

Agroecological and Socioeconomic Environment of Northeast Thailand

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Abstract

The Northeast Region comprises approximately one-third of the total area of Thailand, and about 17 million people or about one-third of the total population. Farmers practice a subsistence type of agriculture that is dominated by rainfed, rice-based cropping systems. Agricultural production and per capita income from agriculture are the lowest in the country. This can be attributed to a number of factors including marginal, infertile, and sandy soils; erratic and inadequate rainfall; lack of irrigation development; obsolete farming methods; lack of mixed cropping; low quality livestock; and unstable market conditions. Collectively, these pose major problems to any attempts at rehabilitation of the Northeast. A logical starting place is to initiate research and demonstration programs to improve soil productivity and farming methods. The key to improving soil productivity is through regular additions of organic amendments. This would help to overcome the extreme soil chemical and physical properties that now contribute to low crop yields.

Introduction

Northeast Thailand is comprised of 17 provinces with an area of approximately 170,000 km² or 33 percent of the total area of Thailand. It is bound by Laos in the north and in the east; by Kampuchea in the east and south; and by the lower part of North Thailand in the west (Figure 1). The Northeast Region consists mainly of a shallow undulating plateau known as the Korat Plateau with an average elevation of approximately 100 to 200 m above sea level. It is underlain by salt bearing rocks that have contributed to a serious problem of soil salinity. The Northeast is an economically depressed area because of its low level of agricultural production and its low per capita income compared with the rest of the country.

The Physical Environment

Topography

As shown in Figure 2, Northeast Thailand is bound on the west by the Phetchabun Mountain Range and on the south by the San Kam Pang and Dangrek Mountain Ranges. The Phu Phan Mountains run in a northwest to southwest direction which divides the region into the Korat and Sakon Nakhon Basins.

The Korat Basin includes a large part of a plain known as Tung Kula Rong Hai, an area of 336,000 ha. This plain includes five provinces and is the major rice growing area of the region.

The Sakon Nakhon Basin comprises the northern part of the Northeast Region and includes Sakon Nakhon, Mukdahan, Nakhon Phanom, Nong Khai, Udon Thani, and Loei Provinces. The area is influenced by tropical cyclones which originate over the South China Sea, resulting in high levels of rainfall.

Rivers

The Chi and Mun Rivers are the two main rivers of the Northeast Region (Figure 3). The Mun River originates from the San Kam Pang Mountains in Nakhon Ratchasima and flows through Buriram, Surin, Roi-Et, Srisaket and finally into the Mekong River in Ubon Ratchathani Province.

The Chi River originates from the Phetchabun Range in Chaiyaphum Province and runs through Khon Kaen, Maha Sarakham, Kalasin, Roi-Et, and Yasothon before meeting with the Mun River in Ubon Ratchathani and then flowing into the Mekong River.

