmers in the city, and more government employees and craftmen. Seventy-five and a half percent of the labor force of Thailand (persons 11 years and older) are engaged in agriculture, fishing or forestry. The per capita Gross National Product

is $179. (Tables 20 & 22)

People and Culture

The Thai people originally lived in Southern China, and centuries ago they migrated South into Thailand. The majority of the population identify themselves as Thai and speak one of the Thai dialects. The dialects are not distinct enough to prevent communication. Cultural differences between the countries four regions are only variations along the same theme. Physically, the people are small to moderate in height and weight, have medium light skin with thick, black eyes. Thai families average around six members, usually only parents and children.

At the base of Thai culture is the predominant religion, Buddhism. Over 93% of the Thai ethnic group called themselves Buddhists in the 1960's. The order of Buddhist monks remains a major social institution. A majority of the males become monks or novices for at least a short period of time. Each religiously sanctioned act accumulates merit which is used to assure moral accendancy and a comfortable life in future reincarnations. The Thai people take very seriously the Buddhist proscription against killing and other forms of violence and open conflict.

Of the non-Thai groups, the only physical types which are easily distinguishable from the Thai are immigrant Indians and Pakistanis, a few westerners, and remnants of the Negritoid Semang in the southern region. The southeast Chinese are the largest minority, and they differ only slightly from the Thais. The grandchildren of Chinese immigrants have traditionally been completely assimilated into the Thai population, but with the rise of Chinese nationalism since 1910 the assimilation rate has decreased. Most of Thailand's Muslim population (about 4% of Thailand's population) are Malays living near the southern border. About one percent of the Thai people belong to tribal groups living in the mountains near the northern boundaries of Thailand.

The national language is Thai, a dialect of the Thai-Kadai language group. It has an alphabet of its own which is quite unlike the Roman alphabet and when transliterated is not fully phonetic. It is a monosyllabic language and involves five tones, with each tone giving words completely different meanings. English is the country's second language, and is taught in all government schools after the fourth grade.

Education

Thailand has a growing educational system. Currently the literacy rate is approximately 70%, well above the average for the developing countries of the region. In 1932, four years of school attendance was made compulsory and presently about 95% of the children of school age are attending. This is a dramatic increase from 1967 when only about one-half were attending school. This growth in student enrollments has created a demand that exceeds the supply of trained teachers. Almost 20% of those teachers already employed have insufficient training to teach even at the elementary level. A further source of demand for teachers comes from the implementation of seven years of compulsory schooling in selected provinces.

The education system consists of 394 kindergarten schools, 28,700 elementary and upper

elementary schools, 1822 secondary schools, 7 technical, 34 teacher training and several special schools. There are nine universities with a total enrollment of more than 43,000 students, and an additional 45,000 students at Ramkamhang University. The student population is 18% of the total population, with over 6.3 million students in primary and secondary schools.

THAI CULTURE

The effects of the peasant character and personality in resisting change cannot be underestimated. As noted in G.M. Foster's, Peasant Character and Personality, "An absence among village residents of any strong sense of identification with the needs of the community as a whole, except for religious activities and the reciprocal work groups organized for rice transplanting and harvesting - the rewards for which are directly personal - the villagers simply are not predisposed to participate in communal projects." (Foster, 1965 p. 17) In a developing society national developmental programs emphasize much community level action in agriculture, health, and education. The following discussion is meant to provide some insight into the nature of the Thai culture as it has relevance to current issues in health and development.

Thai culture is virtually synonomous with Buddhism. Ninety-five % of the population are Buddhists. Buddhism is a common ground that serves to unite the Thai people. Thus, the Thai king is both a secular, political figure as well as a religious and cultural symbol. The religious institutions so permeate the nation that even the poorest villages have small temples (wat) and support the local monks with food and the like.

Buddhism is individual-centered. A major concept is that no one, not even a priest, can save or purify another because the individual is personally responsible for his own destiny. Self-restraint and self-limitation are emphasized. Individual righteousness is immune to the influence of other individuals. "By oneself is evil done; By oneself one suffers; By oneself evil is left undone; By oneself one is purified." (Dhamapada)

Through the acquisition of wisdom, religious destiny, nirvana (release from reincarnation) is reached. To achieve wisdom, the individual must ignore and escape from the entrapments of society. Society creates temptations which lead to suffering, which provide continuance of society, which produce religious imperfectability, which impede the acquisition of wisdom.

In the ideal, the individual ignores and withdraws from society, retreating to the celibacy and sacrifice of monkhood, devoting life to meditation. The Thai state legitmizes the committment of resources and effort dedicated to Buddhism via holding state exams and rewarding successful candidates with degrees and ecclesiastical rank. In other ways it probably does far more than that too.

Social influence is to be ignored. The ideal human is one who transcends but does not reform society. The source of human problems is seen to be the individual's inabilities to transcend the constraints of social wisdom for moral wisdom. Reform of the social order to achieve religious perfection is regarded as unproductive if not a waste of effort and time. Detachment from social rules is the path to religious perfection. Individuals are not required to try to change society's rules to better the possibility of working to serve others better. Benefit to the community may be a by-product of the pursuit of religious wisdom but it is not a goal. Merit-making is a way for people to work toward religious perfection when they can not afford to join the monkhood. Merit making is done via contributions of food and other resources to the local temple to maintain those who are in pursuit of religious wisdom.

The karma process of rewards and punishment contributes to a feeling of group solidarity. It is possible for an individual to gain good karma,to move along the hierarchy, by encouraging change that is favorable to others as well as oneself. Yet, while a single action may be for good karma in immediate consequences, it is believed that acts balance with other acts of both short and long range, good and bad. A Thai-Buddhist proverb explains that as long as evil bears no fruit (visible consequences), the ignorant will imagine it to be sweet. It is only when it ripens that they will experience suffering, and then it is too late. This may have some applicability to development.

Combining doctrines of karma and withdrawal from society produce a division of labor with the common man realizing the impossibilities of his achieving nirvana directly. So by gaining good karma through good acts like supporting those closer to nirvana, via merit-making, he too can move along the continuum. The fatalism of Buddhism is clear in its acceptance of the present as an outgrowth of past actions but it also holds the future dependent on the present in a "becoming" orientation. The mistake of transferring western values to this setting and interpretting that the Thai can accept the notion of putting off immediate reward for the present for the value of future returns should be avoided.

Looking further at how Thai values are shaped we might consider how Thais interact with one another. Language is symbolic communication. The Thai language is heavily derived from Chinese but with Indian and other Asian influences. The Thai language is one that reveals several things about the culture of its people. First, Thai reflects the functionally ordered hierarchy of Thai society relative to social class. That is, each mode of speech confers relative status to those engaged in conversation based on apparent criteria of age, sex, social class and the like. Social equality is non-existent then,based on the way the language confers status via choice of terminology, however it is also neither arbitrary nor fixed by birth.

Another element of Thai language is the way words have meaning. Different inflections and tones of voice can drastically alter the same set of sounds producing a heavily punned form of communication. This may reveal an evasiveness that is linked with a social value of avoiding conflict and avoiding putting people in a position of "psychic pain". It has been said the Thai will apparently seem to agree to suggestions either in kind words or polite silence even though they may be very opposed to the notion expressed. (This is also observed in organizational behavior). One escape in such a situation is the type of language which, through nuance, can convey whole sets of meanings as well as reveal the amount of respect, etc., with which the statement was accepted. It has been suggested, along these lines, that successful lying is praiseworthy if it is undetected by those for whom infliction of "psychic pain" was avoided.

A concomitant of the belief in karma is the view that all forms of existence are related because every form originates in a previous one. The three components of a human being are kai(a material body,) khwan (the body-spirit or life-soul) and winyan (an ego soul). The khwan can reside either inside or outside the body. If it leaves the body wanders away or becomes lost or injured, the individual sickens or dies. A timid and easily frightened person is said to

have a tender and delicate khwan. Gifts are things for khwan. When one is greatly frightened, he says his khwan is lost when a baby cries out in sleep or fright, the mother pats its breast gently saying, "Oh dear khwan, please stay with the body". Sick children have their wrists tied with a piece of unspun thread to bind in the khwan.

The winyan, which is a more abstract concept, is the soul that endows an individual with thought, will, perception, and consciousness. It represents the individual's share of the universal or cosmic intelligence.

The Thai theory of the soul plays an important part in the beliefs about disease and the afterlife. Disease is believed to be the loss of khwan, the intrustion of a foreign spirit in the victim's body or an imbalance of the body's components. A foreign spirit can enter the body either by its own volition or by being projected into it by a witch; the common treatment in either case is exorcism. In the imbalance of the body's components the element that most commonly causes difficulty is 'wind'.

Traditional Thai medicine is a mixture of Chinese and Indian theories, Buddhist and animistic beliefs, and techniques developed through trial and error. Many common afflictions are recognized and easily diagnosed as being of physical origin. Others are thought to be the work of evil spirits that, from whim or malice, enter the body. Sorcerers are frequently thought to be responsible for getting rid of them.

Little attention is given to the prevention of illness, although Buddhist or animistic amulets and charms are used as protection against specific ailments and misfortune in general. Often images of Buddha are worn, metal cylinders containing slips of paper inscribed with magic spells, and cotton strings tied around the wrists or ankles or made into necklaces. The use of tatooing as insurance against disease is widespread.

Some villagers, believe that young children can be assured good health by cutting their hair in a particular way. Several clay dolls, each with a different hairdo, are made and placed in front of a youngster. The child's hair is then arranged like that of the doll he reaches for in belief that he will thus avoid the children's diseases that might otherwise plague him.

House spirits are believed by many to be the most important protection against sickness or other misfortune. Accordingly, spirit dwellings are built on the occasion of a housewarming, and the spirit is pacified frequently to ensure good health.

Traditional methods of therapy include many home remedies and favored food and herbal mixtures that may be known generally or only by a single family. They are usually prepared by the person who is ill or by a member of his family and are taken without ritual or thought of spiritual intervention. Medicines of the Chinese pharmacist, if there is one in the community or those purchased from itinerant peddlers are also popular. They include traditional Chinese medicaments; modern patent medicines, and a few modern drugs such as aspirin, quinine and sulfanilamide.

In cases of more serious illness attempts are made to regain the good will of the house spirit or to seek the help of a local practitioner. The practitioner may be certified in traditional medicine, or he may be an unregistered nonprofessional who engages in the art as

an avocation. Usually, he is a man reputed to have magical curing abilities or one who has devoted himself to the study of herbal medicines. Whether the cure prescribed is primarily medical or ritualistic depends on the diagnosis and, to a large extent, on the specialty of the practitioner. If the difficulty seems to be primarily with an evil spirit, offerings may be made to cool the spirits anger,or elaborate gifts may be promised in the event of a speedy recovery. In more stubborn cases exorcism may be deemed necessary. This is accomplished by incantations; sprinkling with lustral water, offerings of incense, candles and flowers; or even by beating the patient.

During childbirth, which usually takes place at home, most village women are still attended by midwives employing traditional methods. In the absence of a midwife, the pregnant woman's mother or some other relative will aid in the delivery. Traditional postnatal care consists of the mothers staying indoors for six to eight weeks, lying near an open fire.

During the last two decades, Thailand has made great strides in modern medicine and public health, notably medical education and mass control of certain infectious diseases. However, in sharp contrast to the more developed nations of the world, where the leading causes of death and disability are heart attacks, chronic diseases, old age and accidents, the rural population of Thailand still is subjected to ravages of infectious diseases, most of which are preventable. There is also a weak, relatively ineffective system for delivery of health services to the majority of the population of rural areas.

An ethical question of using the knowledge of the dependence of a whole culture on a few fundamental values arises. It is probably unethical and undesireable to initiate subtle change via manipulation of a potential vulnerability. The Thai are vulnerable because they are tradition oriented, because their values are obvious and far reaching and in part equivocal. It may be possible to manipulate a village, say, to accomplish some end by propagandizing the karma value, for instance. Without knowledge of the fuller implication of such an act, as the proverb indicates, drastic damage may result with a fragmentation of the cultural fabric which has, up till now, proved somewhat functional by virtue of the fact that it exists and has existed so many centuries in a relatively unchanged state. The dilemma of how to offer improvements or help to people that need (by other sets of standards and values) it while doing them no harm is a most difficult challenge.

THE ECONOMY

Thailand has a strong economy that has placed it in the group of developing countries which have reached the stage of economic "take-off". Although predominantly agricultural, it is also becoming a sustained semi-industrial economy. With a current population of about 37 million people, the average population density is about 176 persons a square mile but 85% of the population is rural. About 28% of the country is under cultivation. With a 1969 GNP of $6 billion, US. the per capita income was about $170. This is relatively high percapita GNP for South-East Asia, and understates the real economic position of the population because so much of the population (about 80%) are engaged in agriculture, and predominantly as owner-farmers, not tenants.

Agriculture has been the strength of Thailand's economy and at the heart of this has been rice; both for domestic consumption and export. Thailand is commonly known as the granary of South-East Asia, she is the largest rice-exporter of the world and because of a significant corn export is the fourth largest grain exporter of the world. Rubber, tin and light industrial products are the remaining significant exports for Thailand's economy.

The agriculture sector accounts for approximately 30% of the GNP (down from approximately 38% in 1959). It is predominantly labor intensive, accounting for close to 80% of the working population (11.62 million of 15 million). Total farm land under cultivation is 28 million acres, about 28% of the total area. The average farm size is about 10 acres. The three crops of greatest significance are rice, rubber and maize. Other crops include kenaf, tapioca, ground nuts, pulses and legumes, etc. Forestry products, especially teak were once a major source of revenue, but have declined because poor conservation has made them relatively scarce.

Rice has been the mainstay of the Thai economy, much as it has been the mainstay of the diet. In 1969 total exports were valued at $140 million of the total of $730 million in all exports. This represented a decline from previous years because of crop damages from floods and insects amounting to more than 12%.

Although both agricultural and general economic diversification have lessened somewhat the importance of rice, it is still the main foreign exchange earner and is symbolically and practically the center of the economy. Rice farming is still the predominant occupation of the rural population. Since the whole price index of the economy is geared to rice prices, the urban population too is influenced. When the price of rice rises, all other prices rice too. The Thai government maintains a "premium" on exports, basically an export tax which becomes another source of revenue. In this way it also controls rice exports and influences domestic rice supplies and prices. In 1967, Thailand put an embargo on rice exports in order to stabilize domestic rice prices. As the major supplier of rice to other south-east Asian countries, this problem was critical not only to the economy of Thailand but also to the other countries of the region.

Rubber is grown primarily on the southern Malay peninsula. Annual export is in the order of 275,000 metric tons, worth approximately $132 million. Instability in prices in the world market have placed this industry in the difficult position of increasing production to maintain

revenues. Consequently the government's replanting program has had only marginal success in maintaining income.

The development of maize as the third most important crop and a major export has occurred within the last decade. Most is exported to Japan, Taiwan and Singapore. Current production exceeds one million tons annually (in 1969 1.6 million tons valued at $83.5 million). Apparently the increased production relates directly to governmental programs to promote a suitable crop for the Central Plains and the Northeastern regions coupled with the development of a highway building program to facilitate shipment and economic management that increased demand and encouraged farmers to increase production. This clearly is a success story in economic planning, implementation and development for Thailand and one worthy of some study.

Mining and industry make significant contributions to the Thai economy. Tin is the most important mineral for Thailand, and is the largest foreign exchange earner. In 1969 it accounted for $ 82 million. Manufacturing and construction industries have grown in Thailand to account for close to 20% of the GNP. Thailand has become self sufficient in a number of industries, for example cement, sugar, and refined petroleum products. The government has sought to support this industrial growth by means of tax exemptions and has set as the goal for the second Five-Year Plan (1967-71) an industrial growth of 10.8%.

As has been asserted before, Thailand is largely an export economy, where trade accounts for about 20% of the GNP. The main items except for tin are all agricultural. Generally Thailand has had a favorable balance of trade position, but new import taxes were imposed in 1970 because of deterioration of this position. There are no data available to assess the impact of U.S. military withdrawal from the region on the balance of payments position, or the total economy for Thailand.

The relationship between governmental finance policy and development in Thailand is rather close. Prior to 1957 the government was involved in a number of industrial enterprises. However it divested itself of these, keeping only a few monopolies. Consequently, the public sector accounts for only a small part of the GNP, whereas the private sector contributes about 86% of the GNP. The governmental policy has sought to be cautious and non-inflationary. To finance the first Six-Year Plan (1961-66) the government borrowed locally and abroad. By 1969 total foreign borrowings were equivalent to U.S. $150 million. This amount has not proven to be burdensome in debt servicing. Of the foreign loans the World Bank has been the most important to Thailand. Other sources include IBRD, Germany, Eximbank, PL 480 and USAID.

The first Six-Year Plan is generally considered to be successful. The overall growth rate for the six-year planned period averaged about eight per cent per year in real terms. The Second Five-Year Plan (1967-71) involves a government expenditure of U.S. $2,500 million on major projects with priority given to irrigation and power, then transport and education.

In summary Thailand has a basically strong economy, with an impressive growth rate of about 7% during the plan periods. The Thai Baht (the unit of currency) is tied to the U.S. dollar, and currently valued at about 21 Baht per dollar. The recent world-wide inflationary problems, U.S. military withdrawal from South-East Asia, student unrest and the change in Thai government

have created some turmoil for the Thai economy. Substantial data on the extent of the impact are not yet available, however during 1973 prices rose 17% and rice prices alone increased 50% while the minimum wage rose from 60¢ a day to 80¢ a day. (Economic data are summarized in tables 20-29).

ANALYSIS OF HEALTH STATUS

From an analysis of the morbidity and mortality statistics, a review of the general living conditions and demographic factors, four major areas of concern relevant to health predominate:

1. Population Growth
2. Sanitation and Environmental Hazard
3. Nutrition
4. Resource Adequacy and the allocation of resources within the health sector.

These areas, and related problems will be examined separately, although the health problems of the population are caused by an interaction of all these areas. Additionally, the health problems of the nation are caused by an interaction of many factors which are outside the control of the health sector: religious beliefs, traditional behavior and attitudes, physical environment, economic constraints, agricultural practices, technological capabilities, political factors, educational level etc.

The subsequent sections will deal with these problem areas and their interrelationships. Later sections will attempt to integrate these problems and develop suggestions about useful interventions. Some discussion of disease patterns is included after the consideration of population growth for illustrative purposes.

Demographic Characteristics and Descriptive Statistics

Thailand is a developing country, characterized by a young population, high fertility rate, high rate of population growth, high infant death rate and a high prevalence of infectious, rather than chronic diseases. (Tables 19, 30, 31)

At the present estimated growth rate of 3.3% per year Thailand's population will double in 23 years. Although the data are not consistent, the population is estimated at 37 million. The youth dependency ratio is 88%, and the median age is 16. In 1960, 45% of the population was under 15, 53% was of the working ages (15-65) and 2% of the population was over 65. Since the time of that census the situation could have only become worse.

International migration is negligible in terms of numbers, but has a major impact on the society in terms of the loss of highly educated, much-needed members of society. Internal migration is increasing and is of two types: 1) within region movement, 2) movement to the Central Region, in particular, Bangkok. The population increase per year in Bangkok is 5%. The city population is now four million, double that of a decade ago, placing stress on all the public sector resources. This migration to the cities probably reflects both business and educational opportunities available there, and reaction to the growing scarcity of cultivable land.

In 1971 midyear estimate of the crude birth rate was 41/1000 population. The average number of births for Thai women is 6.5. The fertility rate in Bangkok is slightly lower than average. This difference might be explained by the later-than-average age of marriage, the existence of

a larger proportion of non-ethnic Thai, advantages of having a smaller family among non-farmers, or the availability of family planning services. The median ages of marriage are 26 (men) and 23 (women). Fifty percent of all births are borne to women over 30.

The sex ratio in Thailand is about 100 males/100 females, although it is higher in Bangkok, presumably because males are more mobile, economically oriented, or seek educational opportunities in the city.

The population situation in Thailand is quite serious. The data from the 1970 census are not available for this report and other data are quite inconsistent. The birth rate reached a high of 37.7/1000 population in 1968. One estimate for mid-year 1971 showed a continued climb to 41/1000 population, while another projected a decrease to 33.7/1000. Nevertheless current projections show the population growing to anywhere between 70 and 85 million by the year 2000, depending on the success and extent of the family planning programs. (The differences in estimates depends in part on assumptions about the degree of underregistration of births and deaths and current effectiveness of the family planning programs.)

Rapid population growth has a number of major manifestation: lower quality of education per capita, lower level of skill and productivity of the labor force, lower per capita income, unemployment, poorer health conditions, decreased land/farmer ratio and, in the city, housing shortages, traffic congestion, air and water pollution and inadequate water supplies.

An increase in population disproportionate to GNP increase coupled with Thailand's goals of seven year compulsory education by 1990 would leave a smaller portion of the GNP for education per capita, and thus decrease the quality of education.

A decrease in the quality of education, consumption level, and health of the working force will lower the level of skills and productivity in the poorer nourished and less healthy labor force of the future. A need for new jobs, or under and unemployment will result from the increase of the labor force.

The increased demand for food and simultaneous increase in supply of labor will decrease the supply of available cultivable land and lower the land/farmer ratio. Subsequently, the farmer will have to increase productivity/acre and quality of agriculture to meet the needs of the population. This may involve a change from traditional crops, or to improved methods.

A large population would burden the government with expenditures on consumer services, i.e. education, health, leaving little for economic development if social needs are partially met.

Some of these interrelationships are presented in graphic form at the end of this section. (illustration II).

The rate of population growth depends on a number of demographic and social factors: fertility and mortality rates, marriage rates, age at marriage, age composition of married people, continuity of married life. These are dependent upon knowledge, attitudes and, ultimately, actions of the population. The most influential of these factors in reducing the population growth of Thailand is fertility rate. The knowledge of birth control methods alone will not change the situation. A decrease in the fertility rate requires 1) awareness of birth control practices and family planning services 2) a positive attitude toward birth control

3) access to birth control methods and family planning services 4) proper (continuous) action.

A survey of 822 women shows 159 practice family planning, 83 do not know where to get services, and 354 have a negative attitude towards family planning.

A "survey on knowledge, attitudes and contraceptive practice in Thailand" in Protharam shows 70% of the women did not want more children, of these 40% indicated their readiness to accept family planning methods, and 20% actually come to health centers to receive services.

According to the 1969 phase of the National Longitudinal Study of Social, Economic, and Demographic Change, women (on the average) want only four children, but the average of live births/rural woman is 6.6. The desire to have four children, combined with the fact that a low proportion of women practice contraception, points to the ignorance of or inaccessibility to contraceptive methods of women who would like to limit (or space) the number of children.

Consequently a pertinent area in regard to the problem of a burgeoning population in need of health and other services is the rationale for people having children. There is a cultural norm that places a high positive value on having many children. In addition, there are several practical considerations that go into how a family determines its size preference. The high infant mortality rate and relatively high death rate of children produces uncertainty that promotes large family size. The acceptance of the fact that a few children of a family may die is compensated for by having several extra. The economic advantage of large numbers of children is seen in terms of additional labor force of a family to help in the farming activities. Also, children are a hedge against the insecurity of old age. The Thai government does not have a wide spread social security system, so many children are favored to contribute to the support of enfeebled parents. In large families, especially where fertile agricultural lands are not available, older children often move to urban areas for jobs and then send part of their earnings to supplement family income. This is consonant with a religious value that dictates parent-child responsibilities to each other in different stages of their lives.

The nature of the population problem is many-fold. It is a response to economic uncertainty as well as a tradition of culture. The effect is to burden existing systems with growing dependency ratios and the large number of people that need services. A side effect has been in urbanization from a "push" effect of poverty and population pressure in rural areas and a "pull" effect of the seeming attractiveness of the urban area. However, if urbanization is an inexorable process, even with a relatively slower growth rate, projections are for Bangkok (already crowded) to grow from the present 4 million to 13 million by the year 2000. This would mean that in 30 years Bangkok will be as large as the world's largest cities presently are, yet the projected standard of living for the city will be much lower than present large cities today.

This problem pertains not only to the health care system, but also the nutritional status and the living conditions of the Thai people in the future will be largely determined by the population growth. Currently children under age 15 make up about 44% of the population--roughly 16 million. The effects of nutrition are discussed elsewhere, but suffice it to say that

young children suffer the most, and those under 15 have to depend on others to provide them with food. By the year 2000 there could be as many as 35 million children under 15, more than the total population of Thailand in 1968. Clearly it will be very difficult to improve the nutritional status of the Thai people with the kind of population growth they are presently experiencing. The same is obviously true of living conditions. It would be difficult for the government to double the number of people served with potable water in the next 22-24 years, although in theory the increase in population density would result in more people being served by each well or water system. In any case the situation would not show much improvement.

As suggested, families have traditionally had many children, both to provide labor and stability to the family, and to replace the large numbers who normally died as infants or young children. After World War II the mortality rates in Thailand fell sharply, from approximately 30 per thousand before the war to 11 per thousand in the mid-1960's. This was in part due to the expansion of health facilities and public health activities and the consequent reduction in deaths from diseases which had formerly taken high tolls (for example, the death rate from malaria was 329/100,000 in 1943 and only 11/100,000 in 1968).

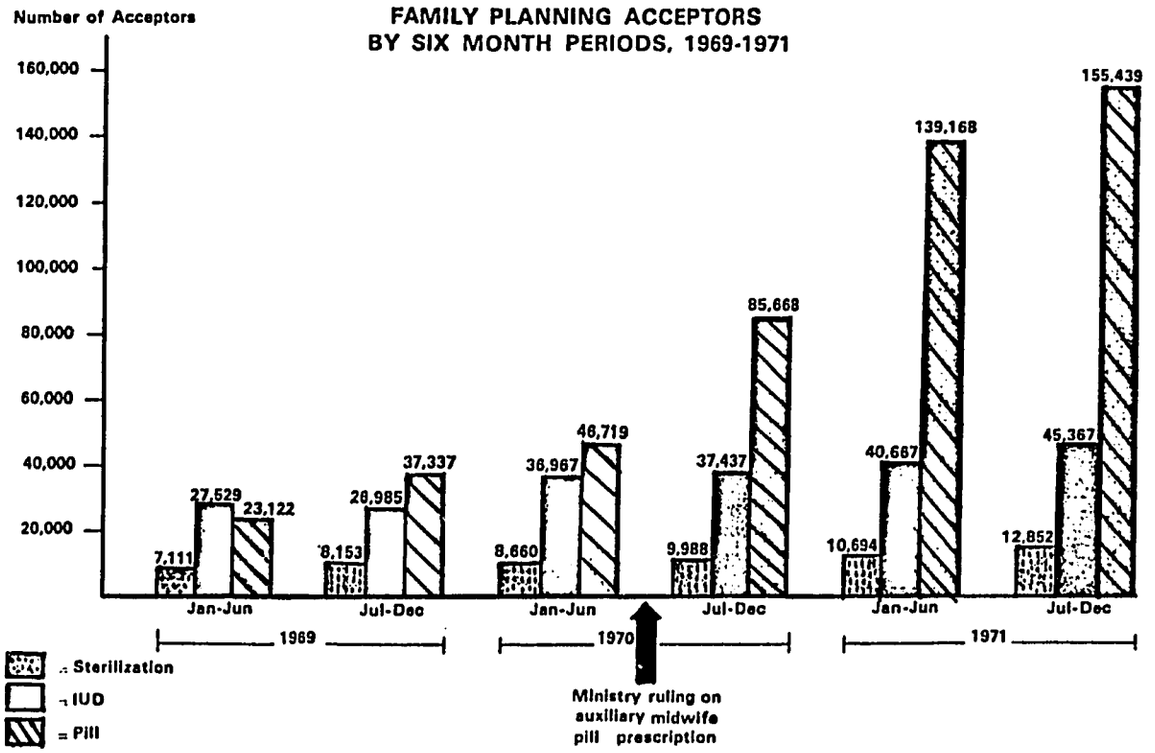
The birth rate has not experienced a similar decline over the same period of time. Only since 1960 has the birth rate dropped from the 45-50 level. By the time she has completed her reproductive years the average Thai woman has given birth six or seven times. One interesting characteristic of Thai fertility behavior is the fact that Thai women continue to give birth throughout the childbearing ages. Nearly 50% of all Thai babies are born to women over thirty, and the birth rate for Thai women aged 45-49 is nearly the same as for women aged 35-39 in the United States. This points out that population planning could be effective by reaching women in their 30's as well as those just reaching childbearing age. The overall effect of this situation has been an annual growth rate of approximately 3.2%, a situation which the government has recently decided it could no longer afford to allow to exist.

During the mid-1960's a series of committees and seminars met in Thailand to study the effects of the high rate of population growth. Virtually all of these submitted reports to the government warning of the dangers of rapid population growth. Finally in 1968 the cabinet authorized the development of family planning services by the Ministry of Public Health for research purposes. The Ministry of Public Health, together with the National Economic Development Board (NEDB) reported to the cabinet on the adverse effects of rapid population growth on both economic and social development and recommended strongly the adoption of a population policy. Accepting the report in March of 1970 the cabinet declared, "The Thai government had the policy to support voluntary family planning in order to resolve various problems concerned with the very high rate of population growth, which constitutes an important obstacle to the economic and social development of the nation." Following this announcement MOPH established the National Family Planning Program (NFPP).

From the onset MOPH decided that family planning activities would make use of the existing

health services and that no new or separate infrastructure would be created. Emphasis was placed on providing services to the rural areas, where 85% of Thailand's population resides. From 1968-1970 the Family Planning Project (FHP) was conducted with a low profile. During this period there was no official gverrmental ruling forbidding public advertising about family planning and contraception. The activities of the Family Health Project were carried out without new workers, by integrating FHP activities into the workload of existing personnel at existing facilities. A major activity of FHP was training. During the three years, a total of 330 physicians, 700 nurses, and 3,090 auxiliary mid-wives received a basic training course, which included the essentials of population dynamics as well as detailed description of the contraceptive methods to be used. Funding for FHP came out of the Maternal and Child Health (MCH), Rural Health, and Provincial Hospital Divisions of MOPH. It is estimated that over $1.5 million (U.S.) were used for the family planning program during this three year period. International support for family planning activities has come from Denmark, USAID, IPPF and UNFPA.

The most important activity undertaken by FHP was a pilot study in 1969. This study took place in four provinces where auxilary mid-wives were allowed to prescribe oral contraceptives, using a simple checklist of contraindications. This proved to be a safe and effective procedure, and in mid-1970 (after the government statement supporting family planning)MOPH ruled that auxiliary mid-wives, who had received the basic course in family planning, could prescribe the pill throughout the country. The chart below illustrates the dramatic effects this ruling had on the number of family planning acceptors. (Illustration I)



Following the establishment of the NFPP a five year proposal was drawn up for inclusion in the NEBD Five-Year Social and Economic Plan (1972-1976). The specific objectives of the NFPP are: To reduce the population growth rate from over 3% to around 2.5% by the end of 1976; to inform eligible women, particularly those living in rural and remote areas, about concepts of family planning, to motivate them to use contraception, and to make family planning services readily available throughout the country; and to integrate family planning activities with overall maternal and child health services and thus mutually to strengthen the activities in these closely related fields.

MOPH set up new acceptor targets for the years 1971 through 1976 (see below). These targets are realistic (they were surpassed in 1971 and 1972), and calculations of woman-years

Table 1: Acceptor Targets by Method, 1971-1976
(thousands)

Year	Orals	IUD	Sterilization	All three Methods
1971	200	80	20	300
1972	235	90	25	350
1973	280	90	30	400
1974	280	90	35	405
1975	280	90	40	410
1976	280	90	40	410
All years	1,555	530	190	2,275

of protection and number of births prevented (by this program) show that by attaining the acceptor targets the objective of lowering the growth rate to 2.5% by 1976 can be met. The results to this date have been very successful. In 1972, there were 327,400 new acceptors of the pill (target: 235,000) and a total of 448,600 new acceptors for all methods, (target:350,000) The chart below shows that the total new acceptors for 1971 also surpassed the target. This

Table 2: **PERCENTAGE OF ACCEPTORS BY REGION, 1965-1971**

REGION	1965-1968		1969		1970		1971		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
BANGKOK-THONBURI	104,728	56	34,361	27	38,304	17	43,874	11	221,267	23
CENTRAL	29,531	16	18,717	14	41,350	18	83,308	21	172,906	18
NORTHEAST	30,530	16	31,495	24	60,550	27	133,598	33	256,173	27
NORTH	15,824	9	32,366	25	64,063	29	113,499	28	225,752	24
SOUTH	6,280	3	13,280	10	21,172	9	29,908	7	70,640	8
TOTAL	186,893	100	130,219	100	225,439	100	404,187	100	946,738	100

chart also illustrates the success the program has had in bringing family planning to the rural areas. (The high percentage of Moslems in the southern region probably accounts for its disproportionately small numbers of acceptors.)

As mentioned earlier, the family planning programs did not require the construction of any new facilities. Instead the family planning programs made use of the existing facilities at all levels. By September of 1970 family planning services were offered at 45 Provincial Health Offices (with physician); 220 first class health centers (with physician); 250 first class health centers (without physician); 1,600 second class health centers; and 1,750 midwifery centers.

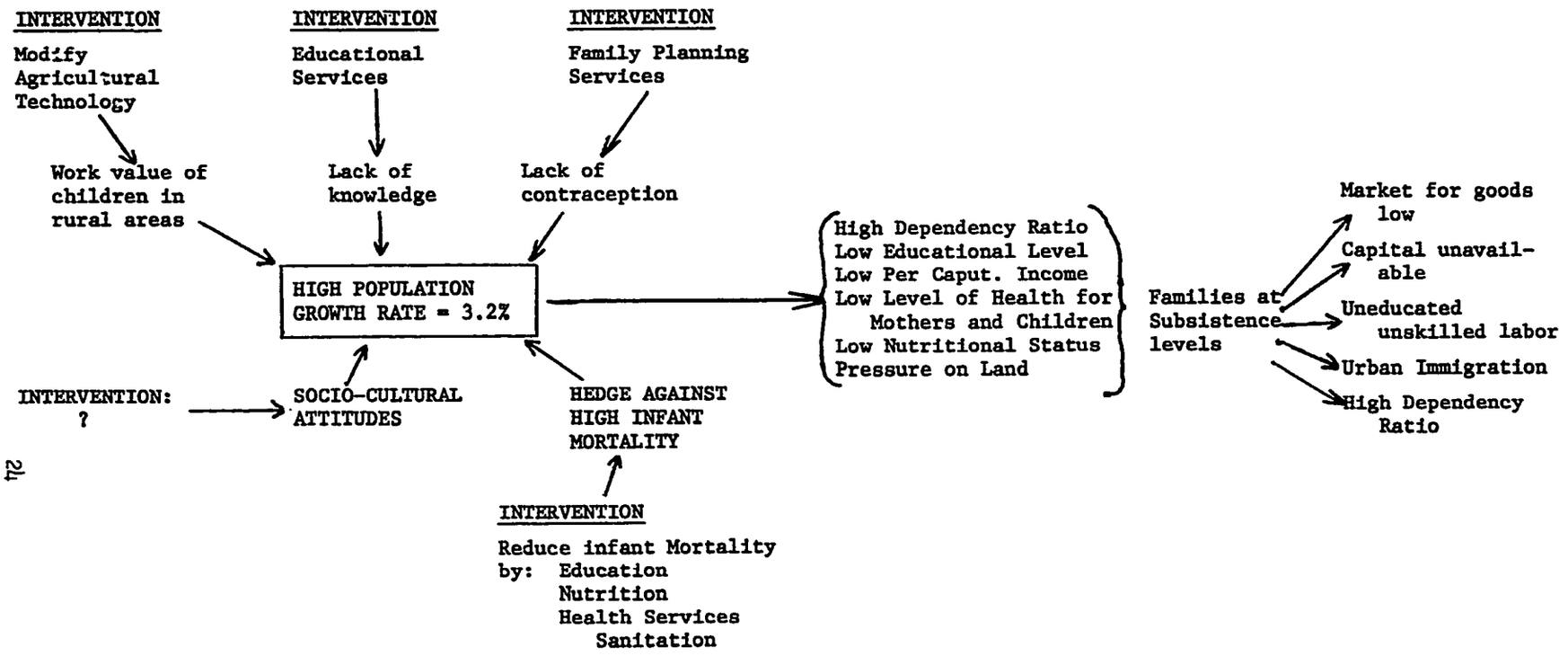
This saves the NFPP a great deal of unnecessary expense. The total NFPP budget for the fiscal year 1972 was $4.8 million, over half of which comes in the form of foreign assistance. The major costs of the program are: supplies ($1.4 million), personnel ($1.2 million), equipment and commodities ($.7 million), construction ($.7 million), and administration, services, and training ($.6 million). MOPH has established a policy that no fees are charged for contraceptive services, but voluntary contributions can be requested. In 1970, MOPH set limits to the amounts asked for each method. The maximums are: $.25 (U.S.) per pill cycle; $1.00 per I.U.D; $1.50 per vasectomy; and $7.50 per tubal ligation. These are set sufficiently low so as not to constitute an economic barrier for family planning.

From a sample of patient records (1970-1971) an analysis shows that nearly 80% of all new acceptors live in rural areas, and some two-thirds are from agricultural households. Over 50% were under 30 years old and a vast majority had had four or less pregnancies. The reason most acceptors gave for practicing family planning was that they did not want any more children, and about 80% had not practiced any form of contraception before initial acceptance in the program. Almost all of the women (over 90%) heard about the family planning services by word of mouth, mostly from friends and relatives, although some heard about it from health personnel.

The current estimate is that 22% of the married fertile women (age 15-44) are either sterilized or practicing some form of contraception. If the number of new acceptors continues to meet or exceed the targets the fall in fertility will be substantial. This fall will initially lower the percentage of the population in the younger age groups, thus lowering the dependents to workers ratio. This will create a population structure more conducive to economic and social development, and will reduce the pressures on health services provision.

The illustration on the following page presents graphically the interrelationships between population growth and other variables and illustrates multiple intervention points that will influence this problem.

ILLUSTRATION II



Patterns of morbidity and mortality:

Historically much death and disability were attributable to epidemics of cholera, smallpox and malaria. While these diseases have become less prevalent, some infectious diseases, and in particular the sanitation-related diseases such as dysentery, typhoid fever, enteritis, diarrheal diseases, and intestinal parasitism, have become more prominent. The following list is illustrative of the leading causes of death (1970). It is important to remember that these are only reported deaths in which a cause is identified. Far and away the most common cause of death (58%) is the category: "symptoms and states ill-defined" meaning that the majority of the population have no medical care at or near the time of death.

Table 3: THE TEN LEADING CAUSES OF DEATH

1.	accidents, poisoning, violence	30/100,000
2.	disease of early infancy and ill-defined deaths in infants less than one year	29.5/100,000
3.	tuberculosis, respiratory system	25/100,000
4.	gastro-enteritis and colitis	25/100,000
5.	pneumonia	16/100,000
6.	heart disease	15.5/100,000
7.	malaria	11/100,000
8.	diseases of pregnancy, and puerperium	9/100,000
9.	diseases of stomach and duodenum	7/100,000
10.	dysentery	3/100,000

The presence of accidents etc. as the first rank is probably partially an artifact of the data system, due to the ease of registration and determination of cause of death. Nevertheless accidents are a significant problem in areas which are rapidly urbanized and mechanized (e.g. Bangkok). The fact that the other leading causes of death are preventable and treatable--diseases such as dysentery, gastro-enteritis, pneumonia, tuberculosis, diseases of pregnancy and the early infant diseases demonstrates the interaction of a hazardous environment, the inadequacies of the basic health services and the marginal nutritional status of much of the population. Eighty per cent of all illness and forty per cent of all deaths are estimated as attributable to the "filth" diseases. The above list has dealt only with death, and clearly understates the quality of life that accompanies this process.

Study of the causes of death by region shows that the Central Region has a much higher death rate from heart disease and malignant neoplasms than the rest of the country. Although this is in part the result of a discrepancy in the reporting system, it is likely that these

diseases are clustered in the Bangkok-Thonburi area which offer better access to care and also a somewhat less hazardous environment.

The expectation of life at birth (1964-1965) is about 55 for males and 68 for females. The crude death rate in 1970 was 9.5/1,000 population. The reported infant mortality rate was close to 38/1,000 live births but is probably higher. Seventeen per cent of all reported deaths occurred in infants one year and under; and 23.6% of all deaths were in children under four years of age.

Although there are major problems with the Thai data (because of problems of accessability to and utilization of health services) it is possible in a general way to identify also the leading causes of morbidity.

Table 4: THE TEN LEADING CAUSES OF MORBIDITY

1. Diseases due to labor, abnormal and normal pregnancy
2. Total infectious diseases
   (a) Gastro-Intestinal infections
   (b) Upper Respiratory infections
   (c) Mosquito-borne diseases
   (d) All other infections (tetanus, hepatitis, malaria, etc.)
3. Accidents, poison, violence
4. Non-infective Gastro-Intestinal diseases
5. Mental diseases
6. Diseases of Genito-Urinary system
7. Malnutrition diseases
8. Malignant neoplasms
9. Diseases of heart and vascular lesions
10. Skin diseases

From these data it can be seen that there is considerable congruence between causes of death and morbidity. A series of surveys conducted by the Ministry of Public Health further support this. In a one month survey of 23,788 persons, 15% of the people surveyed reported ill for a total of 8,334 work days lost (an average of about 2½ days per person). Projected to a yearly estimated morbidity rate adjusted for seasonality this becomes a staggering 1,984/ 1000 population. There appears to be little difference in the general morbidity rates between rural and urban Thailand or between economic status categories in this survey. Another survey ranked symptoms during a one-year study of 2,813 cases as follows:

Table 5: THE TEN LEADING SYMPTOMS OF ILLNESS

1. Fever (789)
2. Weakness (358)
3. Headache (356)
4. Cold (164)
5. Abdominal pain (153)
6. Cough (127)
7. Others (108)
8. Diarrhea (92)
9. Fatigue in joints and muscles (89)
10. Fainting (74)

This is clearly a strange assortment of symptoms, but certainly in agreement with the basic morbidity pattern as presented above. From this it can be seen that both symptoms and illness are a way of life for much of the population. These patterns also have significant economic implications in terms of lost days of work, consumption of medical and other health services and direct expenditures. The average annual expenditure on illness in 1970 was estimated at $7.70 per person. The total expenditure on health was $269 million/year (private) and $66 million/year (public).

Consumption of Medical Services

Further data from hospital utilization, though imperfect, tend to support the previous data (approximately 25-30% of deaths occur in hospitals). Of the ten leading causes of hospital reported deaths in Thailand, only three (accidents, heart disease, and malignant neoplasms) are major killers in the more developed countries. Infectious diseases cause over 26% of the reported (hospital and health center) mortality in a setting in which only 35% of the people make use of health facilities. The relative rank by cause of death is presented in the following table:

Table 6: THE TEN CAUSES OF HOSPITALIZATION

		Death Rate (per 100,000)	
		1967	1970
1.	Diseases of early infancy and ill-defined diseases under 1 yr.	36.3	29.5
2.	Accidents	26.2	27.7
3.	TB (respiratory system)	28.3	21.1
4.	Pneumonia	19.6	15.1
5.	Heart disease	16.5	15.6
6.	Gastroenteritis and colitis	27.6	15.0
7.	Malignant neoplasms	12.9	13.3
8.	Malaria	12.9	10.1
9.	Diseases of childbirth, pregnancy and puerperium	10.1	7.6
10.	Diseases of stomach and duodenum	5.1	6.9

The communicable diseases which were the most common diagnoses at medical facilities included the following: malaria, dysentery, leprosy, tuberculosis, trachoma, influenza, gonorrhea, whopping cough, syphilis, diphtheria, typhoid fever, cholera, and poliomyselitis.

More specific data on hospital and health center admissions, morbidity and mortality are included in a series of tables in the appendix. (tables 33a,b,c & 34 a,b,c)

Two diseases deserve special consideration, because of their magnitude in the past and the effectiveness of the public health and clinical activities of the government: malaria, and tuberculosis.

Malaria

Malaria, one of the major public health problems in Thailand was until recent years the greatest single cause of sickness and death. Not only did it seriously affect the health of the population, but it also had major detrimental effects on the economy. In 1949 a control program using residual insecticide spraying was begun. From 1949 to 1960 the malaria death rate was reduced from 201.5/100,000 to 30.2/100,000 population and to 10.9/100,000 in 1970. During the sixties the government decided upon an eradication strategy and reorganized the program administratively and technically. The comprehensive plan of operations for this program was prepared with the assistance from WHO and USAID and started late in 1970. This program uses residual insecticide spraying, drug administration and surveillance techniques. In the flooded rice field areas where endemicity had been low to moderate, transmission has been interrupted. In the hilly and forested locations of high malaria endemicity the effect has been less clear. Although the number of oases has been reduced, the migration of new populations into this now safer area has complicated the picture by reintroduction of the parasite and more recently the introduction of chloroquine resistant malaria. The movement of agricultural workers between various areas has contributed to the continuing problem of malaria. Data on the population protected and projected targets are presented in tables 44-46. The National Malaria Eradication Project (NMEP) has specified a series of goals as follows:

1. Gradual integration into general health services of consolidation areas considered "safe", i.e. areas which originally had a low endemicity of malaria. A target of 27.39 million population to fall into this category by 1976 has been established.
2. A target of 7.86 million population in consolidation areas is still under the care of the NMEP by 1967.
3. A concentrated effort to reduce attack areas to a population of only 6.8 million will be made by 1976. Areas of exception are "difficult areas" where long range attack measures will be maintained until geographical and/or sociological changes take place.

Although the NMEP has made dramatic progress in malaria control the above goals may be a source of some concern. It is clear both thoretically and from past experience in other countries that it can be hazardous to integrate malaria surveillance into the general health

services prematurely. One hazard is that the general health services may be funded on a priority basis wherein surveillance of a "conquered" disease is given low, if any, priority. Another hazard lies in the skill of the basic health service system to detect and follow-up a communicable disease which is endemic at a low level before it increases rapidly. The final issue is the basically inadequate coverage of the general health services. With utilization rates so low (17% of the population uses health services one time a year) it is difficult if not impossible to maintain an adequate surveillance. If the surveillance system fails, the investment in the initial program may well be lost. Although the total investment is not fully known the U.S. alone invested about $20.7 million in malaria control over a period of about twenty years (out of a total disease control investment of $21.3 during the same period). The benefits, too, seem clear cut. At the start of the program in 1949 there were an estimated four million cases accounting for an estimated loss of 15 million man-days of productivity per year. By 1968 and 1969 the annual number of cases identified was about 67,000 and 64,000 respectively. Data from the first nine months of 1970 are consistent with this trend.

For the NMEP, the immediate concerns for the future lie in three areas: the decision of when, how and how fast to integrate into the basic health services in order to maintain adequate surveillance, the resolution of the problem in the remaining difficult areas, and dealing with a slowly growing problem of chloroquine resistance while meeting the targets which have been outlined.

The illustration below depicts the relationship between malaria and its impact on the society.

ILLUSTRATION III

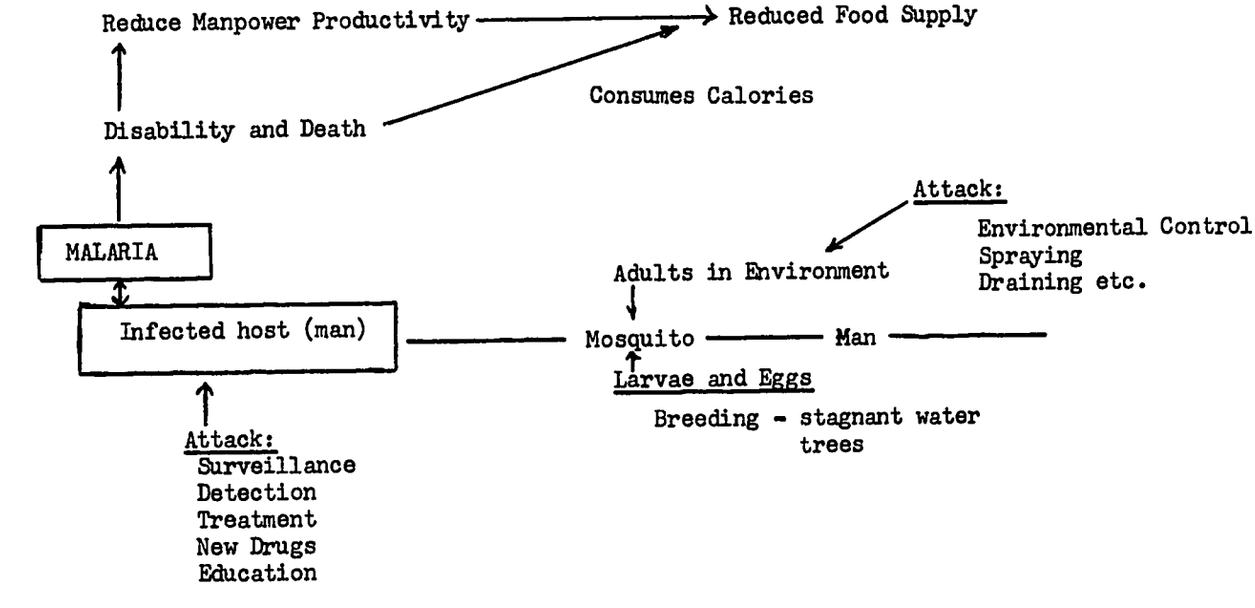
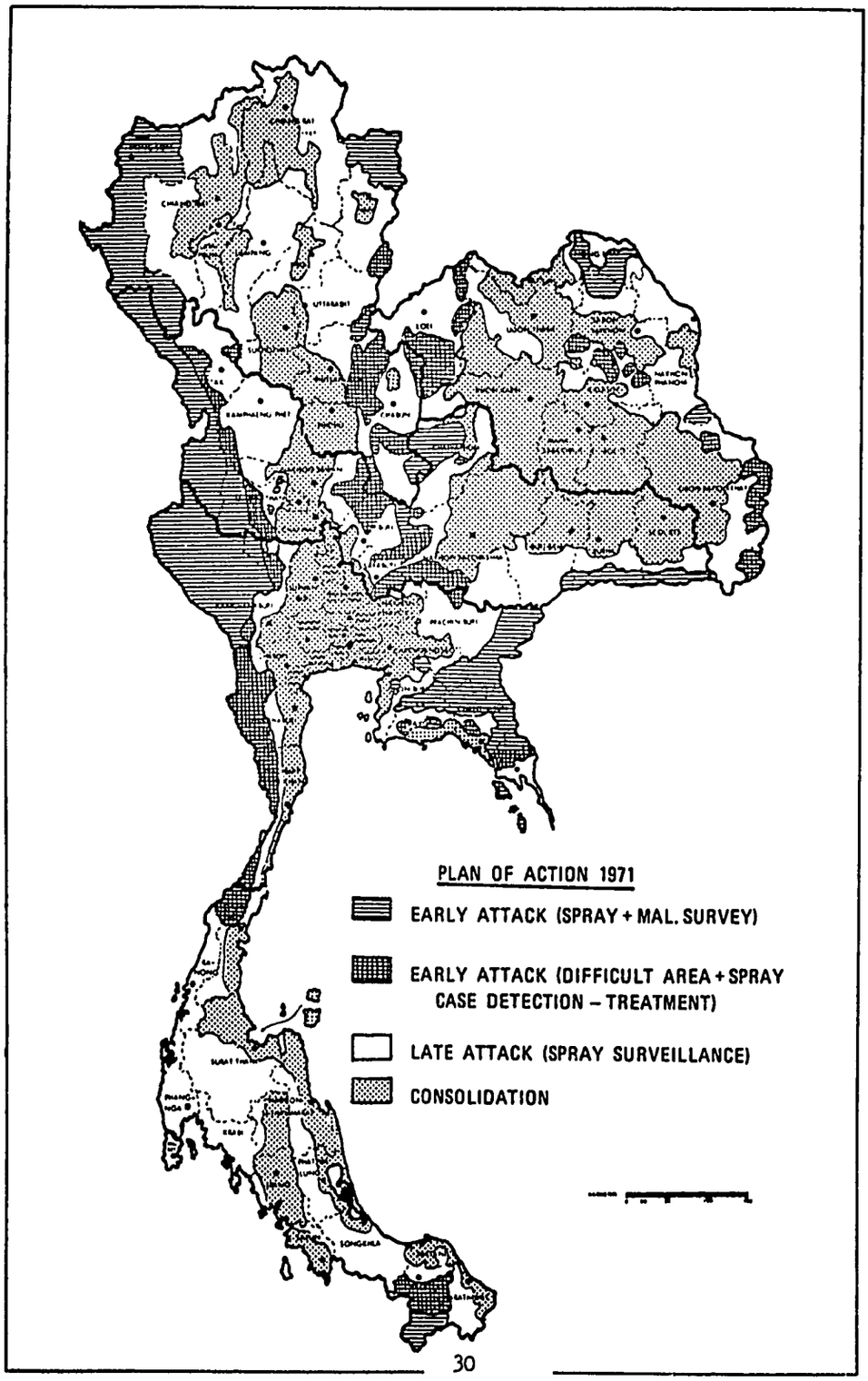


ILLUSTRATION IV

MALARIA ERADICATION PROGRAM



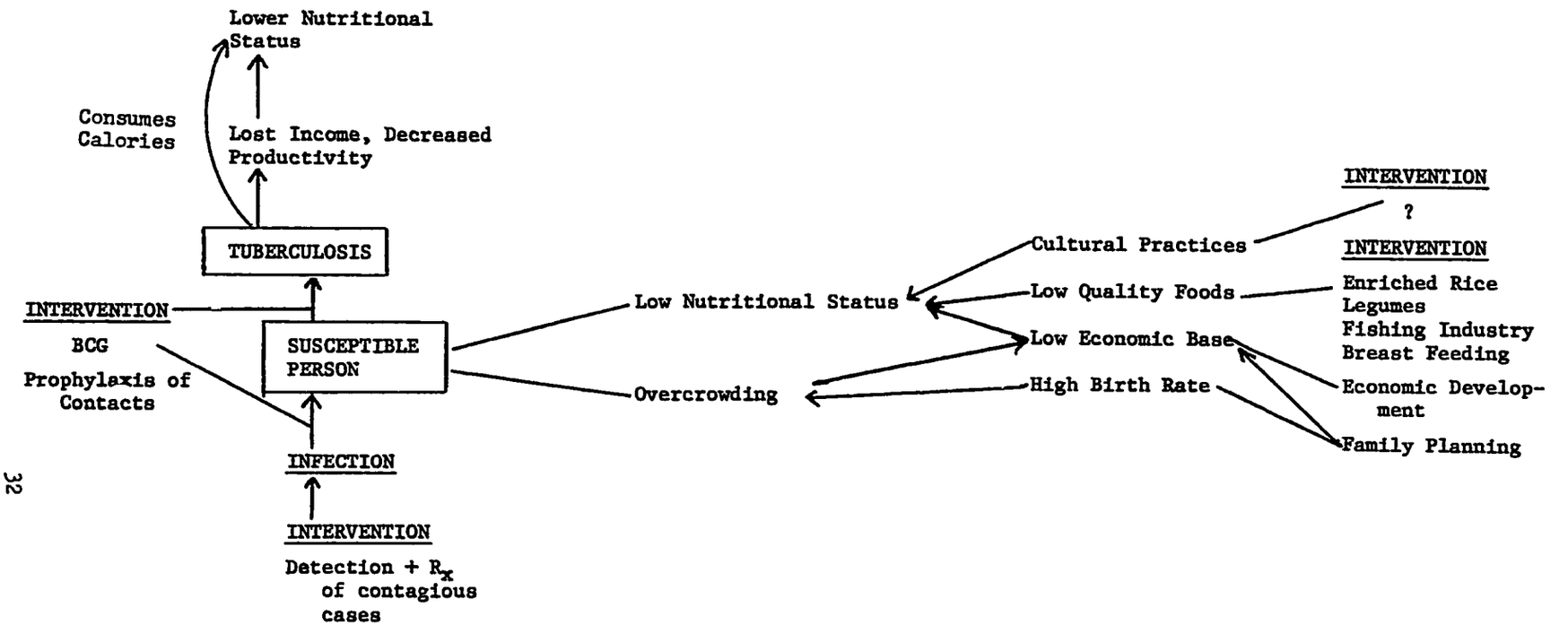
Tuberculosis

Tuberculosis has long been a major public health problem in Thailand and has received a great deal of attention from MOPH and international agencies. It is estimated that about 49% of the country's population is infected with tubercle bacilli. In children aged 10-14, the tuberculin positive rate ranges from 24% in rural areas to 45% in towns, to 74% in Bangkok-Thonburi. It is estimated that about 600,000 patients have tuberculosis detectable by X-ray; 85% of these live in the rural areas.

In 1966 the MOPH expanded the National Tuberculosis Program in the following manner: 1) increased the rate of BCG immunization to exceed the annual rate of population growth by the application of direct immunization without prior skin testing; 2) started the integration of simplified case-finding and treatment methodology into the basic health services; 3) developed the strategy of identification of symptomatic cases only and ambulatory treatment concentrating on highly infectious patients detected by microscopic examination of sputum. In this methodology prevention has received first priority and in the long run, considering the limited resources should prove to be the most effective strategy.