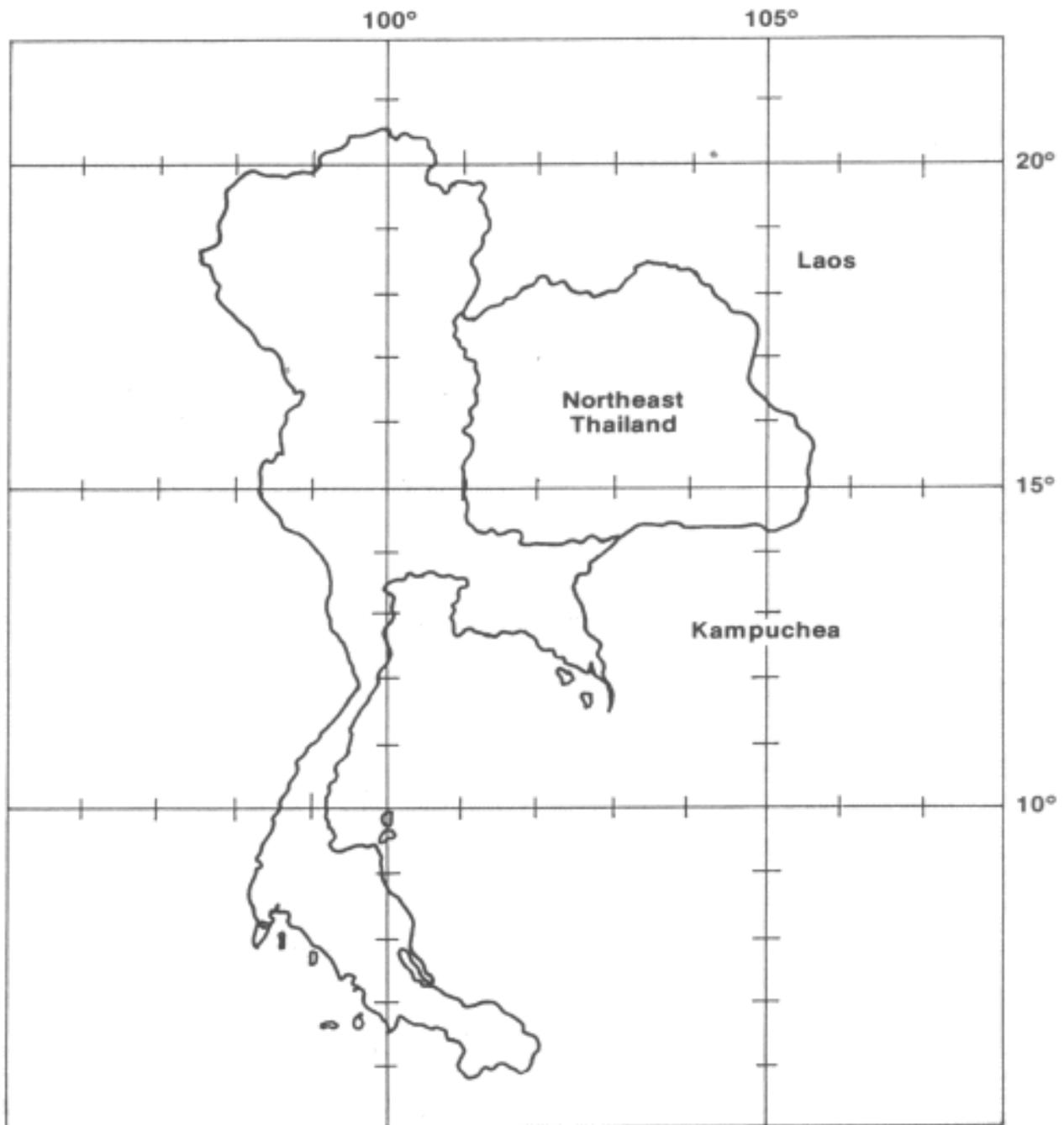


Figure 1. Map of Thailand Showing the Northeast Region.

Climate

The climate of the Northeast Region can be described as a tropical savanna climate. Its average annual temperature is 18°C. There are three seasons: the rainy season from the middle of May to the end of October, the cold season from November to the middle of February, and the hot season from February to the middle of May. The region is dominated by tropical cyclones which originate over the South China Sea, resulting in high levels of rainfall which average 1400 mm per year. However, the distribution of rainfall is uneven. Eighty percent of the total rainfall occurs in the months of August and September and is accompanied by excessive runoff into the Mun and Chi Rivers and finally into the Mekong. This is due to the low water holding capacity of the soils in the Northeast Region.



Figure 2. The Northeast Region Showing Changwat (Provincial) Boundaries.

Soils

Most soils of the Northeast are sandy loams and loamy sands. They are very low in fertility, low in water-holding capacity, often highly acidic, and low in their organic matter content. With the exception of Loei Province, the region is underlain by salt bearing rocks giving rise to salinity problems that have affected 2.85 Mha of paddy. This has resulted in a loss of soil productivity and decreased rice production compared with other regions.

Forestry

Excessive deforestation from logging and land clearing continues to be a serious problem in Northeast Thailand as well as in other regions. There is only about 24,000 km² of forest land left in the Northeast, or 15 percent of the total land area. Important types of forests found in the mountainous areas of the Northeast include tropical evergreen, mixed deciduous, and scrub forests.



Figure 3. Topography of Northeast Thailand.

Mineral and Energy Resources

Important minerals found in the Northeast include copper, manganese, lead, potassium, and natural gas. Potassium which is needed as a fertilizer is found in 14 provinces of the region covering approximately 50,000 km².