By 1970, eight TB centers had been established. In that year these centers examined approximately 314,000 persons and brought 39,202 patients under treatment. An additional 14,000 received BCG immunizations in the clinic setting. These centers are each meant to function as regional clinics for diagnostic, curative and preventive functions as well as supervisory headquarters for all TB activities in an administrative area of about two million inhabitants. In addition there were 111 TB units located within first class health centers. These units provided diagnosis for persons referred from the second-class health centers and midwifery centers. Once diagnosed they would be sent back to these centers for treatment and follow-up. Specific data on the performance of the TB centers, of the TB units integrated into the basic health services and on the number of BCG immunizations are presented in tables 47 - 50. Below the relationship between tuberculosis and socio-economic conditions and health services is presented in illustration V.

ILLUSTRATION V



SANITATION

In 1960 the attention of Thailand's Ministry of Public Health (MOPH) turned to environmental health problems. The incidence and prevalence of malaria had declined in the late 1950's and the "filth diseases" emerged as rural Thailand's greatest health problem. The health and vital statistics still show a predominance of dysentery, gastro-enteritis and colitis, typhoid and parathyphoid, trachoma, intestinal parasitism, diarrhea, and fever. Contaminated water and food and improperly disposed of fecal material either directly promote their transmission or a mechanical agent or vector operates in the transmission of the infection. To a great extent these are diseases that man inflicts upon himself in the way in which he deals with the environment.

Gastro-enteritis is responsible for a high mortality rate in the young. Salmonellosis is a frequent cause of diarrhea in infants under six months of age and contributes to the high infant morality rate. The death rate from enteritis and other diarrheal disease is especially high in the Northeast Region, and is clustered in the 0-4 age group. Here, the rate is reportedly almost twice as much as in the other regions. In this setting, diarrhea, dysentery and fever are common manifestations of known diseases which are, in practice, not clinically differentiated. Its prevalence in the population is certainly higher than is reported because of the lack of facilities for diagnosis, the high prevalence of self-medication by the population, the fact that there are high carrier rates, and because care is frequently not sought before symptoms become excessive.

The reported incidence of dysentery in young children is much higher than in older persons, presumably due to a difference in the severity and possible immunity of the diseases; the young children manifest more severe symptoms and thus are reported more often. There is a high infant mortality rate due to diarrheal disease, indicative of poor sanitation, as well as inadequate medical care and poor nutrition

The widespread occurance of parasitic, enteric, and eye infections is due to poor sanitary habits (in food handling, at work in the fields, and in sewage disposal), and the lack of available potable water supplies in rural areas, especially.

The severity of these cases, inferred from medical care being sought and the high fatality rate of some of these infections, is due to the complicating factors of poor nutritional status and perhaps, inadequate health care, i.e., late entry into the health care system or poor medical service.

Malnutrition and enteric infections interact in a synergistic manner such that malnutrition in the young predisposes to intestinal infections and makes the consequences far more severe. Similarly the intestinal infection decreases absorption of nutrients and further stresses the marginal body. Consequently, there are high social costs such as a decrease in work productivity and increased absenteeism and obviously death.

The sanitation-related diseases rank high on the list of out-patient services provided by

the health department: typhoid fever, dysentery, trachoma, diarrhea and fever. These diseases/conditions and a number of other frequently associated manifestations (weakness, headache, abdominal pain) were listed in the one-year study of diseases/conditions reported in eight areas of Thailand and were repeated in the one month study of patients suffering from various diseases and symptoms, presented previously.

Although there are no disease-specific data available on work days lost, it is reasonable to assume that illness severe enough to cause the seeking of medical care would also cause work days to be lost or, at least, affect the productivity of work. Missed days, or lessened productivity is of substantial importance to the farmer if it occurs during the critical period of harvest or planting, and to an employee because of missed wages and hence the family.

These sanitation-related diseases are also costly in terms of health services consumed, i.e. the hours, personnel, and supplies used in treatment. Since these diseases are preventable, the possibility of intervening earlier in the diseases process should be considered as a far more effective alternative. Because of the high carrier rates for these diseases and the constant opportunity for reinfection, therapy as a public health measure is ineffective and will not reduce the disease in the community. Consequently investments in therapy from the public health standpoint are largely lost, although they obviously do benefit the individual at least for a short time. The only effective measures are prevention measures which ordinarily involve the difficult task of modifying human behavior or the expensive restructuring the environment through the construction of water supply and sewerage systems.

The living conditions of a typical rural village partially explain the widespread existence of these diseases. Perhaps because of their ignorance of the relationship between hygiene and infectious disease and also the lack of facilities, the villagers promote the spread of disease through their mode of living. Flies and mosquitoes breed in stagnant pools of water which may form under houses where livestock is kept. Often, the common source of water for a village may be a stream, a pond, or unprotected well which is used for washing, cooking, and drinking. Disease may be spread when food is contaminated in preparation, eaten with unclean hands or eaten raw. Such behavior is, to a great extent, determined by the physical environment, e.g., the availability of water, raw materials for cooking and fuel.

A survey of two Northeast villages showed less than half the households washed hands before meals or after going to the toilet, and that the majority of the people eat meals with hands and eat raw or not well cooked meat. The survey also reported that most of the drinking water came from public shallow wells (98%-100%), although in the one village piped water was available.

The knowledge of the relationship between unsanitary conditions and the spread of disease would not necessarily change the situation. The provision of potable water and sanitary privies would not guarantee their use in villages. The modification of human behavior is a task which is not easily accomplished, for example, the altering of dietary behavioral patterns.

A 1970 W.H.O. estimate reports that 89% of the rural areas (and 56% of Bangkok

municipality) are without potable water. Approximately thirty million of the total population is without potable water. A number of divisions within the Department of Health and the Ministry of the Interior are involved in environmental sanitation. These divisions operate programs which, for the most part, are concerned with supplying rural areas with potable water supplies and sanitation facilities. The Village Health and Sanitation Project (VHS) of The Division of Community Health Development (MOPH) is concerned with the protection of water supplies. As of 1969, 34.6% of the villages were in this project. The Sanitation Division of MOPH is responsible for providing potable water supplies to the rural communities.

The original objectives of the VHS included: providing at least one source of safe water in each village; providing a sanitary privy for each household; improving premise sanitation; promoting health education ; providing training for a corps of environmental sanitation personnel; and carrying out research for activities related to sanitation programming. To achieve these goals the first step for the VHS Project was to organize a village health committee, and then introduce intensive health education. Next, community action had to be organized to result in: 1) Protection of drinking water supplies; 2) Privy installation and use by each household; and 3) Improvement of premise sanitation through a continuing clean up and refuse disposal program.

The VHS Project ran into a number of substantial difficulties. The health education activities lagged far behind fiscal improvements, and the villager's fundamental outlook and understanding of environmental sanitation remained unchanged. It became impossible to keep the well pumps in good repair, as the villagers had neither the tools nor the knowledge needed to repair the pumps. The VHS programs were not integrated with the provincial health organization, thus producing a rift within the rural health service system. An attempt was made to deal with this last problem in 1966 when the VHS Project was incorporated into the new Comprehensive Rural Health (CRH) Project. The focus of this new project was on a broad scope of health services, including the building of water-seal privies and village wells, along with maternal and child health, nutrition, public health and hospital administration.

Beside the provision of privies, wells, and water systems, by the end of 1965 the VHS had instigated over 6,000 active village health committees. Nearly 50 provincial workshops had been conducted for rural sanitation personnel, and orientation in village sanitation had been given to other officials, including civil-defense workers, education personnel, and public works officials. Two training centers for sanitation workers were also established, with the ability to train a total of 50 junior sanitarians each year. The following table summarizes the primary achievements of the Village Health Sanitation Project by region.

Table 7: Village Health Sanitation Project by Region

Accomplishments during 1960 - May 1970

Region	VHS/CHD Village	Houses in VHS/CHD Village	Sanitary Privy	Sanitary Well	Water Supply
Northeast	7,885	845,025	293,540	4,134	829
South	2,331	263,679	63,182	2,098	724
North	3,668	547,809	310,651	5,811	1,395
Central	3,501	333,780	197,578	3,779	1,140
Total	17,385	1,990,293	864,951	15,822	4,088

The National Community Water Supply Project grew out of the Potable Water Project, which had begun in 1962. In 1966 the decision was made to try to work in villages with more than 1,000 population, and the title of the project changed. Implementation of the project took place with field units of an engineer, assistant engineer and several construction technicians dividing the responsibility for supervision and consultation with the provincial authorities, the conducting of feasibility and construction surveys, and the supervision of construction. Units try to assist or advise villages that already have a system built. The achievements of the Community Water Supply Project are depicted below. The problem of meeting the costs of operation and maintenance has continued to limit the extension of community water systems. Maintenance of the hand pumps on the village wells continues to be an enormous problem.

Table 8:

General Achievement of Community Potable Water Supply Programme

Construction & Supervision

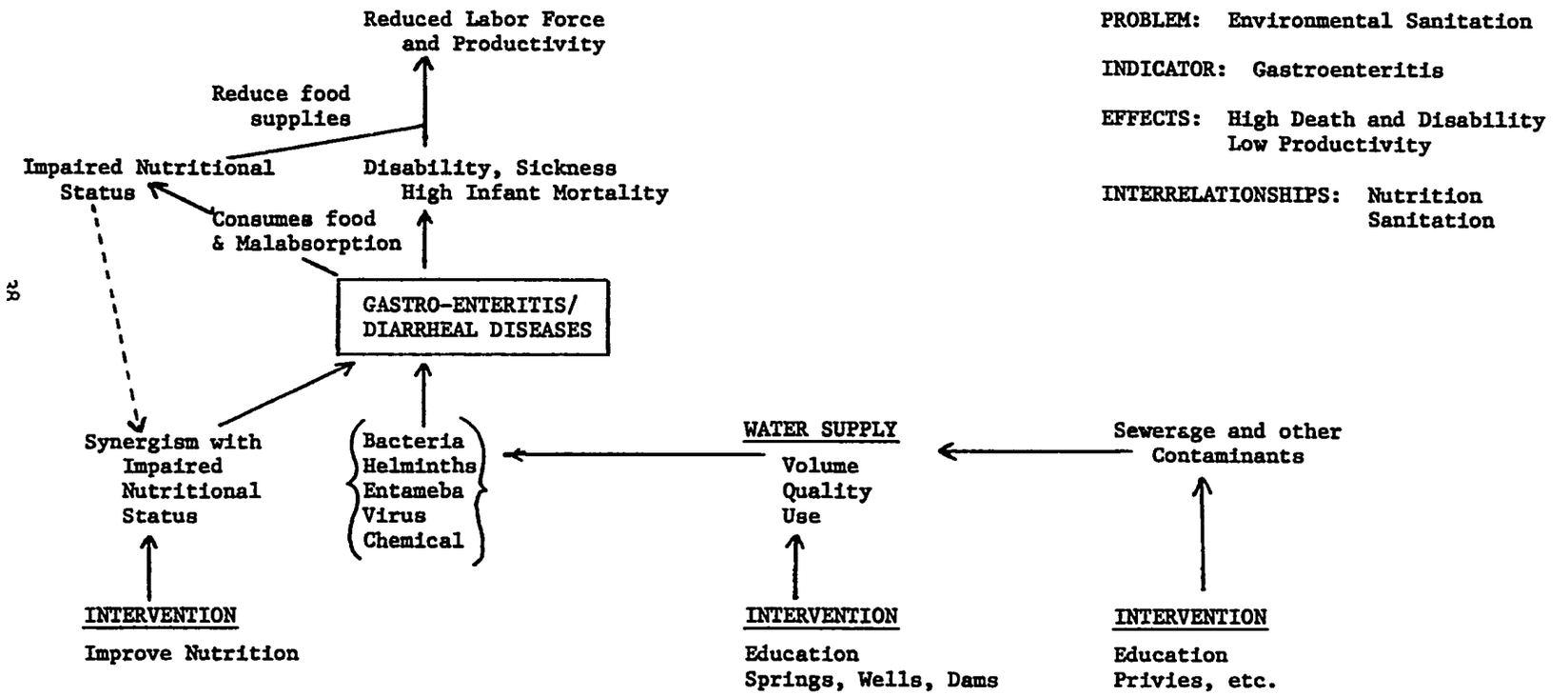
Fiscal Yr.	No. of Systems Constructed	No. of Communities Served	Population Served at Time Constructed
1966	18	24	38,000
1967	47	70	104,000
1968	90	233	255,000
1969	55	117	142,000
1970	59	130	170,000
1971	46	119	138,000
1972	45*	120*	140,000*

* Expected

The amount of money that MOPH has been devoting to rural water supplies has increased constantly since 1969. In 1972 it consumed 5.75% of the MOPH budget for the Health Promotion and Disease Prevention program. It is not likely that more money will do much to improve the sanitary conditions of the rural areas, unless the villages develop a sense of community responsibility. To this end it is essential that local skills be used to provide local sanitation facilities. The sanitation of the rural villages must not depend on outside technicians who can rarely visit the villages. When the villages become capable of maintaining their own sanitation the whole country will benefit from falling disease rates.

Although the availability of potable water is basic to the prevention of the sanitation-related diseases it is essential that other actions and interventions also be considered as many other factors are also involved. Infectious diseases are not always water-borne, but are also transmitted through raw animal tissues, human and animal feces, and insect vectors. Basic hygiene and sanitation of the environment certainly include water supplies, but also go beyond these activities. Consequently, alternatives and supplements to the provision of water supplies should be examined to impact on these diseases. Illustration VI on the following page presents some of these concepts graphically.

ILLUSTRATION VI



PROBLEM: Environmental Sanitation

INDICATOR: Gastroenteritis

EFFECTS: High Death and Disability
Low Productivity

INTERRELATIONSHIPS: Nutrition
Sanitation

NUTRITION

Inadequate nutrition has been one of the most significant and lingering problems of the developing nations. The food and nutrition problems of Thailand are not serious, but the future is also not bright. Although gross protein-calorie malnutrition is not commonly seen in Thailand a number of deficiency diseases are observed. The critical nature of many of the infectious diseases is due to the contributing factor of poor nutritional status. Diarrheal diseases and pneumonia take a large toll in deaths, especially in infants. Tuberculosis, often associated with subnormal nutrition, is still a leading cause of death among infectious diseases. An inadequate distribution system has led to a disproportionate number of deficiency diseases in the remote areas of the country, notably in the north and northeast.

In 1970, a survey of the occurrence of nutritional deficiency among patients attending 62 hospitals in 57 provinces yielded 1,194 cases of hospitalized protein calorie malnutrition and 5,846 cases of vitamin deficiency diseases. Out-patient admissions cited by the Health Department included goiter (3,511 cases) and beri-beri (79,130). Additional consultations which reflect on the nutritional status included: eye diseases (87,734), parasitic infections (144,192) skin diseases (142,267) and diarrhea (130,212). The number of cases reported in health centers clearly underestimates the prevalence of these diseases in the general population. It is certainly only the more severe cases of kwashiorkor and beri-beri that reach the health center.

In general the SEADAG study supports the above conclusions and adds additional data: retardation in height and weight for all ages; protein-calorie malnutrition (PCM) is primarily a phenomenon of children in the age range 1-4 and is most frequently associated with infections or diarrhea; in 1964 PCM accounted for 9% of all pediatric admissions in Chiang Mai Hospital; depressed serum albumin is observed on most population survey; infantile beri-beri and other thiamine defiencies accounted for 4% of all pediatric admissions at Chiang-Mai; other survey data show thiamine deficiencies in all age ranges; riboflavin deficiencies and anemia are common. These data are summarized in tables 39 - 42 and illustration VII-IX at the end of this section.

In general, the caloric intake of the average Thai is adequate, however vitamin and protein deficiencies in the diet are common. The nutritional problem is primarily one of quality rather than quantity, and in urban areas is clearly related to the economic basis of the mass of the population. In particular, the average Thai diet is high in carbohydrates (rice) and deficient in protein and vegetables. (A survey from Ubol province estimates that 90% of the caloric intake is provided by rice.) In Thai the diet is described as "the rice" and "the with-rice". The protein intake is generally obtained from cereal and vegetable sources. The use of polished rice contributes directly to the thiamine deficiency and beri-beri, and the eating of raw fish (which contains thiaminase, an enzyme which destroys thiamine)

complicates the problem. Attempts are being made to fortify rice and to develop high-protein strains to deal with these problems.

Another manifestation is anemia. The ICNND survey (1962) found that 70% of preschool children in rural areas have low hemoglobin levels. Although dietary iron intake appears to be adequate, iron must be lost either through malabsorption or more likely by parasites. A survey in the northern region found 90% of children had at least the type of intestinal parasite or malaria, while 60% had two or more types. In adults the rates were 51% for a single parasite type, and 67% for two or more types.

Other vitamin deficiency problems include riboflavin inadequacy which may contribute to the retarded growth of children. Vitamin A deficiency is not a serious problem except seasonally or in occasional areas. Endemic goitre is widespread, especially among the hill people who lack adequate iodine in their diets. An additional problem is the high prevalence of bladder stones (vesical calculi) in children in the North and Northeast regions. This is apparently directly related to undernutrition and to the use of premasticated glutinous rice as a weaning food.

The most susceptible segments of the population to undernutrition are young children and pregnant and lactating women. Women have about 5-6 children, with a mean lactating time for each of two years per child. Therefore, women are lactating or pregnant for about 1/3 of the age period from 15-45 years. During this time of high need, mothers' diets are not supplemented, some may be restricted in certain essential nutrients, although some women may increase their calorie intake. This builds an obvious relationship to family planning programs and their implications for influencing the total health status of the population. At the birth of a child the rice and spices in the diet are increased and other foods such as meat, fish and vegetables are restricted for a period of several weeks to several months. This obviously places the mother and infant in greater jeopardy. When the child is weaned, his problems are multiplied, because he is commonly fed a thin rice and water gruel. This comes at a time when the child most needs a substantial diet and at a time when he is exposed to a wide variety of diseases in his environment.

The causes of undernutrition in Thailand are many. While malnutrition is the result of some diseases (malabsorption, intestinal parasites, tuberculosis and malaria and possibly lactase deficiency) it is also the cause of more malnutrition because it decreases productivity and the ability to work to produce more food. Factors contributing to nutritional problems are incorporated in illustration VII and include: low yields due to agricultural practices, poor soil quality and water shortages; population pressure that requires food resources to go farther than they effectively can; cultural taboos and practices that determine types and quantities of foods eaten and by whom; methods of food preparation that could destroy nutritive values of food; lack of transportation, roads, refrigeration, communication; lack of knowledge of effective food use and technology; diseases of man that divert energy from agriculture and food gathering efforts, diseases of crops; government import and export policy and poverty

that is a barrier to the purchase of foods.

The lack of education among the rural people of Thailand is one reason for the poor nutritional habits. These people live on a diet that consists mainly of rice, and includes little animal protein. Much of the animal protein that is available along with vegetables and fruit is sold. The belief in traditional practices is very strong, and presents a barrier to the introduction of new, more nutritional foodstuffs, e.g. fortified rice. These practices also perpetuate such negative nutritional habits as the eating of raw fish and meat, which introduce parasitic infections into the people of the northeast. The lack of an efficient distribution system also compounds the problems, particularly in the many remote and isolated areas of the country.

As mentioned earlier the growth of the population figures greatly in the future nutrition problems of Thailand. The other half of that important ratio is agricultural production. In one year (1966 to 1967) overall agricultural production in Thailand decreased by 5%, with rice production decreasing by almost 17% and livestock decreasing by almost 2%. Fishery products have been increasing markedly in recent years, but their proportion of total agricultural production is so small that the effects of their increase have been negligible. Since that year agricultural production has been increasing, but at a rate well below the yearly population growth of 3.2%. The decreasing proportion of the work force which is engaged in agricultural employment is not likely to be off-set by mechanization, and the gap between food production growth and population growth is likely to widen.

The Ministry of Public Health in Thailand has been making an effort in the field of nutrition promotion. MOPH has increased its expenditure on nutrition promotion every year from 1967 to 1972, but the percentage of its budget spent in this area has actually decreased over the same period of time and some is consumed by inflation. Activities during one year (1970) included: Nutritional survey, Shark Liver Oil Production and Distribution, Experimental Cookery, Feeding Program, Food Analysis and Research, Nutritional Deficiency Disease Control, and various Nutrition Education programs.

A recent major project of the Division of Nutrition, MOPH, was the Applied Nutrition Project. This project was started in 1961 with the assistance of FAO/WHO/UNICEF and the cooperation of the Thailand Ministries of Agriculture, Education, and Interior. The program started in the northeast, and a second similar program was launched in 1965 in the north. The original objectives of this small scale project included, "base-line and periodic surveys, production of foods in schools and communities, education of the public, and training of personnel of various levels and categories and the evaluation of the program". Although the results showed only a very 'slight change' in the nutritional status of the population affected, the Division became aware of the fact that the other Ministries did not understand the necessity of nutrition, and thus could not participate effectively in a coordinated program designed to confront several aspects of nutritional problems simultaneously. This led to the reorganiza-

tion of their programs and the setting of two major priorities: 1) The problem of protein malnutrition of the younger age group of the low-income, rural population; 2) The development of high-protein food sources which will deal with deficiencies of protein and other essential nutrients.

To meet the second priority, the Protein Food Development Project was started with the cooperation of the Institute of Food Research and Products Development of the Kasetsart University and USAID in 1968. The objectives of this project include both the development and testing of protein rich and/or fortified foods as well as popularizing these products through commercialization and sponsored feedings. Field trials of the first products have already taken place at Child Nutrition Centers and evaluation of their acceptability and effectiveness is currently taking place. Commercialization and further product development is still to come.

Child Nutrition Centers were started in 1968 to meet the first priority of the Nutrition Division. These day-care centers were established as a means to reach pre-school children in the rural areas and accomodate between 50 and 80 village pre-school children between two and five years of age. The protein supplements developed by the Protein Food Development Project are given to the children along with staple food which the parents are asked to contribute when available. The centers do not limit their activities to the feeding program, but include such health related activities as immunization and periodical physical examinations for the children and the improvement of environmental factors which influence the children's health. Oral reading, group plays and games as well as rest and sleep are included among the normal daily activities.

One important aspect of the Child Nutrition Centers is the participation of the mothers which is utilized in the normal functioning of the centers. Mothers take turns attending the centers and assist in the preparation of meals, as well as assisting in the recreational activities. This first hand experience provides the mothers with practical information about the foods and feeding practice, along with a simple nutrition education. Periodic group discussions are substituted where regular participation is not feasible. Information is also made available about home food production which stresses poultry and fish production and produce can be donated to the center. These are analogues of the mothercraft centers used elsewhere in Asia.

The concept of using these day-care centers as a way to reach pre-school children and their mothers is well founded. The success of these centers should be based on their ability to affect charge in the eating habits of pre-school children and the agricultural habits of their families. Their emphasis on participation should make this possible. They are limited because they are also based on the assumption that malnutrition is primarily an educational lack. So far these have been more like trial projects than a coordinated program. At the end of 1971 there were only about 200 such centers in 35 provinces of the country--serving approxi-

mately one child in 500. They will have to be expanded substantially before they will have a significant effect on the nutritional and thus health status of the country.

The National Food and Nutrition Committee (under the chairmanship of MOPH and representing various concerned ministries) was reorganized in 1972 and proposed a National Institute of Food and Nutrition. Although information has not become available on the establishment of this institute, it was to have the following four functions: 1) to collect data on food and nutrition, demographic and economic data, and formulate a master plan for food and nutrition development; 2) to train workers in connection with programs developed in accordance with the master plan; 3) to conduct research into the nutritional problems of the country; 4) to establish coordination and communications on food and nutrition with other countries of Southeast Asia. One would hope that further utilization of the Child Nutrition Centers would play a major role in the accomplishment of these noteworthy endeavors.

Further information about governmental and voluntary activities in Nutrition were obtained from SEADAG and are included in the appendix.

ILLUSTRATION VII

CAUSATIVE FACTORS

International Relations - Import-Export Agreements
Loans, Aid
Technical Assistance
War

Domestic Policy - Fiscal Incentives
Credit Financing
Import-Export Restrictions
Taxes

Agricultural Production Policy

Land - Area Under Cultivation
Quality
Cultivation Techniques

Low Worker Productivity - Disease, Low Caloric Intake

Crops and Crop Strains

Climate

Flora and Fauna

Harvesting Techniques and Losses

Storage Losses

Transportation Facilities

Poor and Erratic Distribution

Low Economic Base - Purchasing Power in Market Place
Sale of Nutritious but Valuable Crops
Raising of Valuable but non-nutritious Crops

Commercial Processing

Storage Losses During Preparation

Religious, Social and Cultural Trends
and Tabus - Food Choices - Raw Fish
Food Withholding

Lack of Nutrition Information

General Level of Education

Intra-Family Distribution Characteristics
Low Quality Weaning Foods

BASIC PROBLEM:

PRIMARY
SECONDARY

UNDER-NUTRITION

Infectious Diseases:
Increased Annual Caloric Requirements
Respiratory TB - Inc. 19%
Malaria Inc. 8%
Dysentery Inc. 6%

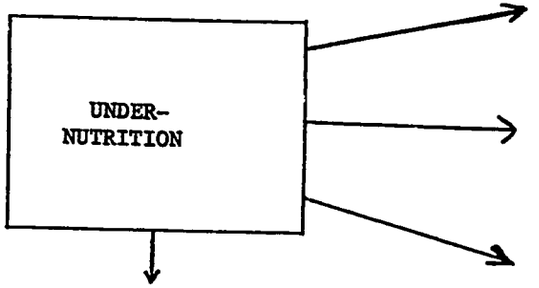
Parsites
e.g. Hookworm

Malabsorption

Metabolic Derangements
e.g., Diabetes, Pregnancy

ILLUSTRATION VIII

BASIC PROBLEM:



1970 - 79,130 Reported Cases

3,541 Deaths (9 mo. period)

ASSOCIATIONS AND MANIFESTATIONS

High Lethality of Childhood Infectious Illness

Protein-Calorie Malnutrition (PCM) + Kwashiorkor

Primarily Ages 1 - 4 years
1964 9% of all pediatric adm. (Chiang Mai)

Depressed Serum Albumin - All Ages

Thiamine Deficiency - 1964 4% of pediatric adm. (Chiang Mai)

Prevalence	Deficiency	
	Chiang Mai	Ubon
Preg ♀	16%	5%
Lact ♀	37%	10%
Infants	9%	3%
Control	16%	12%

Riboflavin Deficiency 15-30% def. by skin lesions
34-51% def. by urine test

Anemia

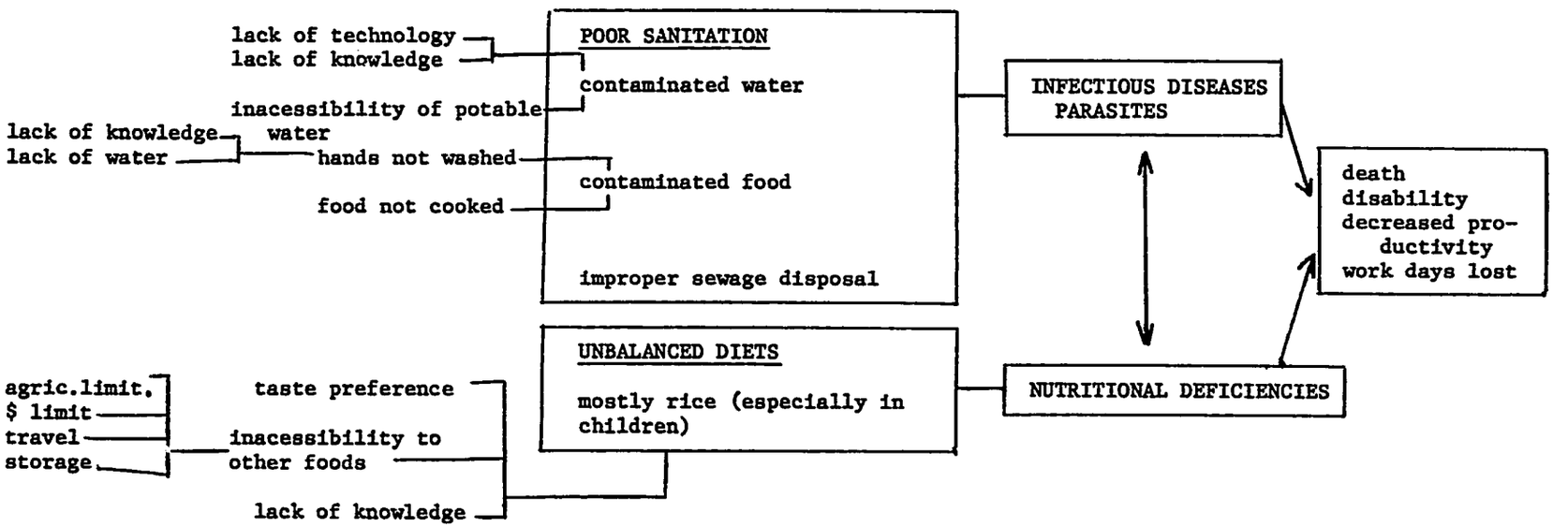
Goiter - 5% Children in Seraph Project had Thyroid Enlargement

Bladder Stones - Highly prevalent in children in NE region

Retarded Growth - Weight ↓5 - 15 Kg Aver
Height ↓10 - 20 Cm Aver } All ages

ILLUSTRATION IX

MULTI-VARIABLE MODEL



HEALTH CARE SERVICES

Organization and Basic Resources

The Ministry of Public Health has the responsibility for the organization and administration of public health services and most of the clinical services of the government. The Ministry is currently organized into four major components as follows: (illustration X)

1. The Office of the Under-Secretary of State coordinates the work of the various departments, and supervises vital statistics, planning, malaria eradication, filariasis control, international health and food and drug control.

2. The Department of Medical and Health Services was organized from two autonomous units. It is responsible for the provision of medical and nursing care in the hospital setting (92 of the 98 hospitals in 1967 under the direction of this Department were located in the provinces). It also supervises the 71 provincial health offices and the health and midwifery centers within the provincial administrations.

3. The Department of Medical Sciences is responsible for promotion of medical research and the running of diagnostic and analytic laboratories.

4. The Department of Health Promotion includes nursing, nutrition, environmental sanitation, health education and medical registration.

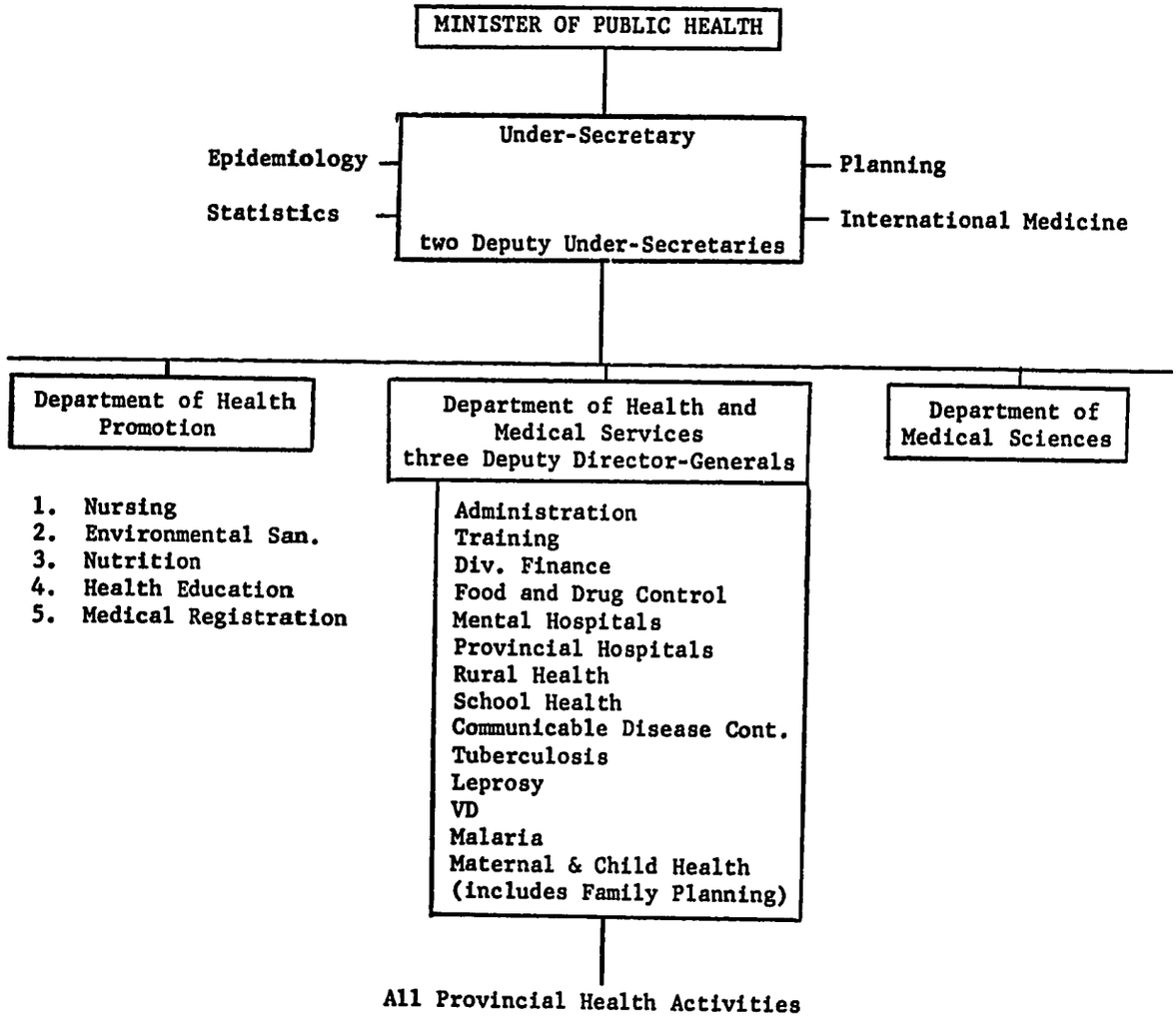
Three percent of Thailand's budget is allocated to the health care system. In 1972, for example, the total health expenditures were $47,819,565. Part of the total expenditure was allocated to central administration, laboratory development, the Department of Medical Sciences, and the Department of Health and Medical Services, which is responsible for health care in rural Thailand. Deducting other expenditures, about $.20 per capita is spent annually on the health of the rural population. This adds up to about $10,000 per district of about 50,000 population for salaries, medications, equipment, transportation and facility maintenance. It is obviously insufficient to support a physician and a team of 36 health workers. Table 9:

Expenditures in the Departments of the Ministry of Public Health are as follows for 1972

Department	Total Expenditures in Baht	
Office of the Undersecretary of State	113,937,110	
Department of Medical Services	420,413,200	
Department of Medical Sciences	12,491,000	
Department of Health	409,549,500	
Ministry of Public Health (total)	956,391,300	($ 47,819,565)

In 1967, hospital services were provided at 171 institutions with a total bed capacity of 28,257 of which 25,836 beds were located in 124 governmental hospitals. (The total bed/

ILLUSTRATION X



population ratio was 0.9/1000). The distribution of hospital by type and the number of beds in 1967 was as follows: Table 10:

	Number	Number of beds
General hospitals	152	20,161
Tuberculosis hospitals	2	450
Infectious disease hospitals	1	150
Maternity	3	210
Psychiatric	8	5,647
Tropical Diseases	1	90
Drug addiction	1	500
Leprosaria	3	1,049

Within this system the Department of Medical Services runs 64 provincial general hospitals staffed by 607 doctors, 1,934 graduate nurses and 1,452 practical nurses,and 8 mental hospitals. In addition in the rural areas, some of the health centers have in-patient accomodation for 10-25 patients. The distribution of provincial hospitals and their manpower resources is as follows: (a map showing the regions is inside the front cover.)

Table 11:

DISTRIBUTION OF PROVINCIAL HOSPITALS AND THEIR MANPOWER RESOURCES

Region	Number of hospitals	Active beds*	Staff			
			Medical	Nursing	Other	Total
All provincial hospitals	84	11,475	543	4,417	4,489	9,449
Region 1	12	1,590	64	621	508	1,193
Region 2	7	1,229	53	483	441	977
Region 3	7	1,531	78	534	735	1,347
Region 4	10	1,430	66	507	512	1,085
Region 5	9	1,293	49	446	407	902
Region 6	10	1,231	75	461	622	1,158
Region 7	11	1,248	66	629	606	1,301
Region 8	8	781	36	285	288	609
Region 9	10	1,142	56	451	370	877

From an organizational standpoint, the Thai Health Care System has been designed to deal as efficiently as possible with a large population and a small number of trained people via a series of regionalized health centers distributed in districts and utilizing teams of health personnel. The Ministry of Health considers the following to be appropriate for each rural district of 50,000 population (600 sq. km.): one primary health center, four secondary health

health centers, eight to ten midwifery centers. A Primary Health Center is staffed by a physician in conjunction with one public health nurse, two graduate nurses, one senior sanitarian, two junior sanitarians, two midwives, three nurses aides, one dental auxiliary, one junior technician and one clerk. At Secondary Health Centers the following are considered appropriate: four each of junior sanitarians, midwives and nurses aides. At eight midwife centers: one midwife per center. Thus for each district there would be one physician and thre others with university education and 32 other health workers with various levels of training. (table 51)

Using reported birth and death data, it would be projected that in a district of 50,000 persons, the health centers would have to manage 1,750 births and 400 deaths. (Considering current death certification rates an additional 400 deaths occur outside the system.) Of the known deaths, 80 would occur in the infant age group (under one year), 60 in the ages 1-4, 40 in the ages 5-14, 110 in the ages 15-49 and 110 in ages 50 years and over. By cause of death, 20 would be identified as diarrhea, 17 as pneumonia, 16 as trauma, 15 as tuberculosis, 12 as malaria, 6 as complications of pregnancy, and the remainder as other causes. This obviously is only a small part of the tasks facing the health team. Basic prevention and therapeutic services must also be provided.

Health Manpower

Since the supply of health manpower is critical to the functioning of this system it is appropriate to evaluate the health manpower situation for the country. In 1969 MOPH identified six major problems in Health Manpower confronting the delivery system as follows:

1. overall shortages of health workers
2. rural/urban imbalances
3. mis-use of professional personnel
4. "braindrain" of professionals
5. over-emphasis on specialization
6. quality of health personnel

Thailand was estimated to have about 5,400 registered physicians in 1971. The four medical schools can produce about 300 physicians per year. Data on recent trends for these and other personnel are given in the following table:

Table 12:

Health Resource Indicators

	1966	1971
Population	32,000,000	38,000,000
Doctors	4,109	5,444
Doctor/population ratio	1/8,000	1/7,000
Nurses	11,885	15,715
Nurse/population ratio	1/2,800	1/2,500
Midwives	1,400	3,310
Midwife/population ratio	1/23,400	1/11,500
Hospital beds	15,400	20,300
Doctor/nurses/beds	1/2.7/12	1/3.2/12

The above table suggests a rather marked improvement in most indicators despite the estimated population growth. However the maldistribution of health personnel between urban and rural areas aggravates the situation considerably as is demonstrated in the following table (1966):

Table 13:

Urban / Rural Distribution of Health Personnel

Health Personnel	Bangkok Area (pop. 2.5 million)	Rest of the Country (pop. 30 million)
Physicians	60%	40%
Dentists	79%	21%
Pharmacists	77%	23%
Nurses	67%	33%
Midwives	57%	43%
Laboratory Technicians	90%	10%
Dental Hygienists	86%	14%

1967 figures showed that in rural areas outside of provincial towns there were 135 MDs stationed at health centers. This computes to a ratio of 1 MD/216,000 rural population. 1972 figures are based on 180 centers making the ratio about 1 MD/180,000 rural population. In provincial towns the coverage is about 1 MD/17,000.

The impact of this maldistribution will be discussed shortly. It is further complicated by an extensive loss of professional personnel. In 1967 Thailand had 646 physicians in training in the U.S. alone (of a total of 654 abroad). During the five year period 1965-1969,

2,165 physicians went abroad while only 987 returned, an impressive net loss of 2,178 (equivalent to the total physician output of seven years) and a loss which Thailand can ill afford economically or health-wise. Comparable statistics for nurses show that 1,806 nurses left while only 443 returned during the same five year period.

Availability of Health Care Services

What is the impact of these three factors on availability of health care for the rural population? Only 45% of the total 556 districts, (each district equals about 50,000) have 1st class Medical Centers. Of these 252 1st class centers only 180 have trained MDs with the knowledge and legal authority to diagnose and treat patients with "modern" medicine. That is, 32% of the total number of districts in the country have MDs and the rest are without this highly trained resource.

The situation is only a little better in terms of 2nd class Health Centers. There are 2,937 second class Health Centers to serve the 5,115 Tambons in Thailand, a coverage rate of 57%. These 2nd class Health Centers, however, have no physician and the para-medical and auxiliary health workers they do employ have little training in medical diagnosis and therapy. The situation is much worse for the Mid-wifery Centers at the village level. In 1973, there were only 1,731 Mid-wifery Centers to serve the 45,640 villages in Thailand. Only 4% of the villages (about 10% of women) have easy access to trained personnel for assistance at childbirth, a situation that undoubtably leads to high neonatal mortality rates. In recent years the numbers of these primary care centers have not increased at a rate substantial enough to make the end of this shortage in-sight. Coverage, then, is inadequate even by Thai standards of appropriateness of coverage.

John Bryant has suggested of this situation:".... it would be wildly optimistic to hope that one MD and a team of 35 can serve 50,000 people especially when it is more likely based on the precept that they will serve closer to 200,000 people" Bryant has calculated that if one new medical school were to be developed every 5 - 10 years, and if every graduate were required to serve the rural population at least one year, then, by 1990, the rural rate would be one MD/50,000, in reality. This kind of development effort would, therefore, take a remedial form for the next twenty years before any dent can be made to decrease the ratios. But, it is doubtful that this could happen without cutting back on other important sectors that require government attention such as education, the economy and other sectors.

Table 14:

Projection of MDs serving at Primary Health Centers in Rural Thailand

Year	nat'l pop.	rural pop.	Prim. H.Ctr.	PHC with MD	rural pop. per MD at PHS	Med. school grads
1965	34 mill.	30 mill.	217	135	220,000	265
1990	64 mill.	40 mill.	600	600	66,000	600

In the above chart if the current growth rate of about 3.3%/ year continues by 1990, the size of the national population will be 74 million. The chart is based on an assumed 10% drop in growth rate each five years after 1970 and assumes the urban population will increase at 7% / year. It also assumes that the MOPH can build and staff over 300 Primary Health Centers with satellites and presupposes 3-4 new medical schools within the next twenty years whose graduates will spend at least one year in service at Primary Health Service Centers. Even then, the MD/population ratio will be 1/66,000.

Even with a four-fold increase in the number of existing rural physicians (i.e. to achieve the 1/50,000) the challenge of creating an effective health care system with so few physicians is difficult.

Administrative Issues

Another major problem of the health sector is service administration. Problems in this part of the health sector spread through the other aspects, aiding or impeding accomplishments of programs, planning and action. Dr. John Kennedy of USOM, enumerated factors impeding the Thai health service as follows: 1) policy, administrative and coordination problems 2) shortage or underutilization of trained health professionals at middle management and supervisory levels 3) misconceptions of the role of the MD in the health delivery team and false professionalism of some MDs and health educators 4) lack of budgetting for supplies for health stations 5) communication and perception gaps between health officials at district level and villages 6) categorical approach to health problems with proliferation of national specialized programs with little focus on village level.

Bryant has offered another important view:

> "Buddhism itself may present problems in the delivery of health services. Most sizable organizations in Western society have an administrative hierarchy with graded responsibility and levels of supervision. There is a flow of policy or instructions from the top down and a feedback of information on field experience from the bottom up. These principles, which are so important to the effectiveness of Western enterprise, may not work in a Buddhist society. In Buddhism the patron-client relationship is at the center of social interaction. There is a sensitive perception of who is the patron(or superior) and who is the client (or inferior). The flow of information is almost exclusively from the patron to the client. The client will seldom challenge or even offer suggestions to the patron. There is reluctance to criticize or confront another person; this disturbs the harmony of interpersonal relationships. Supervision is difficult

because it may involve confrontation and criticism. Thus, essential elements of the organizational mechanism may be weak or missing, but this may be overlooked because on the surface the organization looks the same as its Western model."

One attempted solution to break away from high costs, professional roles and reduce the social distance inherent in the "patron-client" relationship has been the development of auxiliary workers. The obvious impact has been at the village level where the people have been unable to obtain care. The lingering problem has been that many Thai leaders in medicine and medical education have refused to accept the role of the paraprofessional health worker. In seeing their knowledge as privileged, they have not provided adequate training for these auxiliary workers. In reality however, these auxiliary workers give medical treatment without the proper training simply because there are so few doctors in the areas where they work. The problem now is not so much one of insufficient numbers but rather of inadequate abilities. The table below summarizes the types and numbers of health workers through 1973:

Table 15: TYPES AND NUMBERS OF HEALTH WORKERS TRAINED THROUGH 1973

Type of Health Worker	Duration of training	Production per year	Total numbers produced thru 1973
1) District Health Officers	4 months	50	541
2) Junior Sanitarian	1.5 years	500	2,457
3) Auxiliary Mid-Wife	1.5 years	450	4,590
4) Practical Nurse	1 year	130	126
5) Practical Nurse-Mid-Wife	1.5 years	410	Not available
6) Psychiatric Practical Nurse (male)	1.5 years	50	Not available
7) Dental Auxiliary	2 years	20	Not available

The Ministry of Interior, with assistance from MOPH, also trains many types of health auxiliaries to provide more health care at the Tambon and village level. The Ministry of Interior's concern stems from the problem of insurgency, particulary in the northeastern regions of Thailand. It is believed that the best demonstration for the Thai government is to provide better medical care for those in rural areas. Health workers currently trained by the Ministry of Interior include: Tambon doctors, assistant Tambon doctors, rural nurse aides, and village health volunteers.

The chart on the next page presents the two ministry programs and their relationship is presented in illustration XI.

ILLUSTRATION XI

Network and Administrative Relationship
between MOPH and MOI
Thailand, 1973

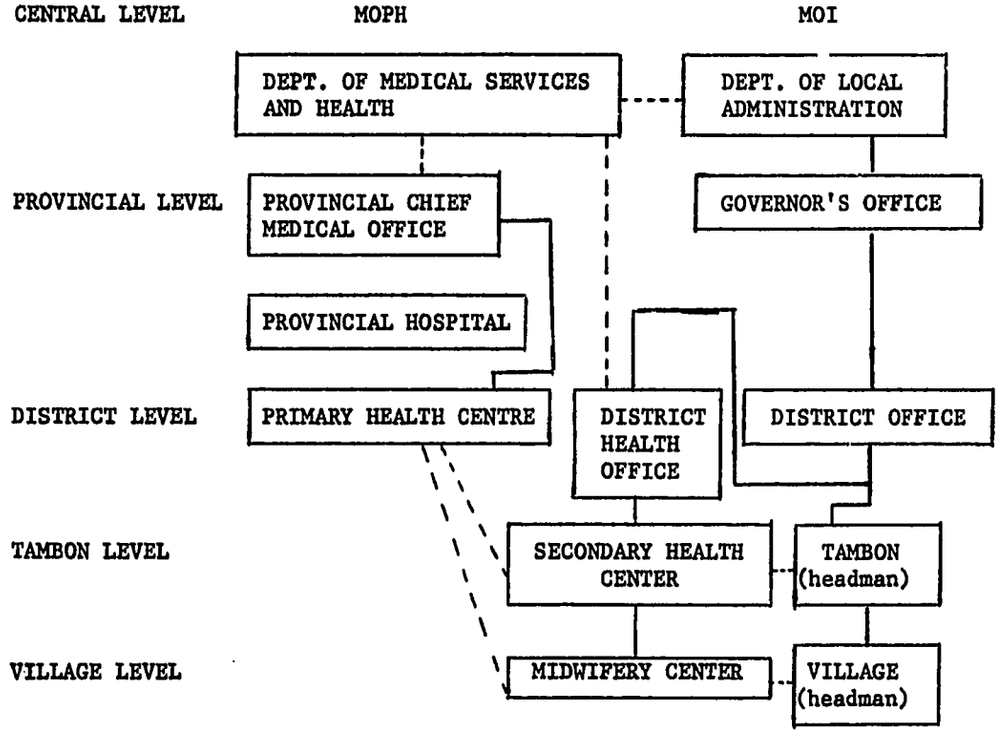


Table 16:

Staffing Patterns

Level	MOPH	MOI
District	District Health Officer Junior Sanitarian Auxiliary Midwife Practical Nurse	
Tambon	Junior Sanitarian Auxiliary Midwife Practical Nurse	Tambon Doctor Assistant Tambon Doctor Rural Nurse Aid
Village	Auxiliary Midwife	Border Patrol Police Village Health Volunteer Rural Nurse Aid

It is difficult at this point to gauge the impact the health workers are having on the health status of the people of Thailand. There is no efficient way of determining whether enough auxiliaries are being produced for the rural areas and what type is most suitable for which level. It is not known whether the auxiliaries from the two ministries provide more services or merely duplicate the services where they are already provided. These questions hawe to be answered before future direction for providing rural health care can be determined.

Manpower Training

MOPH has assisted in the construction and development of medical training facilities within Thailand. There are currently four medical schools in Thailand graduating physicians (M.D.) with six years of training after high school. At the present time approximately 350 doctors graduate each year. There is also a school of dentistry, a school of pharmacy and a school of veterinary medicine. There are also several schools for nurses, practical nurses, mid-wives, and other allied health professions. The problem arises in converting the production of medical personnel into health care for people, particularly in the rural areas.

It has been a standard operating procedure for MOPH to train specific health workers for a project when the need arises. The lack of any comprehensive health plan for the country is both a cause and a result of this procedure. Effective utilization of health care personnel cannot take place until their training is coordinated with the projects on which they work. One division that does coordinate the training of its personnel with the services it provides is the Maternal and Child Health (MCH) Division of the Department of Health.

The Maternal and Child Health Division has the responsibility for providing health services to mothers, newborn infants, and children of pre-school age. These categories represent over 35% of all reported deaths in Thailand. Although MCH's activities include family planning (see section on population) its main objective is to reduce the infant and maternal mortality death rates. From 1940 to 1969 the reported infant mortality rate decreased from 109.8 to 26.2 per 1,000 live-births (the second figure is certainly low due to the under-reporting of maternal and infant deaths plus the large numbers of people outside the system.) Nevertheless, the expansion of MCH services has contributed to a real decrease. MCH activities include the training of MCH personnel and the provision of services through MCH centers.

A priority of MCH has been the training of mid-wives. Currently there are five mid-wifery schools in Thailand, three of which are attached to MCH centers. The objective of the schools is to produce enough skilled mid-wives so that there will be one mid-wife for every 4,000 villagers in the rural areas. The plans are to provide one mid-wifery school in every region of the country. Current production is only 400 mid-wives per year, and the total produced through 1970 was 4,734. These schools provide tuition, board and lodging for free, but the girls, selected from villages across the country, are obliged to serve in a village of their home province. This seems to have been successful at keeping the mid-wives in the rural areas.

A similar selection procedure is used for selecting students for the three year program in nursing and mid-wifery training. This program graduates only 50 students each year, and had trained 610 through 1970. MCH also provides one month refresher courses for mid-wives who have worked for three or four years. Presently 300 mid-wives are trained each year on the progress of MCH to increase the ability to be 'multi-purpose' health worker. A similar, although more advanced, course is offered to nurses. Recognizing it's inability to rapidly meet the great need for trained mid-wives, MCH has also been training traditional 'granny' mid-wives in basic health techniques. At the end of 1967 almost 16,000 granny mid-wives had received training.

MCH is currently planning to establish a Regional MCH Center in every region of the country. There are presently three such Regional MCH Centers. Each center includes a maternity hospital of around 100 beds, and delivers services to those in rural areas including: pre-natal and post-natal care, delivery, infant and child care, family planning services, home care, and so on. Each center also has the obligation to train either mid-wife, nurse, or nurse-aide trainees for work in MCH. For this purpose, each center includes a Mid-wifery Training School with a capacity for 150 trainees annually. Other services provided by MCH personnel include giving immunizations for diptheria and pertussis, vaccinations for typhoid, cholera, smallpox, and BCG vaccination, and health education classes.

Attitudes and Utilization of Health Care Services

With so few physicians and so few resources available for the health problems of the population it is appropriate to ask how the people deal with this. As stated, health services reach only a very small percentage of the total population. This is reflected in the fact that 80% of babies are born without any professional assistance (although a neighbor or traditional practitioner may help). This probably accounts in part for the high infant mortality rate, and certainly for the presence of neonatal tetanus. It is inferred that more than 50% of those dying have no professional care at or near the time of death (58% of deaths of unknown cause and 75% of deaths out of hospital). During 1970 a MOPH survey of 14,000 families in 30 ramdomly selected villages showed that only 17% of the population surveyed used the public health facilities yearly, although on the average the Thai got sick twice yearly and spent about $7.70/person/year on their illnes. This is a remarkable situation considering the number of unattended births, the volume of infant deaths, the volume of preventable and treatable illness in the face of expenditures on the average of 5% of per capita annual income.

Where do people go when they get sick? In urban areas, one half of the population use traditional healers, drug stores, Buddhist monks or treat themselves. In the rural areas, about two thirds of the population use these methods. In Bangkok, about one percent use health centers, two percent use traditional healers, sixteen percent go to public and private hospitals, and an additional third use private clinics. In the rural areas about eight percent of the population use the health centers and public health units and an additional eight percent use provincial and district hospitals when ill. Data from another survey on sources of health care in eight areas of Thailand are presented below:

Table 17:

Sources of Health Care

	Total Number	Percent of Total
Various kinds of Drug Stores	1,035	45
No Treatment at all	545	24
Self-treatment	339	15
Private Clinics of Physician or Dentist	79	3
Government Hospital	75	3
Government Health Center	69	3
Specialized Clinics	55	3
Clinics of other types of Healers	38	2
Neighbors, Relatives, Parents	27	1
Private Hospital	20	1
Traditional Midwives	7	-
Chiropractor	2	-
Total	2,286	100

A survey of medical service utilization according to education showed that the utilization of drugstores, health centers, and quacks decreased with education. This may reflect a direct relationship, or there may be a confounding variable such as age.

A survey of 61,328 persons who used services from provincial hospitals shows 53.5% are satisfied with services, and 24.5% are dissatisfied. Those dissatisfied gave these reasons for their dissatisfaction: Slow services; waste much time (13.8%), Speak rudely; not interested in giving services (9.5%), Illness not treated; drugs no good (1.5%), Long distance, inconvenient to reach (6.8%), several reasons (48%), Other and no answer (19.6%).

A survey of 1,651 persons in rural areas shows 92% are satisfied with health services rendered by the government health personnel at the village level, and only 1.1% are dissatisfied. It is difficult to believe that these results are accurate indicators of the quality of care received; they could indicate a lack of knowledge or the avoidance of conflict attitude on the part of the interviewee, or poor survey methods.

Why, then, do so few people make use of health centers, especially when their health problems are so severe and of such magnitude when, in many areas, the health center is the only source of modern medical aid available? It is in part an issue of the distances to be travelled to the health centers: 81% of people that came into First Class Health Centers came from within 5½ kms. (less than 3.5 miles); 50% of those going to First Class Centers came from within 1¼kms. or less. Similarly, 97% of those going to Secondary Centers were from within 5.5 kms. of it, with 50% within 2 kms. (1.2 miles). Midwife center figures are the same as for Secondary Centers.

Except for mobile units, rarely do personnel go far from the health center into areas needing help: 98% of all home service from First Class Centers was to homes within 5.5 km., with 50% within 1 km. (about ½ mile). In Second Class Centers, 99.5% was to homes within 5.5 km. and 100% of midwife service in homes was to that distance, with 50% being to homes within ½ km. (Table 35)

In this instance it is apparently not transportation because funds have been made available for bicycles and other vehicles.

Another major reason for the low utilization rates for the health services in the face of apparent need is a complex socio-cultural phenomenon. Part of this is the presence of an inhibiting social distance which prevents the patient and the physician from relating in a constructive manner (the patron-client reltionship). Doctors coming into the rural areas, whether by choice or requirement are accustomed to both a cosmopolitan life and the practice of hospital-based medicine utilizing a large, highly trained support staff. They are ill-prepared to deal with the rural peasant, or the rural practice. Further, within the Thai social system it is not appropriate for the subordinate (in this instance the patient) to express concern, mistrust, lack of understanding, disagreement, or complaint. Consequently

the physician or other health professional is likely to have inadequate information both for diagnosis and treatment and the patient is bound in the care he can receive and utilize. This phenomenon in part explains the use of self treatment, friends and traditional healers in which the social distance is far less and the basic value assumptions are highly congruent. It is also likely that the average person has perceived considerable success in his current utilization pattern.

Another impact of the social distance phenomenon is the negative self-fulfilling prophecy. That is, the patient moves in a step-wise pattern overcoming social distance by first consulting with himself, friends, monks, traditional healers, the drug store, pharmacist and finally the health center. Obviously if he improves, he stops his uphill social climb and ascribes the cure to the care he received. If there is no improvement he ultimately reaches the health center. As a consequence the health center deals with the more difficult and chronic problems that are in relatively late stages. Although this is somewhat over-simplified and sterotyped, the health center soon becomes labeled as the place for the very sick and the dying.