Population and Manpower

The 1984 data obtained from the Department of Local Administration, Ministry of the Interior, reveals that the population of the Northeast is more than 17 million or about 35 percent of the total country. The annual rate of population increase is 2.15 percent. The average household size is 5.7 people. The population density averages about 100 people per km². The labor population is approximately 8.5 million or 48 percent of the total population of the Northeast Region. More than 96 percent of the people live in rural areas or on the outskirts of towns. The remaining 4 percent live in the municipal areas.

Land Use

According to the Agricultural Economics Division, Ministry of Agriculture and Cooperatives, in the 1985-1986 cropping year the land used for agricultural purposes was about 8 Mha or slightly less than one-half the total land area. The land use categories are listed in Table 1 by area and percentage of use. It is readily apparent that rice-based cropping systems are predominant in the Northeast with some 35 percent of the total land area devoted to paddy.

Table 1. Land Use in the Northeast During the 1985-1986 Cropping Year.

Land Use	Area <i>ha</i>	Area Used %
Paddy	5,930,000	35.1
Field Crops	1,890,000	11.2
Fruit Crops	104,000	0.62
Horticulture	16,700	0.10
Pastures	70,800	0.42
Idle	354,000	2.09
Forest	2,480,000	14.7
Dwellings	169,000	1.00
Others	124,000	0.73
Unclassified	5,760,000	34.1
Total*	16,800,000	100

*Total may not be precise due to rounding.

Land for Agriculture Use and Land Holdings

Approximately 8.65 Mha, or 52 percent of the total area, are used for agriculture in the Northeast Region. The average farm size is 4.32 ha. Farms in Nakon Ratchasima Province average some 5.76 ha per unit, which is the highest for the region. Farmers in Mukdahan, however, own the least amount of land, only 2.8 ha per household. More than 90 percent of the land devoted to agriculture is owned by farmers. The rest is either rented, mortgaged, or used without rental payment.

Economic and Social Environment

The economic output of the Northeast is 42 percent for agricultural products and 58 percent for non-agricultural products. The largest part of the total income of the people in this region is derived from the cultivation of crops such as rice, cassava, sugarcane, kenaf, maize, and cotton. These crops account for 80 percent of the total agricultural revenues of the region. Minor crops include mungbean, soybean, groundnut, castorbean, sesame, and vegetables.

Data from the Agricultural Economics Division, Ministry of Agriculture and Cooperatives, show that the income from non-agricultural products was 6 to 7 times greater than that from agricultural products (Table 2).

Table 2. Per Capita Income in the Northeast Region from Agricultural Products and Non-Agricultural Products During 1981-1984 (Baht Currency).*

Year	Per Capita Income from Agricultural Products	Per Capita Income from Non- agricultural Products	Ratio of Income from Agricultural and Non- agricultural Products
	<i>Baht</i>		
1981	5,770 (214)	36,200 (1,340)	1:6.3
1982	5,740 (213)	38,400 (1,420)	1:6.7
1983	6,160 (228)	40,600 (1,500)	1:6.6
1984	5,910 (219)	43,300 (1,600)	1:7.3

*values in parenthesis are U.S. dollar equivalents based on an exchange rate of 27 Thai Baht per U.S. dollar.

The Northeast is recognized as an economically depressed area where the average annual per capita income in 1983 was the lowest in Thailand, that is, 7,146 Baht or \$265 U.S. (Table 3). This is only 38 percent of the average annual per capita income for the country as a whole.

Table 3. Per Capita Average Income for Thailand in 1983 by Regions.

Regions of Thailand	Per Capita Average Income	
	Baht	U.S.\$
North	12,400	461
Central	24,000	889
Northeast	7,150	265
South	16,100	598
East	34,600	1,280
West	25,300	938
Average Income	18,800	695

Many factors account for the low income of people in the Northeast compared with other regions. These include:

Soils

Soils used for cultivation are inherently low in fertility and low in organic matter. They are sandy soils having a low water-holding capacity as well as a low nutrient-retention capacity. Also, many of the soils have undergone some degree of salinization which has caused a serious decline in crop yields and soil productivity.