A final rationale of the people for not using health facilities is rooted in their cultural tradition. In the traditional setting, medicine has been closely linked with religious belief. Priests, soul doctors and the like are sought. Beliefs of causality of illness probably are responsible in part for under-utilization as well. The remote traditional culture has beliefs of "ill winds" and "spirits" that only those versed in the realms of supernatural manipulation can be expected to deal with adequately. In addition to folk belief, there is the doctrine of Buddhism that warns that present pains as well as pleasures are punishments or rewards for individual's acts (karma).

Nevertheless people do seek help for illness, help from a wide range of practitioners. Future programs would be well advised to be aware of these patterns of health behavior.

The preceeding has not been an attempt to catalogue the health programs of Thailand's Ministry of Public Health. It is merely presented to illustrate the sorts of programs MOPH has employed and the problems they have encountered. In order to achieve its goals in the future MOPH will have to take a more active role in the authoritative allocation of health resources (including personnel) and in planning the coordination of differing activities with similar goals.

Even if health facilities were used more extensively by the population for whom they were designed, it is not clear that the impact will be significant. As described previously, many health problems stem from peripheral problems. For instance, without adequate potable water the effect of infectious diseases like typhoid and parasites (i.e. liver flukes, helminths etc.) will be unaltered. Similarly, while vitamin supplements could be distributed and educational activities in food preparation and the like could be given, this does not touch the problem of protein-calorie malnutrition. Treating a malnourished child for helminthiasis does not effect the fact that he will be rapidly re-infested or likely to develop some other disease such as dysentery that will kill him. The choice of immunization programs or education or medical

treatment or environmental improvement will be problematic as well as the level of intervention. As Bryant puts it, " The decision to try to serve all the people of a population profoundly influences every step of planning and allocating for health care. Since resources are limited and all needs can't be met, it requires care in deciding which needs should be met. And whatever is done for a few must be interpreted in terms of the needs of all." Perhaps this is the critical concept when it comes to the situation in Thailand.

EXTERNAL ASSISTANCE

Thailand is the recipient of a large volume of technical assistance from a wide range of donors. In the calendar year 1972 Thailand received technical assistance totalling about US$ 39 million from the United States, United Nations, the Colombo Plan countries, other countries, as well as a number of overseas foundations and non-governmental organizations and overseas volunteer.

In terms of dollar value of assistance, the United States is still the largest contributor as depicted in the following table:

Table 18:

Technical Assistance to Thailand by Source, 1972

	(Million US Dollars)
US/AID	16.5
United Nations	8.6
Colombo Plan	5.5
Other Countries and Foundations	6.2
Overseas Volunteers	2.2
Total	39.0

Thailand is in a particularly fortunate position of working with a Development Advisory Group established by the donor countries on the belief that given the multiplicity of donors to Thailand coordination to meet priority needs and to avoid duplication of efforts was desirable. This group was formulated in 1962 and meets both at Ambassadorial and Working Levels. During the first half of 1970 the group undertook a study of its role and defined this role as one of coordination of information. Thailand is meant to supply information of the state of the economy, Thai Government economic planning and foreign assistance requirements and the donor members about their current and proposed aid programs. At the working level the UNDP representative has a permanent executive role which facilitates operations and underscores the role of UNDP in Thai development. The Working Level Group exists only for the agriculture sector at the present, although a comparable group in the field of Vocational Training has been proposed.

U.S. Assistance

As of June 30, 1972, after 22 years of assistance to Thailand the U.S. government (through USOM) had obligated $611 million in assistance funds and actually expended $509 million. The sectors receiving the greatest assistance in terms of net obligations totalling $544 million were public administration, economics, finance and social welfare, including aid to the police

at $130 million; industry and technology, including transportation at $150 million; health and sanitation at $49 million; education at $40 million; agriculture and natural resources at $60 million; and non-project assistance at $114 million.

In 1972 USOM assistance to Thailand totalled $16.6 million of which showed a decrease of approximately $6.6 million as compared with 1971. The decrease occurred with the conclusion of a number of projects in 1971 and by lower levels of support for some existing projects. Six new projects were funded in 1972 including: Teacher Training, National Economic Policy Planning, Custom Improvement, Local Government Financing, Commodity and Property Management and Rural Electrification Survey and Planning. Although some concentration of assistance continued in public safety, rural development, health and agriculture 54% of all U.S. assistance was devoted to assisting the Office of Accelerated Rural Development and the Thai National Police Department.

During the period 1950-1972, the U.S. contributed about $61 million for health projects, which was matched by about $74 million by the Royal Thai Government (RTG). The health projects during this period can be placed in five categories as follows: a) disease control; b) environmental health; c) institutional development; d) local health services; e) food and nutrition and population. A listing by group showing the magnitude of contributions and the time span is presented in tables 53 a - e.

In the early 1950's U.S. assistance focussed on control of communicable diseases (notably Malaria) extension of hospital services to the provinces and creation of health training institutions. With the improvement in malaria status, attention was given to village sanitation in the late 1950's and early 1960's. The focus of this activity was on the poorer, politically sensitive areas, especially in the Northeast. Since that time local health services have been broadened to include nutrition and family planning programs.

a) Disease Control Programs

Of the $21.3 million for disease control, most ($20.7 million) has been for malaria control and eradication. Most of the remaining has gone for the control of intestinal parasites and venereal diseases. The accomplishments of the malaria program are remarkable, and have been previously discussed. They are summarized in illustration IV and tables 43 - 46.

Except for malaria control the U.S. has given little support to the direct control of other communicable diseases. Foreign assistance support for these has come from the World Health Organization (WHO) and the United Nations Childrens' Emergency Fund (UNICEF) especially for the control of tuberculosis, yaws, trachoma, venereal diseases and leprosy. WHO has also made a substantial contribution to the Thai malaria eradication program. SEATO has been active in village health and sanitation activities.

b) Environmental Health Programs:

The activities of the Village Health and Sanitation Project and the Potable Water Projects have been discussed elsewhere.

c) Institutional Development:

Early in the 1950's the antecedent agencies of USAID assisted the Bangkok medical schools and health training units under the Medical Education Project. Although this had some tangible benefits, the project had two problems that kept it from fulfilling its maximum potential. These were a) that the Thai counter-parts had practically no part in the planning of the project, and b) that a single U.S. institution could not supply the diversity of personnel required for the program (under the principle of "adoption" of a Thai school by a U.S. medical school).

In 1957 this project was redirected toward the specific objective of aiding the establishment of a new medical and nursing school in Chiang Mai with the specific objectives of creating a modern school for the training of physicians, nurses and technologists suitably prepared to meet the health and medical needs of Thailand's rural areas. Considerable stress was to be placed on the need for a strong orientation in preventive medicine and community health.

Because Thailand has never been colonized, it has not been subjected to the imposition of an external educational or health care system. Nevertheless many of the health professionals had been trained outside of Thailand and had adopted the features of Western medicine.

In the Bangkok schools, and now at Chiang Mai it proved to be difficult if not impossible to break away from the tradition of hospital-based medical practice. For several years, the consulting U.S. university found it difficult to find a long-term technical adviser in preventive medicine, and filled the position with short-term consultants. A second problem emerged in that the Thai faculty had little interest in public health or community medicine. Without Thai leadership in public health on the faculty and with the lack of consultant continuity, the concepts of social medicine and community health did not receive the intended attention.

The Saraphi Project

Direcly related to this effort, was the establishment in 1968 of a field area for teaching and research in community medicine in the Saraphi District of Chiang Mai Province. Because of the importance of this venture some discussion will follow, excerpted in part from a fine analysis of the situation by John Kennedy, M.D. (Office of Public Health, USOM/Thailand).

At the very onset, in 1966, the main purpose of the Saraphi project was to explore ways of integrating malaria activities and malaria workers into the local health services. Saraphi District, near Chiang Mai City was easily accessible, had been the site of early pilot studies on malaria eradication and the area was in the consolidation phase, ready for integration into

the existing health services. Soon the discussions broadened to the improvement of village level health services in a more general way, with the hope that the concepts of community medicine might be applied. There was also concern that despite the contract with the U.S. institution there had been little attempt at Chiang Mai Medical School to do more than establish a small school with the traditional,episodic, acute care, hospital-based model of the consulting institution. The opportunity of developing a community setting for teaching and research, and growing Thai and U.S. domestic pressures for community "relevance" made it necessary at the end of 1969 to re-examine the main objectives of the project and to develop a plan of operations and meet these goals. A joint USOM-Ministry of Public Health review of the project late in 1969 brought out the following issues:

"1. The Malaria Eradication Division had not developed an experimental model for testing true integration of malaria workers into the general health services. The approach was sterotyped and surveillance still depended on frequent house visits with more or less total coverage--a methodology which is expensive and requires the retention of large numbers of special malaria workers.

"2. The Medical Faculty of Chiang Mai University was not widely involved in the community health teaching program. In the main, participation at Saraphi was limited to the Department of Preventive Medicine. The other departments continued their medical education program essentially as in the past, with little understanding or commitment to health services beyond the medical center complex.

"3. The nursing faculty had, because of lack of voice and representation, lost interest and enthusiasm for the community health training program for student nurses. The essential problem, from the nurses' viewpoint, was that the Thai doctors dominate nursing activities both in training and services. This is a general problem in Thailand, but resentment on their part was particularly intense among the nursing faculty at Chiang Mai.

"4. The Planning Committee had failed to evolve a Plan of Action which would propose and study alternative techniques in the search for better ways of providing rural health services.

"5. In his concern for reproducibility, the Project Manager, by restricting medical and nursing students to passive activities and mostly observation, made it difficult to provide productive, interesting and provocative training experience for these students.

"Partly in response to these criticisms but particularly responsive to point #4 above, the Planning Committee (again without the use of the consultants) evolved,early in 1970, the so-called Saraphi Innovative Plan.

"They established maternal and child health services as first priority for operations in 1970. The decision was based on the facts that maternal and child health problems were very common and services generally inadequate.

"Since a good program of maternal and child health would require the coordinated use of various resources, findings from a study of this service would probably also apply to other health services.

"The general objective was defined as: 'to find suitable and efficient methods to promote health and to give health services to the people, especially in the preschool age group and mothers.' A number of specific objectives were further defined.

"In order to compare different techniques, the district was divided into four areas. In each area a different approach to community MCH services would be utilized and studied. The four methods to be studied are:

1. Well Baby Clinics, daily,with selected home visits.
2. Child Nutrition Center where all preschool children would be collected and supervised five days of the week. The concept is to approach other aspects of maternal and child health including nutrition, family planning, and health education of the mothers through child day care centers.
3. Village Health Posts. An approach to village community health through health posts established in a designated house (or possibly a wat) and manned by a volunteer who will be given incentives but no regular pay. Their functions would be:
   a. Give advice and information to the people about health services provided by the government, and to serve as a gathering point for services and referrals
   b. Help with milk feeding programs
   c. Case finding, reporting and follow-up on communicable diseases
   d. Treat minor ailments and sell Government drugs
   e. Birth and death registration

"4. Cluster Home Visits. This is an attempt to modify the concept of home visiting using clusters of houses rather than individual houses. It is based on the assumption that within Thai rural villages there are recognizable clusters within each of which there is close social interchange and communication. The hypothesis is that home visits to only one designated house of a cluster will be essentially as effective as making individual home visits. If true, this would permit home visiting services with a much smaller staff or the extension of services over a wider area with the same staff.

"This Innovative Plan, although it has a number of inadequacies (e.g. lack of defined comparable indices on which to evaluate results), for the first time attempts to study new approaches to community programs.

"The malaria eradication workers have not come forth with any proposal other than classical active case detection by continued home visiting. One could doubt that MEP officials wish to seriously consider this question, since true integration would threaten the autonomous malaria hierarchy.

"The breach between the Medical School (doctors) and the Faculty of the School of Nursing has probably always existed. In a community health program these interactions become more visable since the roles of the various health workers are less rigidly established than in the hospital environment. Eventually the Thais will have to thresh out their interdiscipline relationships. The Saraphi Project, therefore, provides a mechanism eventually for better communication and understanding between members of the health team."

Further information on the impact of these suggestions and progress in the Saraphi Project is not available at this time.

d) Local Health Services

Active work in the expansion of local health services started in 1953. During the five year period 1953-1957, the U.S. spent $1.8 million and the Thai spent $9 million in improving and expanding provincial hospitals. This had a substantial impact. In 1950 there were only 20 provincial hospitals, by 1958 there were 73. Currently there are 84. Accompanying this, considerable emphasis was placed on health education, village sanitation, maternal and child health, public health and hospital administration. Because of the threat of insurgency in the Northeast new attention was directed to this Region. A Mobile Medical Team project was designed to extend the health and medical services to these remote areas. Although ideally

staffed by a doctor, two nurses and several paramedics the program never overcame the difficulty of recruiting physicians to work in these areas.

e) Food and Nutrition

The need for nutrition activities has been recognized for over twenty years, and a great deal of work has been done in the field. In 1960 the ICNND conducted a major nutrition survey in Thailand which has served as the basis for further work. Most of the activity has been through the efforts of UNICEF and FAO, though the U.S. has donated surplus foods, and supported training activities. The RTG has placed high priority on the development of high protein food sources from domestic foods which will be culturally acceptable and meet the needs, especially of infants and weaning children. The Institute of Food Research and Product Development at Kasetsart University in collaboration with the MOPH has developed and field tested a variety of high protein products through the network of Child Nutrition Centers. It is generally agreed that this Protein Food Development Project was a successful undertaking and the Ministry of Education is interested in developing school feeding programs and the NEDB has sought World Bank funding. The population activities supported by the U.S. have been presented elsewhere in this study.

It should be noted that these health activities described represent only a small part of the total U.S. assistance to Thailand. During the period 1967-71, of all foreign assistance to Thailand only 11% went to health activities. During this period, more than half of total USOM assistance went to the Accelerated Rural Development project and to the Thai National Police project. During this same period the total health expenditure was reduced by nearly 5%.

United Nations Assistance:

The UN provided technical assistance to Thailand through its major programs: the UNDP and its Special Funds (Population, Special Industrial Services and Drug Abuse Control), and through the UN agencies--WHO, UNICEF, UNESCO, etc.

Total assistance in 1972 is estimated at $8.6 million of which $5.1 represents the UNDP assistance. The UNDP assisted projects in 1972 concentrated on agriculture, industry and education and manpower planning.

The largest programs were those in health, family planning, education and social development--the activities of WHO and UNICEF. The WHO is involved in a large number of projects including consultation to the professional school, strengthening and integration of health services, special disease control programs, administration and fellowships.

Assistance under the Colombo Plan:

In terms of volume of assistance to Thailand during recent years the leading donors are Australia, the United Kingdom, Japan, New Zealand and Canada. Major activities included education, transportation and communication, agriculture and health. In 1972 Japan provided the largest share of assistance followed by Australia.

Assistance from other Countries:

Assistance from a number of countries outside the Columbo Plan has been provided to Thailand since 1961, by the Federal Republic of Germany, Denmark, the Netherlands, France, Belgium, Israel, Switzerland and Sweden. More recently other countries such as Austria, the Republic of China, Italy, Norway, Finland, the United Arab Republic and Iran also offered assistance.

In 1972, the Federal Republic of Germany was the largest donor among this group with assistance concentrated on technical education, agriculture, power, administration and community and social development.

Further specific information on development assistance by donor or by project is available in the annual Compendium of Technical Assistance to Thailand prepared by the Development Assistance Group for Thailand.

The Mekong Development Project

The Mekong Development Project was started in 1957 under the auspices of the UN Economic Commission for Asia and the Far East (ECAFE) with the stated purpose "to promote, coordinate, supervise and control the planning and investigation of water resources development projects in the Lower Mekong Basin." The member-states include: Khmer Republic, Laos, Thailand and the Republic of Viet-Nam working under a Secretariat of ECAFE and supported by 25 cooperating countries, and a wide variety of UN and other international agencies, foundations and societies. The Mekong Committee's "Indicative Basin Plan Report" published in January 1972 provides the technical framework for the development of the water resources and related resources of the Lower Mekong Basin over the period 1971-2000. One of the immediate purposes of the project is the construction of dams along tributaries and later along the mainstream of the Mekong. These dams would produce reservoirs to store water from the rainy season, from June to November, thereby checking the annual floods. During the rest of the year they will be the water source to irrigate vast areas of now unproductive land, and will allow double or even triple cropping

of rice on land already under cultivation. The dams would also be used for the generation of hydro-electric power, and for control of rapids, to increase the navigability of the river. Tied into this is the potential for inland fisheries development, a vast economic and protein potential. Aside from the sheer magnitude of the engineering task, many villages and settlements will be inundated by the proposed dams. The social dislocation that will occur, and the change of occupation from farming to fishing for many of the population represents a serious challenge to the planners. In addition, drawing on the experience of Egypt with the Aswan Dam, there is concern of the potential spread of schistosomiasis and a resurgence of malaria.

The Mekong Project has also drawn some criticism, centering around five issues:

1. the project will not work because the region is politically unstable;
2. conceptually the scheme, first formulated in the 50's is out of date;
3. the cost of the project, estimated at 12 billion by the year 2000 is out of proportion to the benefits likely to accrue;
4. the Project will have grave ecological consequences;
5. considering the effort and money expended so far, little has been accomplished.

These are serious considerations. Responses to these are drawn from a 1972 Mekong Committee report, outlining progress to that date.

1) Although there has been considerable conflict in the region, with a war situation in three of the countries the basic attitude has been that this has not seriously threatened the project for two reasons: "the first fact is that the four countries have maintained their faith and their activity in the Mekong Project for fifteen years, uninterrupted by political vicissitudes, breaks in diplomatic relations and war." The second consideration, is that only by cooperative efforts is the development of the Mekong a possibility, a fact recognized by all of the involved countries. It is also recognized that the development of the Mekong will be of benefit to all in terms of socio-economic development. "The four countries thus have ample incentive to maintain and strengthen their cooperation in this task."

2) The argument about the nature of the development concepts is that this is primarily based upon engineering principles, the assumption that building dams and providing power will be of benefit to the population. There is some concern that power will benefit the cities rather than the rural population too, that irrigation will be available to wealthy landlords and not the poor farmers. There should also be questions of cultural acceptability of this new technology. In one example from Laos (probably equally applicable to Thailand) two diesel pumps had been provided for agricultural irrigation. For five months one of the pumps lay idle, depriving many farms of much needed water. The man who owned the property on which the pump was placed refused to give permission for it to run. He knew the water was

badly needed by other farmers but said that a phi, or spirit of the land, had been offended by the pump and that every time the pump ran he (the man) became ill. If the pump were to run again he would die. The dilemma was solved by finding a Buddhist monk to placate the spirit with offerings and prayers. The pump was then allowed to run again.

3) The cost of the Project is estimated at $12 billion during the period 1972 to 2000, to control the Mekong River and its tributaries. Although enormous, this is approximately $6 per Basin inhabitant per year. Since 1957 the 25 supporting countries have contributed $100 million, and the four Mekong countries have invested more than $90 million. Additional support has come from the 16 UN agencies and the World Bank and Asian Development Bank. The Committee has asserted that this degree of national and international commitment will make the project successful and that the benefits will exceed any other viable alternative.

4) The ecological implications have received considerable attention. The Committee has dealt with this in part by sponsoring a series of major surveys that can be grouped in five major categories: engineering studies, economic and social studies, agriculture, navigation improvement, and ecology. The ecology studies are meant to deal specifically with issues of water shed management, fisheries research and development, resettlement plans and studies, groundwater quality research etc. The Smithsonian Institution is studying snail transmission of human schistosomiasis in an effort to control this problem. The WHO is carrying out malaria studies. The basic strategy has been to identify the potential problems and develop interventions that will minimize these.

5) This criticism suggests that the project is moving far too slowly. Part of this lies in the sheer magnitude of the task. The Mekong is the twelfth longest river in the world, and by flow rate is the sixth largest in the world. The Lower Basin, covers 606,000 square kilometers. The second important factor in the slow progress has been the lack of reliable data about the river or about the Basin. Consequently a great deal of time, money and effort has been expended in the collection of the basic engineering and socio-economic data necessary to plan and execute the Project. This seems to be a highly valuable expenditure especially considering the ecologic implications.

In Thailand five projects had been completed by 1972, three more were under construction and one was under investigation. These projects provided a total electrical generating capacity in excess of 55,000 kW and irrigation for about 100,000 hectares of land. Those under construction will provide generating capacity of 40,000 kW and additional irrigation potential

of 86,000 hectares. These projects also include flood control and three of the completed projects include fisheries. Two additional projects have had feasibility studies completed. The United States has contributed to a number of these Thai projects. (Three projects have been completed in Laos, one is under construction in Khmer Republic, others are under study in Khmer and Viet-Nam).

Finally the Mekong Committee has sought to plan for the humanitarian issues involved in development of the Mekong Basin. The SEADAG studies and data included in this study were developed in preparation for a series of conferences devoted to the role of nutrition and health in planning for development of the Mekong. The potential benefits to accrue from development of the Mekong are enormous—flood control, increased agricultural production, better nutrition and health, and higher per capita income. So far, much progress has been made, and the countries have demonstrated that they can work together on this project. Some considerable attention has been paid to the multiple effects which will occur from the Project. Since water use and availability lies at the very heart of Thailand's problems, this project has much to offer if carefully planned and executed.

ILLUSTRATION XII

MAP OF MEKONG DEVELOPMENT REGION

SEADAG

PERSPECTIVES ON PLANNING

Change is inevitable whether it is evolutionary or planned, short-term or long-term, initiated in the micro-system or macro-system. Change permeates all of society and affects every individual whether as initiator or recipient.

The purpose of this paper has been to define critical issues that influence both the rate and direction of change in Thailand, and issues centering around the relationship between health and socio-economic development and amenable to mutual action by the Royal Thai Government and the international assistance agencies. This paper has sought to bring together a series of perspectives, to identify areas where action is likely to be of high impact. In this section a series of planning assumptions will be offered and suggestions about potential programs and interventions' that are likely to be of high yield. These should not be interpreted as being a definitive plan of action, nor a specific set of priorities.

The positions of health in an ordered hierarchy of human values cannot be presumed to be a first class priority. Various cultures react differentially to cues from the environment and also structure the environment in different ways. Minimization of suffering is not necessarily a universal priority of existence. Yet it can be said that people do not wish to see their children suffer or die, nor do they wish to be ill themselves or be barred from their role in family or society by disability. In this context, this paper has asserted that cultural factors are the real and primary controllers of what is logically possible in the Thai setting. In order for any technological feasibility to be made reality it must have a high index of cultural acceptability and desireability while also presenting a clear and positive benefit. That then becomes an ethical imperative. Consequently it is useful to study both technical feasibility and constraints in order to assess which actions are likely to be effective.

Technologic feasibilities for problem change:

Technologic feasibilities exist for accomplishing many improvements related to the development and quality of life in Thailand such as: agricultural adaptations (large scale farming projects of high yield crops, new crops such as high lysine maize, development of new high protein rice strains, agricultural cooperatives, irrigation projects), sanitation activities (development of potable water sources, privy installation, school sanitation activities, education), immumization programs (BCG, DPT etc.) development of alternative manpower categories for health and other functions, development of transportation, communication and power facilities etc. Changes in any or all of these areas are technically possible. However, economic, political and social constraints prevent the execution of all aspects of 20th century technology in the Thai setting and probably make it undesirable.

The following example attempts to demonstrate the requirements for an effective project which act as constraints to technologic feasibility.

ILLUSTRATION XIII

WATER AND PRIVY CONSTRUCTION

Project Resources	Planned Benefits	Socio-Cultural, Economic etc. Change Requirements	Secondary Effects and Benefits
Money Manpower Equipment Strategy Organizational support	Potable water supplies Privies Possible self-financing Decrease disease	Knowledge about value of clean water Change of behavior - wash hands bathing, protect water source Willingness to pay for supply Knowledge about how to maintain system Sense of Community responsibility for water Need supplies and equipment, tools etc. Willingness to use and maintain privies Time, money, ability to do so	Decrease in disease and deaths Improved nutritional status "cleaner" environment If irrigation too--increase agricultural output, possible increase in parasites and mosquitoes Increase expectations and demand for services, health, school etc. Community Development
Other Necessary resources Adaptable Physical Environment Water etc. Transportation and communication			

Constraints:

Potential interventions are subject to a number of constraints, many of which are not under the control of a single agency or sector. For the purposes of this discussion since they are not readily controlled, (although they may be influenced) they are considered to be in the environment of action agencies. These environmental constraints can be identified as cultural, physical,economic, organizational and technological in nature.

Cultural

1. The influence of the Buddhist culture and religion which permenates all aspects of the Thai life will facilitate some and inhibit other possibilities.
2. Basic population characteristics and attitudes such as age of marriage, number of children (hence age distribution and dependency ratios) influence program implementation and the rate of change.
3. Traditional modes of life and thought influence the basic problems and potential form of programs. They also influence as well the utilization of services.

Physical Environment

1. The geography and climate limit the agricultural possibilities, i.e. most of Thailand's farm land is suitable for rice cultivation, but some other crops e.g. mungbeans or soybeans, maize etc. are also grown.
2. The nature of the climate has had a direct negative impact on the eradication of malaria in the hill country.
3. The distribution of natural resources, e.g. water supplies; some areas do not have abundant water supplies, consequently the potential for agricultural development and potable water sources is more limited.
4. The distance, and indirectly time, impose constraints on what is possible in terms of access to services. Similarly the lack of roads and transportation facilities influence the production and marketing of crops etc.

Economic

1. The allocation of monies in various sectors determines the extent of government services. The MOPH budget determines the extent of governmental health services that can be generated. Allocative decisions can only maximize this limited resource. One question that must be considered is whether the distribution of monies by sector really represents social priorities.
2. International assistance influences the nature of programs, and health projects and presumably the quality of life of the population.
3. The GNP and the per capita income set boundaries on the total monies available to the society and to the individual. At the individual level cultural and educational factors influence how this money is spent. (Some would rather buy a radio, than health care or better food).

Organizational

1. The overlapping responsibilities of the MOPH and MOI in certain rural areas may be changeable or may be a constraint.
2. The MOPH organization of health services, i.e. the network of provincial hospitals, health and midwifery centers and decisions made about location and staffing of new centers.
3. The number and distribution of resources (manpower, money, facilities and equipment, organizational relationship, etc.) available to the health sector.
4. The size, distribution and level of village or community organization.

Technological-intellectual

1. The technological resources and the education level both in quality and quantity limit program alternatives.
2. The number of trained professionals and the orientation of their training, i.e. hospital-based medicine or community-based medicine are determined by the educational institutions and by governmental and social policy.
3. The potential value disjunction between western educated Thai officials and scholars and the value orientations of the general population.

The above listing was meant to be purely illustrative of the kinds of constraints acting on agencies that might influence the design, implementation and effectiveness of programs. In this listing, no evaluative judgements were meant to be implied. The listing is also not exhaustive. For example, political constraints were not defined, in part because there is no way to assess them at this point in time or outside of the Thai setting.

Planning Perspectives:

In order to develop a series of recommendations for problem intervention it is useful to think of at least three planning perspectives as follows:

1) sectoral planning
2) inter-sectoral planning
3) policy planning

1) Sectoral Planning

Sectoral planning deals with identification of problems under the direct control of the administrative agency, and with the development of strategies which will optimize the allocations of resources within the sector. In the case of the health sector, sectoral planning would deal with identifying the need for health care, consumption of health services, supplies of health resources (manpower, facilities, monies, organizations etc.) and develop a strategy for distributing these resources to provide the greatest benefit (however that is

defined). From this perspective we might ask the questions, what are the best types of manpower (in terms of costs or productivity, or quality etc.) to provide rural health care, or family planning? We might ask what is the most effective strategy for control of a specific disease. How can the maldistribution of health manpower be altered? How can the rising costs of health care be controlled, or how can the health care system improve its financial base? The answers to these questions may be given explicity in a health plan, or implicitly in the allocative decisions of an agency. For example the MOPH decided that greater effectiveness and efficiency could be derived from the family planning program without significant risk by allowing auxiliaries to distribute oral contraceptives subject to certain guidelines. This was clearly a sectoral planning decision. If such decisions become coordinated and permeate the management structure of the MOPH, it could be said that a planning activity exists and is being implemented.

2) Inter-sectoral Planning

The limitation of the sectoral planning perspective is that not all of the causes of a problem nor all of the resources for problem resolution lie within a single sector. From the perspective of the health sector the origin of much of the demand for health care lies outside of the control of the health care system, so that it is constantly forced to respond to demand it cannot control or even influence. Similarly, historically much of the progress in health status at the community level has come about through actions taken outside of the health sector. Consequently the inter-sectoral planning approach seeks to identify the relationship between health and socio-economic conditions, between the health sector and other sectors of the society as it impacts on health. In this way it is possible to determine what effects specific programs or policies in a particular sector will have on other sectors. The goal of planning by this perspective is to maximize the potential beneficial impact of cooperation among sectors. For example the nutritional status of the population (a concern of the health sector, since it influences health and illness, hence demand for care), is directly influenced by crops grown for consumption (the agricultural sector), the patterns of trade and marketing (economic), transportation, knowledge (education) and beliefs (culture) etc. Consequently an inter-sectoral plan would look at these relationships and provide a series of coordinated approaches.

Although it may be obvious that the whole society and hence its problems and strengths are tied in an interlocking web, it is commonly not fully utilized in the planning process. The health planner would assert that health of a population can be improved by non-health actions, and that other sectors can benefit from health actions.

Two studies on the contribution of health to development in Thailand are illustrative. *

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*Griffith, et al"Contribution of Health to Development", International Journal of Health Services: Volume 1, Number 3, 1971.
Kühner,A. "The Impact of Public Health Programs on Economic Development", International Journal of Health Services: Volume 1, Number 3, 1971.

Kühner in 1971 sought to describe the economic impact of the malaria eradication program (NMEP) in Thailand in reducing losses in working time and GDP. Through the construction of a model, the losses to the GDP from malaria disability and illness are computed over 12 years. The downward trend in losses is attributed to the benefits of the NMEP. A separate series of calculation is offered to illustrate the losses that would have been expected in the absence of the NMEP. Using the minimum estimates, for 1952 the total GDP lost through malaria morbidity and mortality among agricultural workers was estimated at 30.3 million baht. For 1966 the same estimate is 5.9 million baht. The projected "standardized" losses for the same time in the absence of the NMEP would have been 30.3 million baht (1952) and 49 million baht (1966). The minimum culmulative losses without the NMEP would have been 583.3 million baht. (It should be remembered this deals only with part of the total population--the agricultural working force). Although the estimates may not be precise, it should be clear that the benefits from a malaria program extend far beyond the reduction in suffering and death, to include economic and agricultural benefits.

The other paper by Griffith et al presents a study of costs and benefits of malaria prophylaxis in a small mining (wolfram) operation in Northwestern Thailand. The benefit is estimated as difference between the output with and without malaria prophylaxis, and the direct cost/benefit ratio for the study period is calculated as 1:65. In this instance the increase in benefit was not due to an increase in per capita output, but was due to a total increase and stabilization of the labor force

These two examples have suggested that simple investments in health activities can have economic and other benefits to the society. It should also be suggested that non-health investments can markedly improve the health status of the population. In another study (Syncrisis III) it was demonstrated that in one setting the determining factor in undernutrition was governmental agricultural policy, fiscal incentive systems, and international trade in foods. In this instance, the establishment of an appropriate food, nutrition and agriculture policy could have increased both the economic output and the nutritional output of the agriculture sector. The adoption of such a policy (with a definition of performance criteria) would have improved the economic situation of the country and also have had a marked impact on the nutritional, hence the health status of the population. Such a policy would optimize the interrelationships between the sectors. For Thailand the potential benefits of the Mekong Project in terms of flood control, fishery development, hydro-electric power, and water resources both for agricultural irrigation and potable water supplies is impressive. Through coordinated planning these positive outcomes can be enhanced, while some of the potential risks in terms of parasite increase and social and environmental disruption can be minimized. Therefore to achieve the positive potential of these effects and minimize the negative effects, first recognition of these relationships and planning across sectors and disciplines becomes essential.

3) Policy Planning

Social policy has three distinctive attributes. Social policy incorporates some statement about a future direction for change, an implicit statement of current values and a belief about what is possible or feasible. As such, social policy statements can be used as analytic or evaluative criteria for assessing the current state of being, or as decision criteria for action and the allocation of resources. Policy statements have been incorporated and used in this context in the Socio-Economic Development Plans for Thailand or in much narrower context of the policy on limiting population growth. The policy planning perspective asserts that the allocation of governmental resources can influence the actual delivery of goods or services at the community or individual level. In the context that policy planning deals with future desirables it is basically innovative. We have suggested that the governmental tax level on rice exports directly effects not only the price of rice in Thailand but also many other goods. It also effects then the state of nutrition of the population, at least at the lower economic levels. It also has impacts on other nations in South-East Asia. Other policies such as development of rural or provincial communities, equity of access to certain basic services (education, health etc.), Thai self-sufficiency in technical assistance in health, or self-sufficiency in certain industries all fit within this framework. Consequently through the development and implementation of appropriate policies it is possible to influence the rate and direction of socio-economic development in Thailand.

Working from these three planning perspectives, sectoral, inter-sectoral and policy planning, a list of recommendations for Thailand has been developed. This list does not include all that could or should be done, but identifies those that appear to be practical and of high benefit, given the assumptions that follow. At the conclusion of this section a set of illustrations for three problem areas shows the relationship between contributing factors at various levels of social organization (individual, primary social group, national, international) and potential types of intervention for each problem at each level of organization. The assertion is made that intervention must occur at least at the two, possibly the three lowest levels for effective action to take place.

Thai Progress

Before listing suggestions for planning in Thailand it is important to recognize the remarkable strides made by Thailand both in terms of health and socio-economic development during the last two decades. Modern medicine and public health programs have been instituted, mass control of communicable disease has greatly altered the patterns of death and illness. The Thai Ministry of Public Health has sought to extend these benefits to the rural population and has conducted significant surveys into the needs, attitudes, beliefs and practices of these populations in order to identify the best mechanisms of providing appropriate health care. The Government has moved to control the high population growth rate and has moved away

from traditional approaches to achieve this. Similarly in terms of socio-economic development, the country has also made progress, developing a stable and growing economy built on a strong economic base. It has increased the educational opportunities of its population and thereby the literacy rate, has undertaken, in cooperation with her neighboring countries a major project in the development of the Mekong basin. Although all of the problems have not been solved for Thailand, the government clearly has taken an active role in dealing with them and as a result the country is in a very favorable position. This attitude has a direct positive implication for intervention and planning strategies.

Recommendations for Thailand

The suggestions for planning attention which follow will utilize the fore-going perspectives and constraints. The planning premises include the assertion that since the problems are multi-causal the potential interventions and solutions are also multiple, that there is no single intervention which is "the" solution. In fact it is highly likely that simultaneous multiple interventions will be far more effective because of synergisitic relationships among these actions. Consequently if any real effect is to occur, a "critical mass" of action must also occur, the inputs must be large enough and coordinated for the desired effects to occur. Another planning premise (and it seems a reasonable one) is that the Thai government and the foreign assistance agencies are really devoted to improving the quality of life of the Thai people. It is suggested that this be done within cultural acceptability (i.e. minimize cultural disruption) and should reflect the unique needs and characteristics of each Region. As planning assumptions the social value of moving toward equity of access to services and moving toward Thai self-sufficiency are incorporated in the following recommendations.

Summary of Basic Problems

The basic problems relevant to health identified in this study can be summarized as follows: maldistribution and shortage of manpower, facilities and resources for health, a cultural factor that influences the way people think about health and interact with the health sector and a variety of preventable and treatable illnesses and nutritional problems. All of this is complicated by rapid population growth, low economic base, poor transportation and communication and inadequate sanitary facilities. There are some significant problems inherent in the highly centralized administrative system of the MOPH and the disjunction between the professional roles and possibly westernized values of the producers of health care services and the needs and wishes of the general population. These problems have been summarized in a somewhat different way by the Thailand Group at the Quaker International

Symposium on "Rural Health Care" in 1973 as follows:

I. Population Explosion

II. Disease
   a. communicable and infectious
   b. diseases of pregnancy, childbirth and puerperium
   c. accidents, poisonings, violence
   d. malnutrition diseases (protein-calorie and vitamin deficiencies)

III. Health Service Administration Problems
   a. no clearcut national health policy or national health plan
   b. low government health budgets (3% of total yearly budget)
   c. out-of-date public health laws
   d. poor statistical health data
   e. inadequate health services, especially to rural areas
   f. inadequate production and maldistribution of health personnel
   g. poor coordination between producers (universities) and users (Ministry of Public Health) of health personnel
   h. poor coordination between public and private sectors.

From the above discussions it seems that two major weak links can be identified as conceptual areas. One of these is the responsibility of the health sector: the design and implementation of an effective and acceptable health delivery system that is affordable on Thai standards and will meet the needs of the Thai population. The second of these is an intersectoral problem: that of water delivery and use permeating all phases of rural and urban life.

Recommendations appropriate for action within the health sector

Assuming that the MOPH will not receive a substantial increase in the share of the GNP the only options open are to optimize the allocation of the limited resources to high impact problems, and to apply pressure to other sectors to fulfill their responsibilities that bear on health. This means that the MOPH will need first a stronger data base than is currently available. Such a data base can be developed within a health care system and should include only those data which are critical to decision-making, either at policy levels or program levels. This probably means more of a change in the orientation of data collection rather than absolute volume of data. Secondly it means the development of a much larger emphasis on the planning and evaluation functions within the MOPH such that there will be a coordinated Health Plan for Thailand which incorporates identification of the magnitude of demand for health care attributed to inadequacy of nutrition, sanitation and the like. Based upon this it is possible to apply rational demands on other sectors for problem-solving assistance. The planning function ought to explore and document the benefits, both social and economic accruing from a

variety of health programs (e.g. the NMEP).

Within this general framework, some specific issues arise:

1) Should or will the MOPH and the RTG strive to influence the orientation and curriculum of the medical schools and other institutions training health care professionals? Similarly will they influence the nature of future projects similar to the one at Saraphi?

Currently, lack of coordination between the producers (the Universities) and the users (the MOPH and the population) is at the basis of many of the administrative and delivery problems. University programs could be re-oriented to produce physicians interested in and capable of dealing with the people on a community level, rather than on a one-to-one basis. The present system, in which the physician (and other professionals too) wait at the health center for patients to come does not make for efficient or effective use of these scarce resources. Although it is unrealistic to think of the physician as meeting all the needs of the community, he certainly can act as leader and educator in organizing a community-oriented program of preventive and curative health services.

2) Is the MOPH willing to continue to promote the use of auxiliaries, and paraprofessionals? Is the MOPH willing to incorporate and strengthen to a far greater extent the positive potentials of the traditional practitioner?

Some of the benefits of this approach by the MOPH are already clear in the utilization of auxiliaries in the NFPP and the training of granny midwives. Expanding the role of the health centers and the midwifery centers to include more of the district's population could have a great impact. Modification will have to be made in the basic approach to make the health program more acceptable to the general population, and to increase utilization to an effective level. The auxiliaries can play a greater part in the community-based program, since the one physician has the responsibility for all the communities in the district. Certainly auxiliaries and other paramedical personnel can be trained to deliver basic medical care in the absence of a physician--care which is of high quality, high benefit, low risk and low cost. One of the main benefits and functions of this approach would be in establishing a working relationship between the health service and the people of the community. There personnel could also take an active role in health education and outreach services to many people of the district who now have no access to such services.

3) Can the MOPH develop and implement a model or total health care system that meets cultural acceptability and health needs, yet is consonant with the resources and the state of technologic development of Thailand?

Some suggestions toward this end are offered above. Another proposal has been made under a joint project supported by the MOPH and USAID (the so-called DEIDS Project, meaning Development and Evaluation of an Integrated Delivery System). This project is meant to meet the criterion of Thai self-sufficiency, to incorporate a wide range of indigenous workers and

paraprofessionals and be integrated into the basic design of the health care system. Conceptually this is a very strong approach, for it is an analogue of the basic health behavior of the population and should remove the "social distance" barriers to effective care. The question remains whether or not it is practically implementable, whether the responsible agencies and finally the professionals carry sufficient determination and commitment to the concept to carry it out, remembering the difficulties that occurred early in the Saraphi Project.

4) Will the MOPH be able to develop a basic health service of sufficient scope and depth that it can safely integrate the categorical disease programs into this service? Specifically what is the appropriate strategy and timing such that parts of the NMEP can be incorporated into the health network and maintain adequate surveillance and treatment potential with the benefits of reduced cost?

5) Is the MOPH prepared to deal with the potential development of the Mekong Region both in terms of preventing the negative health outcomes through social dislocation, occupation change and water management and also provide health services to the new population settlements that are being planned? Clearly this has planning implications for the MOPH.

Recommendations appropriate to inter-sectoral planning:

It is asserted that the MOPH cannot effectively participate in inter-sectoral planning activities without an articulated health plan. From this base however, a number of potentials arise for inter-sectoral planning. These would include the following:

1) Support of projects and programs for the development of water resources. The weakest link in the health chain appears to be water. Individual behavior changes such as washing hands before eating or medical care may contribute to the lessening of disease, but the problem is so allencompassing that action should be taken, not at the individual level, but at a more macro-level. Water is related to intestinal parasitism, typhoid, cholera, dysentery, gastro-enteric disease, etc. Water is related to agriculture, or rather lack of it in non-rainy seasons, has confined large numbers of people to valley areas that have permanent water supplies. This compounds the communicability of certain diseases and heightens possibilities of parasitism, increases pressure on land and limits agricultural productivity. The monsoon climate with a long rainy season has helped create and perpetuate the traditional form of wet-rice farming. Dam projects have been suggested and to some extent, implemented, thereby creating a cultural dislocation problem while providing also tangible economic benefits. Projects of creating a safe drinking water supply and delivering it to remote villages would create the possibility of labor-intensive projects. Labor-intensive projects would help employ people and raise the per capita income. A raised per capita income could mean that a family

could afford to spend more of its income on health and nutrition, housing, education etc., though this is not necessarily true. Labor-intensive projects designed around water supply delivery might also have the social manifestation of community development. This could mean that village members would be working together and coordinating their efforts. This in turn could lead to a new found sense of community that could open up the individual to group interests.

2) The support of agricultural and nutritional efforts for the introduction of new crops--new strains of rice, maize etc. the promotion of duck egg raising and the introduction of fish farming in protected ponds.

3) The development of school health education programs dealing both with food production, and sanitation of the environment as well as school feeding programs.

4) Support of health activities of the monks with improvements in educational levels of the monks and the facilities of the monasteries and the wat (temple).

5) Integration of MOPH and MOI rural health programs.

6) Coordination of health center development with transporation plans.

Recommendations appropriate to social policy planning:

1) Support the development of national and regional socio-economic development planning including health planning.

2) Support the development of rural areas and provincial capitals, to decrease urban immigration--perhaps through administrative decentralization and regional planning and implementation of projects.

3) Support the development of research into and implementation of an agricultural and nutrition policy that meets performance criteria based upon economic and nutritional factors.

4) Seek to stem the "brain-drain" of highly trained resources, not only health professionals. The annual outflow of health professionals currently exceeds the yearly production.

5) Promote the concept of rural service for skilled resources, integrated with the concept of relevancy of curriculum for Thailand's needs and resources.

6) Promote the development and utilization of alternative types of manpower for health and other functions.

7) Continue the intersectoral/inter-country planning aspects of the Mekong development Project so as to maximize the economic benefits and minimize the social costs of disruption, occupation change etc.

8) Maintain the current policy of reduced population growth seeking educational, economic and social incentives to support this policy.

Following are three illustrations dealing with the problem areas: rural health services, population growth and nutritional insufficiency. For each of the four levels of social organization--individual, primary social group, national, international, some of the relevant factors have been identified. Corresponding to these levels of social organization and the factors, types of intervention have been identified for each of the problem areas. The central thesis is that each of these problems is multi-causal and multi-dimensional. Consequently effective intervention on the problem is possible through a multi-dimensional intervention. The purpose of the planning system is to design and coordinate such a multi-dimensional intervention, so that it need not become a thing of chance.

ILLUSTRATION XIV HEALTH SERVICES

INTERNATIONAL	NATIONAL	PRIMARY SOCIAL GROUP	INDIVIDUAL
Relative priority of health vs. other activities Political relationships "Brain-drain" Technical assistance and support Support of UN agencies International trade policy	Production of health personnel Percent of GNP on health services Percentage of personnel in public vs. private sector Percentage of health personnel leaving country vs. returning Level and quality of training relevance to needs and technology Urban/rural distribution Administrative efficiency and reponsiveness to needs Duplication of services Transportation Level of health planning Strategy for optimal allocation of resources according to needs Social value priorities about health Development of health services Development of alternative delivery systems and personnel Recognition of non-health sector factors Inadequate and inappropriate data base	Local customs Use of traditional sources of health care Willingness of health care personnel to move where needed Level of health education Prevalence of illness Level of community organization and responsibility	Level of individual health Attitudes and beliefs about health and causation Level of health education Knowledge and willingness to use health services Accessability to services including cost, transportation Perceived social barriers Social, economic cultural ability to use medical care and follow directions Utilization of alternative sources of care Personal priorities of health Personal action to produce illness or health--food , self-medication, washing, sanitation etc.

TYPES OF INTERVENTION

INTERNATIONAL ASSISTANCE	GOVERNMENTAL POLICY	RELIGION, SOCIALIZATION COMMUNITY ACTION	INDIVIDUAL ACTION
Increase international humanitarian concern and allocations Attitude changes Control of exchange and drain of professionals Technical assistance Develop methodologies for analysis of problems Study of sectoral and intersectoral allocation methodologies	Increase allocation to social and economic development Develop high impact strategies by planning and evaluation Increase proportion in public sectors Increase low cost high production manpower Change professional restrictions on roles of para-professionals Control over out-migration of manpower Utilize indigenous and traditional practioners by upgrading activities Decrease urban migration by rural and provincial development	Implement public sector services at village levels-health and educational Develop community water and sanitation services Use indigenous workers-train Work with monks for education and programs Develop multi-action community programs- e.g. Family planning, community nutrition, education, school gardens, community sanitation etc.	Bring individual to health care facility Bring service to individual-immunization , malaria, mobile sanitation Education about service Reduce social barriers, use traditional or indigenous worker Study individual needs and expectations Remove economic barrier

ILLUSTRATION XV

PROBLEM: UNDER NUTRITION

INTERNATIONAL	NATIONAL	PRIMARY SOCIAL GROUP LOCALITY	INDIVIDUAL
Conflicting interests Uncoordinated action Inadequate support Inappropriate assumptions for the culture and level of technology	Agricultural production Agricultural financing and incentives Transportation and distribution of foods Marketing Development International trade Size of population and rate of population growth Educational level of population Level of Technology	Dependency ratio - number of individuals in family Diseases: parasites and infectious Cultural use of food and distribution within community Economic base - purchasing power for food Community attitudes - caring responsibilities	Education - how to buy and prepare food Well baby care and weaning foods Ability to raise food and diversify Distribution within family: Nutritional Insufficiency: Quality Quantity Disease Food Intake

TYPES OF INTERVENTION

INTERNATIONAL ASSISTANCE	GOVERNMENTAL POLICY	RELIGION, SOCIALIZATION COMMUNITY ACTION	INDIVIDUAL ACTION, EDUCATION
Coordination of development assistance Identification and support of high impact areas Cooperation with Thai planning authorities Development of a strategy for Thai self-sufficiency Support for training Reduction in "brain-	Agricultural policy Agricultural diversification Agricultural technology Population control National support for transportation National policy on curriculum Design and literacy International trade policy	Community cooperatives for agricultural processing, storage and financing Community nutrition programs School lunch programs, Community sanitation programs	Basic health services Educational activity Food raising Hand Washing Individual attitudes-responsibility, caring

ILLUSTRATION XVI

POPULATION

INTERNATIONAL	NATIONAL	PRIMARY SOCIAL GROUP LOCALITY	INDIVIDUAL
Political and social prssure for population control Conflicting interests Level of support Mechanism of support	Support of Family Planning Total economic support of MOPH Governmental attitudes Coverage of population by basic services Rate of economic growth Manpower resources and rate of production of manpower--all types rural/urban distributions and implications educational level	Family need of children for field labor Social Security for old age Socio-cultural attitudes about large family Social incentives Educational level	Desire to have children Desire not to have children 1) knowledge, access to contraception 2) attitudes toward health professional Individual experience with disease, death etc. Economic base Alternatives

TYPES OF INTERVENTION

INTERNATIONAL ASSISTANCE	GOVERNMENTAL POLICY	RELIGION, SOCIALIZATION COMMUNITY ACTION	INDIVIDUAL ACTION
International support of Family Planning Programs Technology Technical assistance Recognition of value of basic cultural differences	Family planning policy Support of family planning incentives for restricting family size Social security systems Economic development Integration into basic health services Decrease infant mortality	Resocialization of community norms regarding age of marriage, number of children Education at community level Community integration Level of technology Development of community health services with family planning	Nature of family relations Contraception Health care Utilization

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APPENDIX

This section summarizes the public and private, academic, national and international organizations which are engaged in or planning human nutrition and health-related activities in Thailand. The data were collected form November 1972 to January 1973, so it is evident that changes in priorities, plans or resources may modify the description to some extent. This section is drawn directly from a SEADAG paper "Nutrition and Some Related Diseases of Public Health Importance in the Lower Mekong Basin: A Review" prepared by R.A. Grossman, Chamlong Harinasuta and B.A. Underwood.

THAILAND

A. Government Agencies

1. Division of Nutrition, Department of Public Health Promotion, Ministry of Public Health (Bangkok). Personnel: In Bangkok -- five physicians, six pharmacists, ten nutritionists, four scientist-technicians, two sanitarians, and three public health nurses; at provincial headquarters -- eleven nutritionists, one sanitarian, and one public health nurse. Its projects and programs are these: a) Applied Nutrition Project (with WHO and UNICEF), started in 1961 with a pilot project in Ubon Province; it presently operates day care centers in most Northeast and some northern provinces for preschool children (ages 2-6), where nutrition education is given to mother and child; intensive protein supplementation (1.5 g/kg. body weight/day) is provided with lunch meals at centers in Ubon and Roi Et Provinces, and partial supplementation is provided in the other provinces; sanitarians and midwives at the local first and second class health centers operate the day care centers. b) Protein-Food Promotion Project: Using local materials, protein-rich foods have been produced (since 1968) for child nutrition centers (in cooperation with Kasetsart University). c) Salt Iodation Project: 10,357 tons of iodated salt were produced in 1970 at the pilot plant. For several years in the Northeast local merchants have been encouraged to iodate their salt voluntarily. d) Pilot Nutritional Anemia Project: a recent survey was performed in Khon Kaen Province (1972), in cooperation with Nagoya University, Japan. Data are presently being analyzed.

2. Food and Beverage Section, Department of Medical Sciences, Ministry of Public Health (Bangkok). Work is conducted on water and food analyses for licensing and quality control purposes.

3. National Institute for Food and Nutrition, located temporarily at the Faculty of Medicine, Ramathibodi Hospital, Bangkok. The Institute is presently being organized with participants from Ramathibodi Faculty of Medicine, Kasetsart University, the Ministry of Education, and the Nutrition Division, Ministry of Public Health. A national food and nutrition policy is being planned.

B. Academic Agencies

1. Faculty of Medicine, Ramathibodi Hospital, Bangkok. This is a nutrition and metabolism research group. Personnel: 11 M.D.s and Ph.D.s; 17 nutritionists, pharmacists, chemists, and medical technicians. Cooperating agencies: Rockefeller Foundation, NIH (U.S.). Its projects include: studies of bladder stone disease in Thailand, incorporating large scale field work in Ubon Province (as outlined in the section on nutritional disorders); clinical and biochemical evaluation of nutritional status in infants and preschool children in the Northeast; studies of the urinary hydroxyproline index, serum vitamin A levels, beri-beri, phosphate supplementation, and biochemical variables affecting protein nutritional status and anthropometry in preschool children; studies on food, water, and breast milk composition; and a study on nutritional anemia in Thailand. Food analyses are performed in the in-house Nutrition and Food Sciences Research Laboratory.

2. Chiang Mai University Medical Center, Chiang Mai.

a. Anemia and Malnutrition Research Center (established in 1967). Cooperating agencies: St. Louis University, Rockefeller Foundation, NIH (U.S.). Personnel: large staff of physicians, scientists, nurses, technicians, and social workers. The Center is primarily concerned with hospital and laboratory research on the etiology of nutritional anemia in children and adults, PCM in children, and the interaction between malnutrition and infection. Some applied public health nutrition studies are being performed, such as follow-ups of discharged patients, high-protein baby food supplementation at a village infant care center, and a field study on vitamin A supplementation. The center also provides training for interested investigators and health workers.

b. Saraphi Project, Saraphi District, Chiang Mai. This is the "community laboratory" for the Faculties of Medicine and Social Sciences. Cooperating agencies: University of Illinois and the Ministry of Public Health. The project was established in 1968 to perform comprehensive health and socio-economic studies, stimulate student interest and awareness, provide instruction for, and promote health services integration in the Saraphi District (population 60,000).

To date, nutrition-related surveys have included height and weight determinations, goiter and angular stomatitis prevalences, and water analysis.

3. Faculty of Public Health, Mahidol University, Bangkok.

a. Department of Nutrition. Personnel: Four M.D.s, fourteen scientist-technicians. The Department's work focuses upon the training of public health personnel in nutrition.

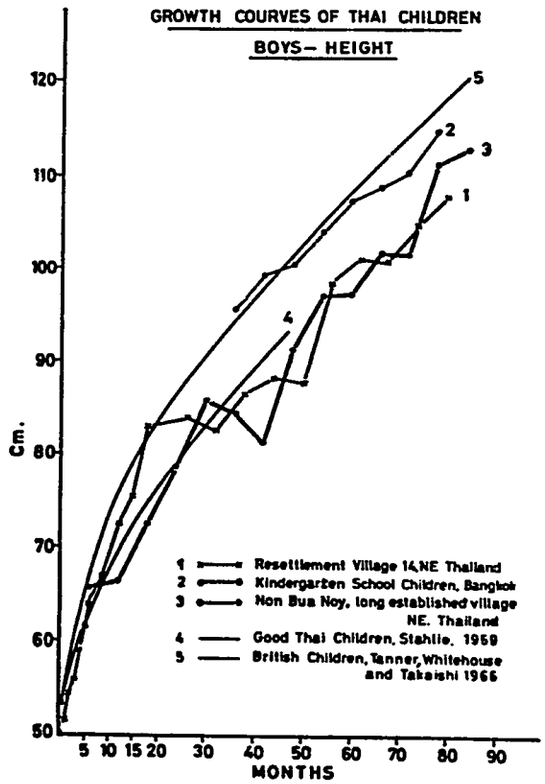
b. Soong Ngern Project, Soong Ngern District, Korat. The Faculty's "community laboratory" at Soong Ngern District (population 45,000), near Korat City was established in 1969. Its aims in public health study and training are similar to those of the Saraphi Project. Some results of work to date have been summarized in earlier sections of this report (T1 in Table 2). It is planned to study further various aspects of community life related to nutrition.

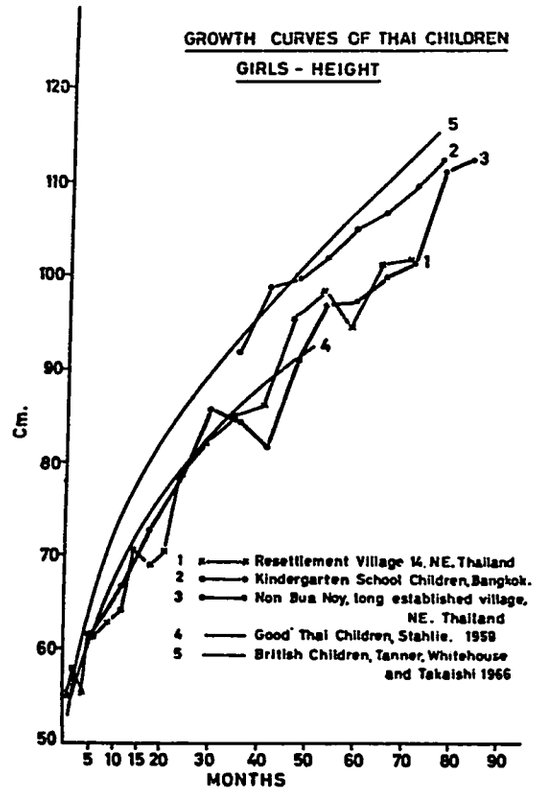
4. Faculty of Tropical Medicine, Departments of Tropical Nutrition and Tropical Medicine, Mahidol University, Bangkok. Personnel: Six M.D.s and Ph.D.s, seventeen scientist-technicians and research assistants. The work program includes laboratory research and instruction on nutrition and public health problems; field projects include growth studies of preschool children in Northeast Thailand, as well as research on the hydroxyproline index, vitamin A, thiamine, riboflavin, and food composition and diet in Northeast Thai study areas. The major field study area is in the vicinity of Ubolratana Dam, Khon Kaen Province; results have been mentioned in several places in this report (T2 in Table 2).