Water

Agriculture in the Northeast Region is almost exclusively rainfed. While the average rainfall is rather high, drought is common even during the rainy season and can result in crop damage and yield reduction. Facilities and infrastructure for irrigation are lacking. Data from the Agricultural Economics Division, Ministry of Agriculture, show that in 1986 there were only 600,000 ha of irrigated land, or approximately 7 percent of the total agricultural area.

Methods of Growing Crops

The traditional methods of growing crops are still being used in the Northeast. The high level of unemployment during the off-growing season results in the mass migration of people from villages to the cities in search of jobs. Some people also find work in the more developed agricultural areas in the east, west, and south of Thailand. They often find work on sugarcane, cassava, maize, and rubber plantations. Others find jobs in the mining and fishing industries. These people return home when the rice growing season begins, and the migration cycle begins again after the planting and harvesting end.

The Crop Growing Structure

The main economic crops of the Northeast are rice, cassava, maize, sugarcane, and kenaf. Less important crops include cotton, sorghum, mungbean, and groundnut. In the past mixed cropping was encouraged as a means of reducing risk. However, mixed cropping has not been widely adopted by farmers in the Northeast. Farmers have continued to do sole cropping even though it has a higher degree of risk in terms of income. Their main problem involves the market place where prices are generally low because they are unable to bargain effectively to obtain stable market prices.

Farm Livestock Enterprises

Domestic animals that are reared by villagers include buffaloes, cows, pigs, chickens, and ducks. They are an important food source, provide draft power, and are a source of revenue. The methods used for livestock production in the Northeast are rather primitive and breed quality is low. Consequently, the productivity and net returns from livestock are low.

Industry

Large scale industries of the region include sugar mills in Udon Thani, Khon Kaen, Chaiyaphum, and Buriram Provinces and the Phoenix Pulp Mill in Khon Kaen.

Less important industries include jute and rice mills. There are a total of 10 jute mills in Nakhon Ratchasima, Khon Kaen, and Udon Thani. Rice mills can be found throughout the region. Based on 1985 statistics, rice mills accounted for approximately 83 percent of the total number of factories in the Northeast.

Cassava mills rank second in number after the rice mills. The cassava industry generally can be found in most provinces in the Northeast. The mills produce cassava flour and pelleted cassava for livestock feed.

Small scale industries such as silk, cotton, and mat weaving have also brought revenue and income to the region.

The Living Environment

Most people in the Northeast have settled in cluster communities such as villages. However, they also live alongside of main roads and in newly established villages. The relationships among the villagers are very strong. They are Buddhists and lead simple lives. This situation, however, is now changing. Their way of life is becoming more like those living in towns. This is partly due to the influence of rural development. The Northeast has the best road system in the country and most villages are connected by roads. This has brought a lot of conveniences to the villagers who can travel throughout the year without difficulty. There is also electricity in most villages, and many people have acquired appliances such as electric fans, electric irons, television sets, and refrigerators.

Conclusions

The population of the Northeast Region of Thailand is one-third of the total population of the country. Its area also comprises one-third of the total country. The climate is tropical savanna with three seasons. Most soils of the region are of low fertility and have salinity problems. Land holdings for agricultural purposes account for about half of the total land area. Per capita average annual income in the Northeast is less than 40 percent of the national average. Such factors as low fertility soils, erratic and insufficient rainfall, lack of water for irrigation, obsolete farming methods, lack of mixed cropping, low quality livestock, and unstable market conditions all contribute to the very low income of Northeast farmers. There are, however, a growing number of important industries such as rice and cassava mills, which provides some employment and will help to improve the economy of the Northeast. The fact remains that agriculture in the region is in need of considerable rehabilitation. Perhaps the highest and most urgent priority is to improve the productivity, fertility, and tilth of agricultural soils. The key to improving soil productivity is through the regular addition of organic amendments such as crop residues, animal manures, green manures, and composts. Improved soil physical conditions and increased soil organic matter content would enhance the retention and storage of water in soils and, in turn, would increase crop yields. Increased soil organic matter would also help to ameliorate such extreme conditions of soil acidity and salinity which are now adversely affecting crop yields in the region. Shifting from sole cropping to mixed cropping would also help to restore soil productivity. Research and demonstration programs should be conducted on farmers' fields for the most effective transfer of technology. The principles of nature farming may be worth serious consideration in this regard.

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