5. Faculty of Science, Department of Biochemistry, Mahidol University, Bangkok. Personnel: Five Ph.D.s, eight scientist-technicians and research assistants. Primary work includes laboratory studies on vitamins A and E and on thiaminase activity. A study of vitamin E in children with PCM is in progress.

6. Institute of Food Research and Product Development, Kasetsart University, Bangkok. Personnel: Seven scientist-technicians. Cooperating agency: Division of Nutrition, Ministry of Public Health. Objectives of the Institute are to produce and improve vegetable protein as a food source. Some derived foods and supplements are tested at Child Nutrition Centers.

ILLUSTRATION XII





Migasena, P et al
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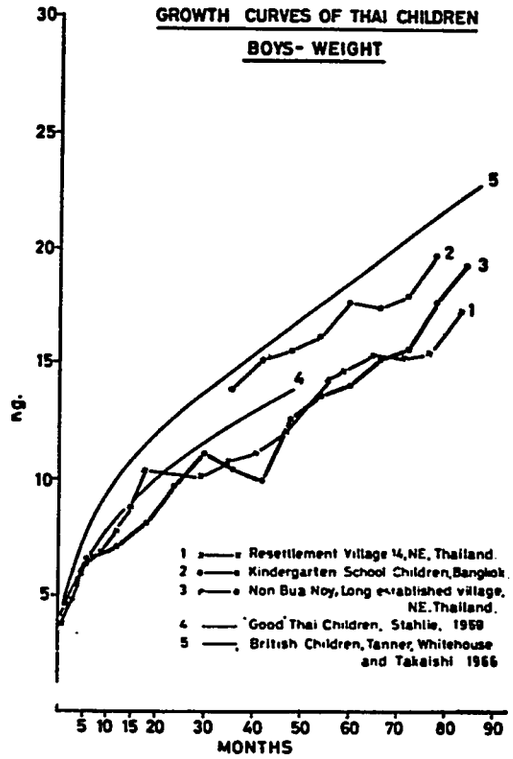
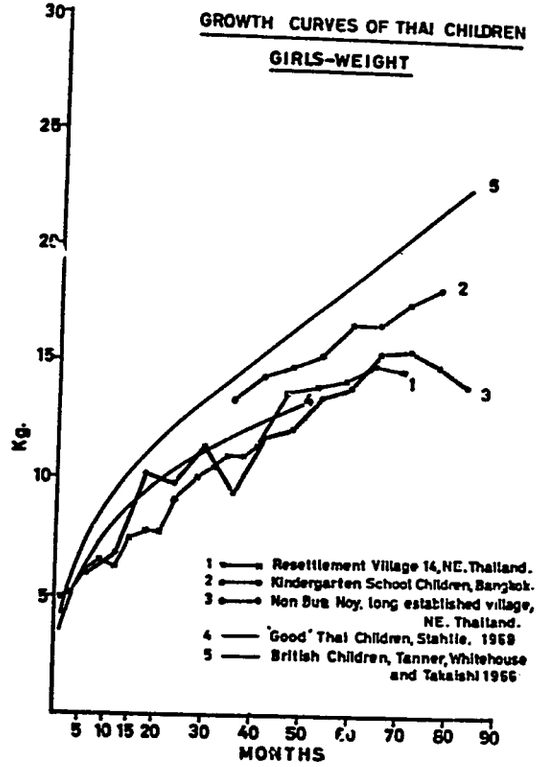
ILLUSTRATION XIII





Migasena, P; SEAMEO-TROPMED

Table 19: Birth and Death Rates, Thailand

Vital Statistic	Range of the 16 Thai province rates (1970)	Average of the 16 Thai province rates (1970)	Soong Ngern, Korat, 1971 Pop.=15,713
Crude birth rate	28.2 - 41.5	34.9	23.8
Crude death rate	4.9 - 10.5	6.9	5.4
Infant death rate	13.3 - 48.9	24.7	63.2
Maternal death rate	1.9 - 5.2	3.2	5.5

Even where births and deaths are more accurately recorded in relatively small prospective surveys, these vital statistics will usually be difficult to interpret because of small population bases.

Table 20: Thailand The percentages of the Labor Force in each class.

75.6%	agriculture, forestry, fisheries
1.7%	professional, technical, related workers
.6%	administrative, executive, management
1.6%	clerical
7.9%	sales
.3%	miners, quarrymen, related workers
1.8%	transport and communication
7.8%	craftsmen, production process, laborer
2.7%	services, sports and recreation

Table 21: Distribution of Municipalities in Thailand by Size (1973).

Size	Relative Frequency
100,000	1
75,000 - 99,999	2
50,000 - 74,999	4
40,000 - 49,999	7
30,000 - 39,999	9
20,000 - 29,999	18
10,000 - 19,999	45
5,000 - 9,999	29
2,500 - 4,999	4

Table 22:

Household Income Distribution by Income Class and Residence, 1969

Income Class (baht)	Rural	Urban
Under 3,000	26.4%	1.0%
3,000 - 5,999	26.7%	4.1%
6,000 - 11,999	27.3%	19.0%
12,000 - 17,999	10.4%	21.1%
Over 18,000	9.2%	54.8%

Source: Household Expenditure Survey 1968-1969
National Statistical Office, Bangkok

Table 23: THAILAND GROSS NATIONAL PRODUCT
at 1962 Prices
(million baht)

	1967	1968	1969
Agriculture	28,423.0	31,090.9	34,234.2
Crops	19,459.8	21,834.0	23,901.7
Livestock	4,109.6	3,734.0	3,830.0
Fisheries	2,481.9	2,775.8	3,587.6
Forestry	2,371.7	2,747.1	2,914.9
Mining and Quarrying	1,698.1	1,779.5	1,911.5
Manufacturing	13,903.1	16,680.3	18,456.2
Construction	5,512.9	7,265.5	7,599.2
Electricity and Water Supply	966.5	1,189.1	1,427.9
Transport and Communication	7,025.3	6,863.2	7,637.8
Wholesale and Retail Trade	18,677.6	17,249.2	18,819.1
Banking, Insurance and Real Estate	3,691.6	3,565.3	4,124.0
Ownership of Dwellings	3,492.1	2,091.4	2,187.3
Public Administration and Defence	4,420.7	4,362.9	4,764.5
Services	8,234.2	10,441.1	11,215.8
GROSS DOMESTIC PRODUCT (G.D.P.)	96,075.7	102,578.4	112,377.5
Net factor from income abroad	193.3	140.6	43.6
GROSS NATIONAL PRODUCT (G.N.P.)	96,269.0	102,719.0	112,421.1

Source: National Development Board

Table 24: FINANCE

BUDGET, (1970 Fiscal Year)
(million baht)

REVENUE		EXPENDITURE	
Taxes and Duties	19,660.1	Economic Services	7,898.6
Customs	6,142.0	Agriculture	3,190.9
Income Tax	2,450.0	Power and Fuel	483.9
Other	11,068.0	Industry	163.0
Sales of Goods and Services	431.3	Transport, Communications	3,802.7
State Enterprises	669.5	Other	258.1
Other Sources	1,039.1	Education Services	5,149.9
		Defence	5,413.8
		Debt Service	2,586.8
		Public Health and Social Services	2,307.9
		Public Health	918.0
		Social Welfare	773.2
		Miscellaneous Social Services	616.7
		Justice, Police and Corrective Services	2,862.5
		General Administrative Services	1,194.1
		Miscellaneous Expenditure	1,231.4
TOTAL	21,800.0	TOTAL	28,645.0

Source: Department of Comptroller-General

20.80 baht = U.S. $1.00

Table 25: THAILAND: DEVELOPMENT PLANS
(million baht)

REVENUE	First Plan (1961-66)	Second Plan (1967-71)
Domestic Sources	22,019	41,440
Foreign Assitance	10,638	14,435
TOTAL	32,657	55,875
EXPENDITURE		
Agriculture and Co-operatives	4,622	11,300
Industry and Mining	2,584	885
Power	4,329	3,540
Communications, Transport	10,229	17,080
Community Development and Public Utilities	5,468	10,250
Public Health	1,363	2,570
Education	2,491	6,520
Commerce	---	180
Reserve	1,560	3,550
TOTAL	32,646	55,875

Table 26: EXTERNAL TRADE
(million baht)

	1963	1964	1965	1966	1967	1968	1969
Imports	12,803	14,253	16,185	25,347	22,188	24,103	26,891
Exports (including re-exports)	9,676	12,339	12,941	14,310	14,166	13,679	14,722

Table 27: TRADING PARTNERS
(million baht)

	IMPORTS FROM				EXPORTS TO			
	1966	1967	1968	1969	1966	1967	1968	1969
German Federal Republic	1,458.0	1,946	2,013	2,345	585.7	573	622	510
United Kingdom	1,539.0	1,610	1,668	2,034	520.9	403	436	406
Hong Kong	379.4	428	415	411	932.4	1,084	925	1,156
Indonesia	577.0	195	178	195	462.9	562	183	273
Japan	6,743.5	8,046	8,146	3,192	2,940.5	3,000	2,875	9,515
Malaysia	233.4	193	204	248	819.9	999	1,194	963
Netherlands	487.0	470	456	583	373.9	708	966	1,030
Singapore	301.0	271	n.a.	294	1,020.6	962	n.a.	1,180
United States	9,136.1	3,648	4,507	4,847	971.2	2,024	1,788	2,168

Table 28: PRINCIPAL COMMODITIES IMPORTED
(million baht)

	1966	1967	1968
Dairy Products	552	558	564
Tobacco	273	291	450
Clothing and Footwear	1863	2063	1802
Medicine and Pharmaceutical Products	466	548	563
Household Goods	521	649	708
Paper and Paperboard	498	540	579
Chemicals	1075	1351	1404
Iron and Steel	994	1231	1353
Fertilizers and Pesticides	361	524	660
Construction Materials	471	577	485
Machinery	3277	4558	5188
Motor Vehicles and Parts	1839	2362	2697
Fuels and Lubricants	1873	1588	1994

Table 29: PRINCIPAL COMMODITIES EXPORTED
(million baht)

	1966	1967	1968	1969
Rice	4001	4653	3776	2945
Rubber	1861	1574	1796	2664
Tin Ore and Metal	1315	1822	1547	1658
Kenaf and Jute	1614	866	675	781
Maize	1520	1355	1575	1674
Timber	299	194	218	166
Tapioca Products	644	725	761	n.a.

Table 30: **Number of Livebirths by Age of Mother and Percentages : 1965–1969**

Age of Mother–Year	2508 (1965)		2509 (1966)		2510 (1967)		2511 (1968)		2512 (1969)	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Total	1,117,698	100.0	1,085,594	100.0	1,116,424	100.0	1,200,131	100.0	1,133,526	100.0
Under 15	620	—	753	0.1	899	0.1	480	—	574	0.1
15–19	74,694	6.7	80,485	7.4	83,934	7.5	91,858	7.7	91,214	8.1
20–24	265,482	23.8	260,053	23.9	268,539	24.1	295,524	24.6	285,713	25.2
25–29	289,760	25.9	274,279	25.2	277,377	24.8	288,379	24.0	267,990	23.6
30–34	227,407	20.3	215,850	19.9	222,601	19.9	234,962	19.6	215,613	19.0
35–39	157,083	14.2	150,559	13.9	154,945	13.9	168,483	14.0	155,308	13.7
40–44	62,856	5.6	61,461	5.7	63,344	5.7	68,440	5.7	64,549	5.7
45–49	13,000	1.2	13,501	1.2	14,437	1.3	14,004	1.2	13,817	1.2
50 and over	2,790	0.2	2,973	0.3	2,788	0.2	2,506	0.2	2,480	0.2
Unknown	24,006	2.1	25,680	2.4	27,560	2.5	35,495	3.0	36,268	3.2

Table 31: **Number of Deaths from Leading Causes and Rates (per 100,000 Population) : 1965–1969**

Causes of Death /1	2508 (1965)		2509 (1966)		2510 (1967)		2511 (1968)		2512 (1969)	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Total	216,830	727.8	236,243	775.2	230,622	740.2	232,116	729.0	243,444	737.2
Certain diseases of early infancy & Ill-defined diseases of under 1 year	11,671	39.2	12,161	39.9	11,324	36.3	11,294	35.5	10,042	30.4
Gastro-enteritis & Colitis	8,007	26.9	11,299	37.1	8,587	27.6	8,622	27.1	8,182	24.8
Tuberculosis of Respiratory system	7,668	25.7	8,058	26.4	8,827	28.3	8,569	26.9	7,839	23.7
Pneumonia	6,880	23.1	6,234	20.5	6,117	19.6	5,458	17.1	5,351	16.2
Malaria	4,522	15.2	4,490	14.7	4,015	12.9	3,309	10.4	3,450	10.4
Diseases of Heart	4,960	16.6	5,599	18.4	5,152	16.5	4,378	13.8	5,138	15.6
Accidents, Poisonings and Violence	7,012	23.5	7,734	25.4	8,148	26.2	8,107	25.5	8,583	26.0
Disease of Pregnancy, Child-birth and the Puerperium	3,483	11.7	3,237	10.6	3,150	10.1	3,200	10.0	2,927	8.9
Typhoid & Paratyphoid	714	2.4	1,284	4.2	786	2.5	643	2.0	538	1.6
Dysentery	1,711	5.7	5,094	16.7	1,651	5.3	1,511	4.7	987	3.0
Beri-beri	665	2.2	925	3.0	1,085	3.5	440	1.4	530	1.6
Diseases of the Stomach & Duodenum	1,208	4.1	1,290	4.2	1,601	5.1	2,045	6.4	2,168	6.6
Others	158,329	531.4	168,838	554.0	170,179	546.2	174,540	548.2	187,709	568.4

Remark: /1 According to 7th Revision

Table 32: Leading causes of death and rates (per 100,000 pop.), 1969

Certain diseases of early infancy and ill-defined diseases of under 1 year	30.4
Typhoid and Paratyphoid	1.6
Gastroenteritis, Colitis	24.8
Dysentery	3.0
Tuberculosis of Respiratory System	23.7
Pneumonia	16.2
Beri-Beri	1.6
Malaria	10.4
Diseases of the Stomach and Duodenum	6.6
Diseases of the Heart	15.6
Others	568.4
Accidents, Poisonings and Violence	26.0
Diseases of Pregnancy, Childbirth and Puer perium	8.9

Table 33 a: PROVINCIAL HOSPITAL PATIENTS BOTH SEXES - ALL AGES

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASE FATALITY RATE %
	TOTAL PATIENTS	337,617	13,777			4.1
1	FRACTURES & INJURIES	35,836	1,556	10.6	11.3	4.3
2	DIARRHOEAL DISEASES	32,591	973	9.7	7.1	3.0
3	RESPIRATORY DISEASES	29,133	1,218	8.6	8.8	4.2
4	DELIVERY UNCOMPLICATED	28,904	39	8.6	0.3	0.1
5	COMPLICATIONS OF PREGNANCY CHILDBIRTH & PUERPERIUM	20,545	33	6.1	0.2	0.2
6	MALARIA	16,298	742	4.8	5.4	4.6
7	ABORTION	10,620	49	3.2	0.4	0.5
8	PEPTIC ULCER GASTRITIS DUODENITIS	8,895	332	2.6	2.4	3.7
9	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	8,813	298	2.6	2.2	3.4
10	DISEASES OF FEMALE GENITALIA	7,319	32	2.2	0.2	0.4
	FIRST TEN CONDITIONS	198,954	5,272	58.9	38.3	2.6
11	EFFECTS OF POISONS	7,224	350	2.1	2.5	4.8
12	PSYCHONEUROSIS & PSYCHOSIS	6,940	38	2.1	0.3	0.5
13	T.B. RESPIRATORY SYSTEM	6,040	549	1.8	4.0	9.1
14	PYREXIA OF UNKNOWN ORIGIN	5,975	310	1.8	2.3	5.2
15	URINARY CALCULUS	5,688	87	1.7	0.6	1.5
16	SKIN DISEASES	5,326	57	1.6	0.4	1.1
17	INFLUENZA	4,885	8	1.4	0.1	0.2
18	MALIGNANT NEOPLASMS	3,499	496	1.0	3.6	14.2
19	ALLERGIC DISORDERS	3,197	78	0.9	0.6	2.4
20	BENIGN & OTHER NEOPLASMS	2,906	46	0.9	0.3	1.6
	FIRST TWENTY CONDITIONS	250,634	7,291	74.2	52.9	2.9

Table 33 b: DISEASE IN INFANCY 1 - 11 MONTHS PROVINCIAL HOSPITALS

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASE FATALITY RATE %
	TOTAL IN AGE GROUP	14,138	1,136			8.0
1	DIARRHOEAL DISEASES	5,074	293	35.9	25.8	5.8
2	RESPIRATORY DISEASES	5,067	359	35.8	31.6	7.1
3	PYREXIA OF UNKNOWN ORIGIN	557	53	3.9	4.7	9.5
4	MENINGITIS & ENCEPHALITIS	293	81	2.1	7.1	27.6
5	SKIN DISEASES	281	1	2.0	0.1	0.4
6	THAI HAEMORRHAGIC FEVER	278	21	2.0	1.8	7.6
7	DIPHTHERIA	212	25	1.5	2.2	11.8
8	AVITAMINOSIS & DEFICIENCY DISEASES	189	34	1.3	3.0	18.0
9	MALARIA	178	18	1.3	1.6	10.1
10	CONGENITAL MALFORMATIONS	156	24	1.1	2.1	15.4
	FIRST TEN CONDITIONS	12,285	909	86.9	80.0	7.4
11	FRACTURES & INJURIES	134	8	0.9	0.7	6.0
12	EFFECTS OF POISONS	118	31	0.8	2.7	26.3
13	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	84	24	0.6	2.1	28.6
14	INFLUENZA	80	1	0.6	0.1	1.2
15	URINARY CALCULUS	79	-	0.6	-	-
16	MEASLES	79	1	0.6	0.1	1.3
17	BENIGN NEOPLASMS	68	2	0.5	0.2	2.9
18	WHOOPING COUGH	61	1	0.4	0.1	1.6
19	ANAEMIA	46	8	0.3	0.7	1.7
20	EYE DISEASES	38	1	0.3	0.1	2.6
	FIRST TWENTY CONDITIONS	13,072	986	92.5	86.8	7.5

Table 33 c: DISEASE IN EARLY CHILDHOOD 1 - 4 YEARS PROVINCIAL HOSPITALS

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASE FATALITY RATE %
	TOTAL IN AGE GROUP	31,375	2,087			6.7
1	RESPIRATORY DISEASES	10,011	436	31.9	20.9	4.4
2	DIARRHOEAL DISEASES	6,123	300	19.5	14.4	4.9
3	URINARY CALCULUS	1,603	16	5.1	0.8	1.0
4	PYREXIA OF UNKNOWN ORIGIN	1,458	100	4.6	4.8	6.9
5	DIPHTHERIA	1,433	162	4.6	7.8	11.3
6	FRACTURES & INJURIES	1,292	63	4.1	3.0	4.9
7	MALARIA	1,089	119	3.5	5.7	10.9
8	THAI HAEMORRHAGIC FEVER	999	100	3.2	4.8	10.0
9	MENINGITIS & ENCEPHALITIS	658	282	2.1	13.5	42.9
10	SKIN DISEASES	600	8	1.9	0.4	1.3
	FIRST TEN CONDITIONS	25,266	1,586	80.5	76.0	6.3
11	EFFECTS OF POISONS	545	56	1.7	2.7	10.3
12	BURNS	417	48	1.3	2.3	11.5
13	AVITAMINOSIS & DEFICIENCY DISEASES	361	67	1.2	3.2	18.6
14	NEPHRITIS & KIDNEY INFECTIONS	324	20	1.0	1.0	6.2
15	MEASLES	285	4	0.9	0.2	1.4
16	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	249	21	0.8	1.0	8.4
17	INFLUENZA	241	1	0.8	-	0.4
18	ASCARIASIS	217	6	0.7	0.3	2.8
19	ANAEMIA	170	24	0.5	1.2	14.1
20	TYPHOID & PARATYPHOID	163	14	0.5	0.7	8.6
	FIRST TWENTY CONDITIONS	28,238	1,847	90.0	88.5	6.5

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Table 34 a: BANGKOK HOSPITAL PATIENTS BOTH SEXES - ALL AGES

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASES FATALITY RATE %
	TOTAL PATIENTS	116,160	4,695			4.0
1	DELIVERY UNCOMPLICATED	34,078	2	29.3	-	-
2	COMPLICATIONS OF PREGNANCY CHILDBIRTH & PUERPERIUM	17,370	19	15.0	0.4	0.1
3	RESPIRATORY DISEASES	4,835	268	4.2	5.7	5.5
4	ABORTION	4,822	14	4.2	0.3	0.3
5	FRACTURES & INJURIES	4,783	252	4.1	5.4	5.3
6	MALIGNANT NEOPLASMS	4,013	725	3.5	15.4	18.1
7	DIARRHOEAL DISEASES	3,624	340	3.1	7.2	9.4
8	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	3,022	66	2.6	1.4	2.2
9	DISEASES OF FEMALE GENITALIA	2,821	8	2.4	0.2	0.3
10	EYE DISEASES	2,640	2	2.3	-	0.1
	FIRST TEN CONDITIONS	82,008	1,696	70.6	36.1	2.1
11	PSYCHONEUROSIS & PSYCHOSIS	1,971	14	1.7	0.3	0.7
12	BENIGN NEOPLASMS	1,868	76	1.6	1.6	4.1
13	CONGENITAL MALFORMATIONS	1,420	157	1.2	3.3	11.1
14	PEPTIC ULCER GASTRITIS DUODENITIS	1,243	63	1.1	1.3	5.1
15	HAEMORRHAGE OF PREGNANCY & CHILDBIRTH	1,172	4	1.0	0.1	0.3
16	VACULAR LESIONS OF CENTRAL NERVOUS SYSTEM	1,138	392	1.0	8.3	34.4
17	NEPHRITIS & KIDNEY INFECTIONS	1,014	88	0.9	1.9	8.7
18	THYROID DISEASE	806	9	0.7	0.2	1.1
19	RHEUMATIC FEVER AND HEART DISEASE	805	108	0.7	2.3	13.4
20	SKIN DISEASES	738	20	0.6	0.4	2.7
	FIRST TWENTY CONDITIONS	94,183	2,627	81.1	56.0	2.8

Table 34 b: DISEASE IN INFANCY 1 - 11 MONTHS BANGKOK HOSPITALS

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASE FATALITY RATE %
	TOTAL IN AGE GROUP	4,375	603			13.8
1	DIARRHOEAL DISEASES	1,514	171	34.6	28.4	11.3
2	RESPIRATORY DISEASES	1,277	85	29.2	14.1	6.7
3	CONGENITAL MALFORMATIONS	281	47	6.4	7.8	16.7
4	MENINGITIS & ENCEPHALITIS	197	49	4.5	8.1	24.9
5	AVITAMINOSIS & DEFICIENCY DISEASES	100	32	2.3	5.3	32.0
6	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	76	11	1.7	1.8	14.5
7	VASCULAR LESIONS OF CENTRAL NERVOUS SYSTEM	69	25	1.6	4.1	36.2
8	DIPHTHERIA	58	5	1.3	0.8	8.6
9	THAI HAEMORRHAGIC FEVER	53	1	1.2	0.2	1.9
10	SKIN DISEASES	49	1	1.1	0.2	2.0
	FIRST TEN CONDITIONS	3,674	427	84.0	70.8	11.6
11	EFFECTS OF POISONS	36	9	0.8	1.5	25.0
12	MEASLES	33	3	0.8	0.5	9.1
13	FRACTURES & INJURIES	30	3	0.7	0.5	10.0
14	BENIGN NEOPLASMS	28	3	0.6	0.5	10.7
15	WHOOPING COUGH	20	2	0.5	0.3	10.0
16	BURNS	20	1	0.5	0.2	5.0
17	T.B. OF MENINGES & C.N.S.	17	9	0.4	1.5	52.9
18	EYE DISEASES	17	-	0.4	-	-
19	PYREXIA OF UNKNOWN ORIGIN	15	5	0.3	0.8	33.3.
20	ANAEMIA	13	1	0.3	0.2	7.7
	FIRST TWENTY CONDITIONS	3,903	463	89.2	76.8	11.9

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Table 34 c DISEASE IN EARLY CHILDHOOD 1 - 4 YEARS BANGKOK HOSPITALS

	CONDITION	ADMISSIONS	DEATHS	ADMISSIONS TOTAL %	DEATHS TOTAL %	CASE FATALITY RATE %
	TOTAL IN AGE GROUP	5,862	444			7.6
1	RESPIRATORY DISEASES	1,573	48	26.8	10.8	3.1
2	DIARRHOEAL DISEASES	692	51	11.8	11.5	7.4
3	DIPHTHERIA	390	32	6.7	7.2	8.2
4	CONGENITAL MALFORMATIONS	285	21	4.9	4.7	7.4
5	THAI HAEMORRHAGIC FEVER	221	9	3.8	2.0	4.1
6	FRACTURES & INJURIES	209	11	3.6	2.5	5.3
7	MENINGITIS & ENCEPHALITIS	191	39	3.3	8.8	20.4
8	AVITAMINOSIS & DEFICIENCY DISEASES	172	29	2.9	6.5	16.9
9	NEPHRITIS & KIDNEY INFECTIONS	165	9	2.8	2.0	5.5
10	APPENDICITIS INTESTINAL OBSTRUCTION HERNIA	139	5	2.4	1.1	3.6
	FIRST TEN CONDITIONS	4,037	254	68.9	57.2	6.3
11	BURNS	109	15	1.9	3.4	13.8
12	MALIGNANT NEOPLASMS	105	28	1.8	6.3	26.7
13	SKIN DISEASES	103	2	1.8	0.4	1.9
14	ANEMIA	94	2	1.6	0.4	2.1
15	EFFECTS OF POISONS	90	4	1.5	0.9	4.4
16	BENIGN NEOPLASMS	88	8	1.5	1.8	9.1
17	MEASLES	75	3	1.3	0.7	4.0
18	T.B. OF MENINGES & C.N.S.	74	25	1.3	5.6	33.8
19	ALLERGIC DISORDERS	71	1	1.2	0.2	1.4
20	TYPHOID & PARATYPHOID	42	3	0.7	0.7	7.1
	FIRST TWENTY CONDITIONS	4,888	345	83.4	77.7	7.1

Table 35: DISTANCE TRAVELLED BY INDIVIDUALS WHO CAME TO HEALTH CENTRE FOR SERVICE AND BY HEALTH PERSONNEL WHO WENT TO VILLAGE HOMES TO GIVE SERVICE BY TYPE OF HEALTH CENTER

Distance from home to centre	Percent of total service contacts with individuals in health centres			Per cent of total service contacts by health personnel in village homes		
	First-class centre	Second-class centre	Midwifery centre	First-class centre	Second-class centre	Midwifery centre
Less than 0.5 Kilometre	7.5	24.0	44.0	28.7	31.7	45.5
Less than 1.5 kilometres	51.2	43.7	74.0	57.4	57.1	91.6
Less than 2.5 kilometres	72.3	57.8	85.2	74.8	68.3	96.1
Less than 3.5 kilometres	77.4	79.6	88.7	96.5	94.4	96.1
Less than 4.5 kilometres	80.2	92.1	94.5	96.5	99.3	100.0
Less than 5.5 kilometres	81.4	92.3	94.5	96.5	99.3	100.0
Total per cent	100.0	100.0	100.0	100.0	100.0	100.0
Total number	1,596	542	400	143	142	180

Table 36: Population, Area, and Population Density in the Lower Mekong Basin Development Region, by Country

Country	No. Provinces	Pop. estimate (1969 - 1971)	Area Km^2	People per Km^2
Thailand	16	13,221,000	188,900	70.0
Laos	15	2,684,000	220,500	12.2
Khmer Republic	14	5,905,000	158,000	37.4
South Vietnam: Highlands	4	535,000	35,200	15.2
Delta	16	6,589,000	38,000	173.4
Total	65	28,934,000	640,600	———

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Table 37: Recent Vital Statistics, by Country

Statistic*	Thailand	Laos	Khmer Republic	South Vietnam
Crude birth rate per 1,000	34.9** (1970)	47 (1965)	45 (1969)	28 (1965)
Crude death rate per 1,000	6.9** (1970)	23 (1965)	18 (1969)	6.4 (1965)
Average annual rate of population growth (%), 1963-68	3.1	2.4	2.7	2.6
Literacy (%), 1969 (77)	68	20	41	60
Infant mortality rate per 1,000 live births	24.7** (1970)	NA	120-150 (1969)	36.7 (1965)
Maternal death rate per 1,000 births	3.2** (1970)	NA	NA	8.2 (1969)
Gross National Product (GNP) (U.S. $ billions), 1969 (77)	6.0	0.2	1.0	3.1
GNP average annual increase (%) 1964-69 (77)	5	0	NA	16

* Birth and death data compiled from various published and unpublished sources.

** Rates for the 16 Thai provinces in the Lower Mekong Basin development region only.

NA = Not available.

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Table 38: **Reported Incidence (Cases and Deaths) of Selected Diseases in the Countries of the Lower Mekong Basin Development Region.**

DISEASE CATEGORY	(109) Thailand (1970)		(131) Laos (1968)		(10) Khmer Republic (1971)				(6) South Vietnam (1971)			
					Inpatients		Outpatients		4 Highland provinces		16 Delta provinces	
	Cases	Deaths (Through September)	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1. Diarrhea and enteritis (including amebic and bacillary dysentery)	184,630	6,104	1,821	62	3,329	348	81,864	19	3,751	0	15,040	7
2. Malaria	231,244	3,437	1,695	92	1,601	52	7,678	3	3,375	9	9,668	12
3. Pulmonary tuberculosis	23,651	7,189	333	42	1,667	186	6,671	3	901	1	7,569	31
4. Nutritional deficiencies (including vitamin deficiencies)	79,130	3,541	358	11	715	29	35,355	4	NA*	NA*	NA*	NA*
5. Pneumonia (all etiologies)	NA	5,458	407	9	544	132	5,125	5	NA	NA	195	5
6. Typhoid-paratyphoid fevers and other dalmonelloses	589	440	98	4	470	11	530	0	74	0	690	29
7. Leprosy	12,408	63	18	0	12	0	55	1	NA	NA	44	0
8. Diseases and complications of pregnancy and childbirth	12,387	2,589	1,491	30	3,056	67	4,680	14	NA*	NA*	NA*	NA*

NA=Not Available

* 1969 figures (Total country) — Nutritional deficiencies: 6,995 cases, 167 deaths. Pregnancy and childbirth conditions: 136,937 cases, 2,589 deaths.

Table 39: **Results of Surveys of Heights and Weights**

Year	Province (Project)	Reference	Ages Tested	No. Tested	Results and Comments
1960	**THAILAND** Udorn, Ubon, and Chiang Mai	(40)	All	1,842	Average weight 5-15 kg. and average height 10-20 cm. lower for Thais than Americans for both sexes and all ages over one year. Values for South Vietnamese (1959) similar to those of Thais.
1965	Chiang Mai	(113)	3-12	38	Mean weight lower than that of Bangkok children.
1968	Chiang Mai (Saraphi)	(18)	0-5	1,669	Body weight nomograms produced from the results in urban and rural samples.
1970	Chiang Mai	(59)	Birth	583	Birth weight 2995 $\pm$ 28.3 g. for males; 2905 $\pm$ 27.6 g. for females. Weight doubled in 5 months and tripled in 12 months.
1969	Khon Kaen	(3)	3 mos.—7 yrs.	180	Average heights and weights lower than those of similarly aged Bangkok children.
1969	Korat (Soong Ngern)	(75)	0 – 2	229	After 12 months, height and weight lower than the Harvard (U.S.) standard; on the average, 70% of standard weight and 85% of standard height.
1969	Korat (Soong Ngern)	(2)	Birth	NA	Average birth weight of both males and females3,020 g.; average height 48.3 g.m.
1970	Korat (Soong Ngern)	(2)	2 – 6	72	From ages 2-6, average heights ranged from 78-100cm.; average weights from 10 to 15 kg. Similar for boys and girls.

Table 40 **Average Daily Dietary Intake Per Capita**

SURVEY DESCRIPTION		Calories	Protein gm.	Protein gm./kg.	CHO gm.	Fat gm.	Calcium mg.	Iron mg.	Vitamin A (I.U.)	Thiamine mg.	Riboflavin mg.	Niacin mg.	Vitamin C mg.
Thailand (40)													
1. ICNND (1960)													
Chiang Mai		1660	46.5	1.5	343	12	371	27	< 4311	.52	.76	8.7	34.0
Udorn		1837	45.0	1.4	396	8.5	342	26	< 2750	.40	.42	10.5	23.3
Ubon		1962	47.7	1.5	421	10	311	18	< 2500	.45	.40	12.3	22.9
2. Khon Kaen (1969)	Age												
(2 villages)	1-3	651	17.0	–	137	3.3	133	2.8	268	.25	.12	5.3	12.4
(Migasena, P. *et al.* –	3-6	736	19.7	–	153	4.5	115	3.5	627	.31	.18	6.7	16.6
personal	6-8	1034	24.8	–	230	5.2	137	4.3	376	.43	.20	8.4	22.0
communication)	Adults	1770	47.2	–	–	17.3	266	23	1700-2900	.42	.50	9.8	26
3. Ubon (1966) (63)	All Ages	–	56	1.1	–	–	–	–	–	–	–	–	–
4. Korat (1970) (13)	Age												
(Soong Ngern,	1.5 – 2.4	544	10.5	–	115	4.8	231	3.2	374	.43	.28	4.8	4.7
one village)	2.5 – 3.4	865	16.3	–	188	5.4	53	2.4	408	.51	.44	5.9	2.3
	3.5 – 4.4	864	16.6	–	168	11.9	200	4.3	734	.63	.43	6.3	3.4
	4.5 – 5.4	1276	14.7	–	283	9.4	99	4.6	942	.87	.65	8.6	5.1
	5.5 – 6.4	1417	16.6	–	292	20.2	353	6.0	859	.89	.65	9.9	11.7
	Pregnant women	1980	39.4	–	421	15.5	574	11.9	1149	1.57	.89	17.2	15.3

Table 41: Hemoglobin and Hematocrit Levels Indicated in Recent Surveys in Northeastern and Northern Thailand

Survey Description	No. Tested	Hemoglobin (g/100ml)		Hematocrit (%)
		Mean	% <12	Mean
(1)				
1. Ubon (1964)				
Pregnant women ≥6 mos.	70	9.3	95	29.2
Lactating women ≤7 mos.	70	9.9	84	32.3
Control women, same ages	54	10.2	91	34.5
Infants ≤7 mos.	53	9.2	98	26.2
(3)				
2. Khon Kaen (1968)				
2 villages. Preschool children	128	9.1	–	38.5
(3)				
3. Khon Kaen (1971). 3 villages				
ages 0-12	117	–	26	–
ages ≥13	205	–	17	–
(8)				
4. Schoolchildren (1971)				
Khon Kaen	390	11.7	61	38.7
(Bangkok)	(184)	(12.4)	(30)	(41.6)
(18, 74)				
5. Chiang Mai (1971)				
Saraphi Villagers				
All ages: Male	620	9.5	–	–
Female	879	8.8	–	–
Ages 20-25: Saraphi Villagers	96	9.6	–	–
Medical Students	208	13.2	–	–
(1)				
6. Chiang Mai Valley (1970)				
4 villages:				
(ages 1-39) Male	157	12.2	47	39.8
Female	158	11.4	65	38.2
Urban Schoolchildren:				
(ages 6-8) Male	81	11.8	46	39.1
Female	78	12.1	42	39.1

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Table 42: **Prevalence Rates (%) of Helminths and Pathogenic Protozoa in Stool-Examination Surveys in the Riparian Countries.**

	SURVEY DESCRIPTION	Reference	Ages Included	No. Tested	Water-Borne					Soil-Transmitted				Tapeworms Taenia spp.	Total with Helminth Infections	Protozoa		Total with Helminth and/or Protozoa Infection
					Liver Flukes		Blood Fluke	Intestinal Flukes	Lung Fluke	Intestinal Roundworms						E.h.	G.1.	
					O.v.	C.s.	S.j.		P.w.	H.w.	A.l.	T.t.	S.s.					
THAILAND	1. Opisthorchis survey throughout Northeast (1966)	(34)	All	7,706	10-92	–	–	–	–	–	–	–	–	–	–	–	?	–
	2. Ubolratana dam area, Khon Kaen (1967-69)	(35)	All	11,773	50	0	0	7	0	22	<1	<1	1-3	<1-2	62	<1	5	–
	3. Ubolratana dam area, Khon Kaen (1969)	(3)	0-7	146	2	0	0	6	0	20	1	–	–	–	28	0	3	–
	4. Ubolratana dam area, Khon Kaen (1972)	(3)	All	1,296	35	0	0	4	0	34	<1	<1	3	< 1	54	0	5	–
	5. Village (Ban Tard) in Udorn (1967)	(66)	All	438	70	0	0	1	0	16	<1	1	2	7	–	1	–	–
	6. Villages in Udorn and Kalasin (1967-69)	(35)	All	1,735	78	0	0	7	0	34	2	1	5	2	80	<1	5	–
	7. Soong Ngern Project, Korat (1970-71)	(2)	< 15	440	20	–	–	–	–	12	2	4	1	2	29	8	14	58
			> 15	413	52					13	1	2	1	3	50	8	8	76
	8. One village, Thoeng District, Chiang Mai (1967)	(135)	6-14	107	–	–	–	–	–	31	45	5	–	–	62	–	–	–
	9. Saraphi Project, Chiang Mai (1968)	(18)	All	292	20	0	0	1	0	17	13	3	5	2	45	1	3	–
	10. Saraphi Project, Chiang Mai (1969)	(18)	All	534	28	0	0	1	0	43	14	18	3	1	–	2	4	72
	11. One village, Payao District, Chiang Rai (1968)	(67, 68)	1-14	266	27	–	–	–	–	8	67	62	–	–	–	13	–	–
			> 15	128	47	–	–	–	–	6	52	53	–	–	–	5	–	–
	12. Khon Kaen (1971) 6 schools	(3)	7-10	390	89	–	–	20	–	90	<1	2	7	1	–	0	0	–
LAOS	13. Khong Island, Sithandone (1967)	(146)	All	547	7	0	–	0	0	31	28	13	4	–	64	–	–	–
	14. Khong Is. (1966) Schisto. Screening	(70)	All	1,012	–	–	0.7–26	–	–	–	–	–	–	–	–	–	–	–
	15. Khong Is. (1967) Schisto. Skin test positives.	(70)	All	206	–	–	14	–	–	–	–	–	–	–	–	–	–	–
	16. G-I symptomatic out- and in-patients (1968-70)	(69)	All	35,507	9	–	0	–	–	9	20	13	4	1	–	<1	<1	–
	17. Village (Ban Nong Sai I) Out-patients Vientiane (1971)	(5)	All	412	–	–	–	–	–	2	25	–	–	–	–	–	–	–
	18. Vientiane City (1971) school-children + parents	(83)	–	872	54	–	–	–	–	25	43	46	–	–	86	–	8	–
KHMER REPUBLIC	19. Nutrition Project, Kandal (1971)	(78)	All	825	–	–	–	–	–	36	65	5	–	< 1	–	0	1	80
	20. Floating houses, Kratie (1968)	(42)	< 15	70	–	–	73	–	–	–	–	–	–	–	–	–	–	–
	21. Schistosomiasis survey (1968-69) (Schisto. Skin test pos.)	(147)																
	Stung Treng		School-children	55	2	–	4	0	–	40	38	2	2	0	65	–	–	–
	Kratie		"	119	2	–	14	1	–	33	45	5	1	0	82	–	–	–
	Bassac		"	169	1	–	<1	3	–	56	80	32	2	0	92	–	–	–
	Kampong Cham		"	40	2	–	0	0	–	50	55	10	2	0	78	–	–	–
SOUTH VIETNAM	22. Can Tho City + Villages along Mekong River (1968)	(16)																
	URBAN		Adults	122	0	<1	0	0	–	64	25	15	6	< 1	–	2	2	75
	RURAL			287	0	<1	0	0	–	38	51	10	4	0	–	2	1	52
	23. Village (Binh Duc), Dinh Tuong	(71)	All	235	0	0	0	0	–	35	78	–	–	–	–	–	–	–

*O.v. = *Opisthorchis viverrini*
C.s. = *Clonorchis sinensis*
S.j. = *Schistosomo japonicum*
P.w. = *Paragonimus westermani*

H.w. = Hookworms
A.l. = *Ascaris lumbricoides*
T.t. = *Trichuris trichiura*
S.s. = *Strongyloides stercoralis*

E.h. = *Entamoeba histolytica*
G.1. = *Giardia lamblia*
– = Not Reported

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Table 43: EVOLUTION OF MALARIA ERADICATION PROGRAM

SOURCE OF FUNDS 1949-1972

PERIOD	TYPE OF PROGRAM	SOURCE OF FUNDS	APPROX. EXPENDITURES IN MILLIONS U.S. $
1949-51	Pilot Studies; Control in selected areas	RTG	Unknown
		WHO/UNICEF	.045
1951-57	Control Program	RTG	2.78
		U.S.	2.81
		WHO	.038
1958-62	Eradication Program-- Preparatory Period	RTG	5.56
		U.S.	2.49
		WHO	.035
1963-65	Eradication Program. Extension to Nationwide Program	RTG	8.21
		U.S.	4.77
		WHO	.179
1966-69	Nationwide Eradication Program	RTG	17.01
		U.S.	9.58
		WHO	.657
1970-72	Nationwide Eradication Program	RTG	15.28
		U.S.	1.07
		WHO	.499
TOTALS 1949-72 IN MILLIONS U.S. DOLLARS:		RTG	48.84
		U.S.	20.72
		WHO	1.453
	TOTAL ALL SOURCES:		71.01

Table 44: **Progress of Anti-malaria Campaign 1949—1970**

Year	Malaria Deaths	Mortality Rate/100,000	Population Protected		
			Spraying	Surveillance	Total
1949	38,046	201.5	—	—	—
1950	35,819	183.1	77,503	—	77,503
1951	34,225	169.1	581,312	—	581,312
1952	29,115	139.2	1,570,249	—	1,570,249
1953	21,451	99.3	3,016,808	63,727	3,080,535
1954	16,473	73.9	4,266,442	414,776	4,681,218
1955	14,520	63.2	5,618,856	1,636,192	7,255,048
1956	12,617	53.3	7,364,176	3,052,107	10,416,283
1957	10,458	43.0	7,640,891	4,383,810	12,024,701
1958	9,462	37.8	7,833,290	4,551,871	12,385,161
1959	8,530	33.2	6,988,095	7,124,294	14,112,389
1960	7,960	30.2	6,321,576	6,246,036	12,567,612
1961	6,636	24.5	5,350,414	4,782,582	10,132,996
1962	6,739	24.3	9,434,879	5,226,544	14,661,423
1963	6,488	22.8	13,323,827	5,520,097	18,843,924
1964	5,287	18.2	15,982,285	8,000,136	23,982,421
1965	4,522	15.2	18,376,706	6,736,591	25,113,297
1966	4,490	14.7	19,109,757	6,424,346	25,534,103
1967	4,015	12.9	19,609,242	6,979,835	26,589,077
1968	3,308	10.4	15,261,282	12,661,459	27,922,761
1969	3,450	10.4	13,097,487	15,544,412	28,641,899
1970	—	—	12,385,219	19,190,539	31,575,758

Table 45: **Number of Deaths from Malaria by Sex and Rate (per 100,000 Population) and Proportional Mortality Rate (per 1,000) B.E. 2488-2512 (1945-1969)**

Year	Number			Rate	Proportional Mortality Rate
	Total	Male	Female		
2488 (1945)	51,456	28,788	22,668	304.9	186.0
2489 (1946)	48,618	26,683	21,935	283.0	187.7
2490 (1947)	52,034	28,156	23,878	297.1	222.1
2491 (1948)	44,215	23,969	20,246	243.0	232.7
2492 (1949)	38,046	20,746	17,300	201.5	199.8
2493 (1950)	35,819	19,869	15,950	183.1	194.2
2494 (1951)	34,225	18,863	15,362	169.1	176.5
2495 (1952)	29,115	16,251	12,864	139.2	153.9
2496 (1953)	21,451	11,975	9,476	99.3	117.2
2497 (1954)	16,473	9,104	7,369	73.9	55.5
2498 (1955)	14,520	8,103	6,417	63.2	77.4
2499 (1956)	12,617	7,024	5,593	53.3	62.5
2500 (1957)	10,458	5,786	4,672	43.0	47.9
2501 (1958)	9,462	5,307	4,155	37.8	45.3
2502 (1959)	8,530	4,848	3,682	33.2	41.4
2503 (1960)	7,960	4,510	3,450	30.2	35.9
2504 (1961)	6,636	3,709	2,927	24.5	31.5
2505 (1962)	6,739	3,798	2,941	24.3	30.5
2506 (1963)	6,488	3,698	2,790	22.8	27.8
2507 (1964)	5,287	3,043	2,244	18.2	22.9
2508 (1965)	4,522	2,663	1,859	15.2	20.9
2509 (1966)	4,490	2,649	1,841	14.7	19.0
2510 (1967)	4,015	2,350	1,655	12.9	17.4
2511 (1968)	3,308	1,920	1,388	10.4	14.3
2512 (1969)	3,450	2,007	1,443	10.4	14.2

Table 46: **Projection of Population to be put in Different Phases**

Phase	Estimated Population in thousands						Remarks
	1971	1972	1973	1974	1975	1976	
Attack	9,960	8,820	7,680	7,200	6,845	6,700	The number of population is estimated. 3% increasing each year from the census in 1960.
Spray 1 cycle	6,220	5,320	4,483	4,090	3,635	3,490	
Spray 2 cycles	3,740	3,500	3,197	3,110	3,210	3,210	
Malariometric Survey	1,040	0,880	0,746	0,750	0,775	0,800	
Surveillance	8,920	7,940	6,934	6,450	6,070	5,900	
Consolidation	18,414	14,800	12,530	9,260	7,330	7,860	
ACD house to house visit	9,054	6,700	5,440	3,580	2,240	1,910	
ACD cluster house visit	9,360	8,100	7,090	5,780	5,090	5,950	
Integration	7,816	13,650	18,190	23,080	26,555	27,390	
lst. step	7,816	8,070	4,900	5,730	3,530	—	
2nd. step	—	5,580	13,290	17,350	23,025	27,390	
Total	36,190	37,270	38,400	39,540	40,730	41,950	

Table 47: **Number of Deaths from Tuberculosis by Form and Rates (per 100,000 Population) : 1965–1969**

Category[1]	2508 (1965)		2509 (1966)		2510 (1967)		2511 (1968)		2512 (1969)	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Total	7,764	26.1	8,122	26.7	8,967	28.8	8,605	27.0	7,889	23.9
Tuberculosis of Respiratory system	7,668	25.7	8,058	26.4	8,827	28.3	8,569	26.9	7,839	23.7
Tuberculosis of meninges and central nervous system	53	0.2	47	0.2	52	0.2	18	0.1	27	0.1
Tuberculosis of intestines, peritonium and mesenteric glands	6	—	10	—	60	0.2	10	—	13	0.1
Tuberculosis of bones and joints active or unspecified	10	—	6	—	6	—	7	—	8	—
Late effects of Tuberculosis of bones and joints	20	0.1	—	—	—	—	—	—	—	—
Tuberculosis of skin and subcutaneous cellular tissue	—	—	—	—	1	—	—	—	1	—
Tuberculosis of lymphatic system	—	—	—	—	1	—	—	—	—	—
Tuberculosis of genitourinary system	2	—	—	—	—	—	—	—	—	—
Tuberculosis of adrenal glands	—	—	—	—	—	—	—	—	—	—
Tuberculosis of other organs	2	—	—	—	20	0.1	1	—	—	—
Disseminated tuberculosis	3	—	1	—	—	—	—	—	1	—

Remark: [1] According to 7th Revision

Table 48:

ACTIVITIES OF THE TUBERCULOSIS PROGRAM

	1968	1969	1970
Number of provincial TB units	58	91	111
Number of people examined (microscopy of sputum)	11,362	10,729	16,852
Number of bacteriologically positive	1,335	1,192	1,834
Number of new patients registered	5,692	11,180	10,573
Number of patients under active treatment	5,902*	10,095	14,782

(*including referred cases)

Table 49:

NUMBER OF BCG IMMUNIZATIONS BY AGE AND YEAR

Fiscal Year	Age				Total
	under 1	1-4	5-14	15 and over	
1968	79,774	448,624	1,427,328	38,839	1,994,565
1969	77,794	341,793	982,676	53,989	1,456,252
1970	61,625	302,455	891,024	39,398	1,294,502

Table 50: **Overall Achievements of TB Control Centres**

1968—1970

Year	Centres	Number of new Examinees	Number of TB suspected by X-rays	Number of Sputum examined	Number of Patients treated	Number of Homes visited	Number of Contacts examined	Number given Socio-economic Assistance	Number of BCG vaccinated in Clinic
1968	Bangkok	196,903	14,969	36,342	8,695	3,772	2,081	3,871	2,580
	Chiang Mai	43,698	4,578	6,817	3,428	1,251	1,615	4,166	4,388
	Khon Kaen	35,766	5,405	13,085	5,188	1,029	1,260	3,420	4,328
	Yala	83,287	4,914	6,808	4,865	1,200	322	923	869
	Korat	17,568	3,617	9,727	3,272	654	1,165	2,975	1,218
	Ubon	9,280	2,882	4,520	2,855	498	888	1,296	1,390
	Total	386,502	36,365	77,299	28,303	8,404	7,331	16,651	14,693
1969	Bangkok	201,029	14,170	33,785	11,538	4,272	1,969	9,368	1,835
	Chiang Mai	32,435	5,889	8,880	4,218	1,321	1,833	4,572	1,448
	Khon Kaen	17,786	4,889	14,978	4,840	830	1,217	4,049	3,539
	Yala	27,302	3,547	10,148	3,515	903	397	3,320	675
	Korat	21,997	4,575	13,834	4,058	1,025	1,833	7,197	2,946
	Ubon	16,783	3,509	9,317	3,486	700	1,611	3,733	2,647
	Chon Buri	1,119	327	420	310	2	26	188	38
	Total	318,451	36,906	91,362	31,965	9,053	8,886	32,427	13,128
1970	Bangkok	105,370	10,474	36,272	10,001	5,284	1,960	9,217	1,404
	Chiang Mai	72,105	8,028	10,417	6,275	1,207	1,316	5,825	631
	Khon Kaen	19,505	5,200	13,918	5,160	255	1,395	5,172	2,830
	Yala	68,529	6,759	11,999	6,521	751	234	5,037	604
	Korat	23,518	6,043	11,023	5,604	1,110	2,578	9,671	5,452
	Ubon	15,432	3,566	11,841	3,525	546	1,540	3,594	1,990
	Sakon Nakhon	4,244	1,075	3,765	983	160	112	—	523
	Chon Buri	5,428	1,180	4,045	1,133	196	464	—	670
	Total	314,131	42,325	103,280	39,202	9,509	9,599	38,516	14,054

Table 51: Health team intended to serve a district in rural Thailand

Health personnel	Health facilities		
	One primary health center	Four secondary health centers	Ten midwifery centers
Physician *	1		
Nurse *	1		
Public health nurse *	2		
Senior sanitarian *	1		
Dental auxiliary +	1		
Clerk +	1		
Junior sanitarian +	2	4	
Nurse aide +	3	4	
Midwife +	2	4	10
Junior technician +	1		
Total	15	12	10

Source: Ministry of Health, Thailand.

* University education

+ Elementary or secondary school education

Table 52: MEDICAL REGISTRATION

1. Number of Registered Practitioners (up to January 1971)

A. Moderm Arts of Healing

First Class:	
Physicians	5,661
Dental Surgeons	683
Pharmacists	1,840
Nurse-Midwives	2,822
Nurses	7,021
Second Class:	
Physicians	617
Dental Surgeons	910
Pharmacists	305
Midwives	4,739

B. Old-Fashioned Arts of Healing

Physicians	34,024
Pharmacists	15,451
Midwives	8,498

2. Number of Private Registered Clinics (up to January 1971)

A. Modern Arts of Healing

First Class:	
General Clinics	3,092
Dental Clinics	214
Maternity Cinics	138
Second Class:	194
General Clinics	
Dental Clinics	586
Maternity Clinics	29

B. Old-Fashioned Arts of Healing

General Clinics	809
Maternity Clinics	4

3. Number of Private Registered Hospitals with Beds (up to January 1971)

A. Modern Arts of Healing

General Hospitals	110
Maternity Hospitals	115

B. Old-Fashioned Arts of Healing

General Hospitals	2
Maternity Hospitals	6

Number of Hospitals and Hospital Beds 1969

	Number of Hospitals	Beds
1. General Hospitals		
1.1 Hospitals under the Ministry of Public Health	87	15,433
1.2 Other governmental hospitals	14	4,281
1.3 Municipal hospitals	5	948
1.4 Other organizations	12	429
1.5 Private hospitals	46	1,610
Total	164	22,701
2. Specialized Hospitals		
2.1 Health Department (Infectious, Tuberculosis, Leprosy)	4	4,000
2.2 Medical Services Department	10	6,165
2.3 Other governmental hospitals	1	80
2.4 Non-governmental hospitals	5	341
Total	20	10,586
3. Other Medical Establishments with Beds		
3.1 Health centres 1st class	269	2,192
3.2 Old people homes	4	250
3.3 Institution for Drug Addicts	1	500
Total	274	2,942

Remark: Figures for hospitals under the Ministry of Defence are not included.

Table 53: RTG HEALTH PROJECTS RECEIVING USOM SUPPORT, BY FIELD OF ASSISTANCE, 1950-1972

A. DISEASE CONTROL PROGRAMS

Project No.	Title	U.S. Input (In $000)	RTG ฿ Input (In U.S. $000 Equiv.)	Period of Project
511-107	Malaria Eradication	$ 21,154.3	$ 47,313.3	FY 51-69
510-043	Intestinal Disease Control	92.9	205.1	FY 52-58
510-045	Communicable Disease Control*	7.3	1.3	FY 52-60
510-044	Cholera Control	109.6	none	FY 58-60
511-503	Thailand Malaria Operational Research		82.8	FY 70-72
	TOTALS:	$ 21,364.1	$ 47,602.5	

Obligations and Budgets from Program Agreement. On average, actual expenditures are 15 to 20% less than these amounts. U.S. Input fugures include Mission and AID/W.

Table 53: RTG HEALTH PROJECTS RECEIVING USOM SUPPORT, BY FIELD OF ASSISTANCE, 1950-1972

B. ENVIRONMENTAL HEALTH PROGRAMS

Project No.	Title	U.S. Input* (In $000)	RTG ฿ Input* (In U.S. $000 Equiv.)	Period of Project
520-047	Environmental Health Sanitation	$ 918.9	$ 214.7	FY 51-58
530-048	Rural Health	1,153.4	1,712.7	FY 52-62
520-046	Health & Sanitation	5.7	None	FY 55-58
520-109	Village Health & Sanitation	1,772.1	1,563.8	FY 60-68
521-186	Potable Water Project	3,142.9	2,145.8	FY 66-69
	TOTALS:	$ 6,993.0	$ 5,637.0	

C. INSTITUTIONAL DEVELOPMENT

(Medical Education and Health Training)

Project No.	Title	U.S. Input* (In $000)	RTG ฿ Input* (In U.S. $000 Equiv.)	Period of Project
540-050	Health Education	$ 207.7	$ 218.0	FY 51-59
540-108	Medical Education	1,480.4	2,847.0	FY 51-65
590-110	Water Management Seminar - Hua Hin	19.1	None	
540-051	In & Pre-Service Training	145.6	420.1	FY 52-59
540-174	Chiang Mai Medical School	5,850.8	9,169.8	FY 62-69
	TOTALS:	$ 7,703.6	$ 12,654.9	

Table 53: RTG HEALTH PROJECTS RECEIVING USOM SUPPORT, BY FIELD OF ASSISTANCE, 1950-1972

D. LOCAL HEALTH SERVICES

(Includes Both Curative and Preventive Services)

Project No.	Title	U.S. Input* (In $000)	RTG ฿ Input* (In U.S. $000 Equiv.)	Period of Project
055-052	Hospital Improvement	$ 1,604.2	$ 1,221.6	FY 51-62
590-055	Health & Sanitation Admin.	866.2	41.0	FY 51-59
550-053	Police Hospital Improvement	138.4	None	FY 55-61
550-054	Siriraj Hospital Equipment	62.3	None	FY 55-61
540-179	Rural Health	5,042.1	4,833.4	FY 61-
590-170	Drug & Pharmaceutical Control	112.4	11.8	FY 64-69
540-179.1	Mobile Medical Teams	641.5	6.0	FY 68-71
	TOTALS:	$ 8,467.1	$ 6,113.8	

E. FOOD, NUTRITION AND POPULATION

Project No.	Title	U.S. Input* (In $000)	RTG ฿ Input* (In U.S. $000 Equiv.)	Period of Project
540-179.2	Protein Food Development	$ 638.2	$ 758.2	FY 69-72*
580-209	Family Health	6,273.1	1,548.3	FY 68-72*
	TOTALS:	$ 6,911.3	$ 2,306.5	