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New Challenges Facing Asian Agriculture under Globalisation

Volume II



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Food Security under Changing Agricultural Environment in Southeast Asia

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Introduction

The rapid change in the international development environment is forcing the developing world to face new challenges in agricultural development. More than 1.2 billion of the world's rural population live in extreme poverty. Today, the number of the world's agricultural-based rural poor is lower than that in 1977, but nearly a billion of the rural population suffer from poverty and hunger and are fighting with environmental hazards.

In developing countries, agriculture is far more than just a supplier of food. In most countries, it still provides 60-80 per cent of all gainful employment. Furthermore, the full load of working the land has deterred people from migrating to already overcrowded cities who also depend on the supply of food from agriculture.

The strong economic growth, rapid structural change, increasing affluence, probable continued strong economic performance in the region, and a projected population of over 615 million by the year 2010 are all factors that have caused a rise in demand for food in developing countries. Human activities are increased to hunt additional agricultural production to meet added required food demand. As a result, the patterns of land use are going on an unsustainable direction, causing destruction of natural vegetation. In addition, irrigation and fertiliser consumption for higher agricultural productions are reaching their limit. Thus, long-term agricultural development with a systematic strategic process of knowledge shared with other parties related for sustainable agricultural production is needed. Changed agricultural environment and its impact on regional food security are discussed in this paper.

Objective of the Paper

The objective of this paper is to explore issues related to the overall agricultural production for food security in Southeast Asia. Secondary data are obtained from various publications and existing reports on the related subject. Discussions are elaborated under the following headings: environmental change and agricultural production, relationship between population and cropland, land use, irrigation and fertiliser consumption.

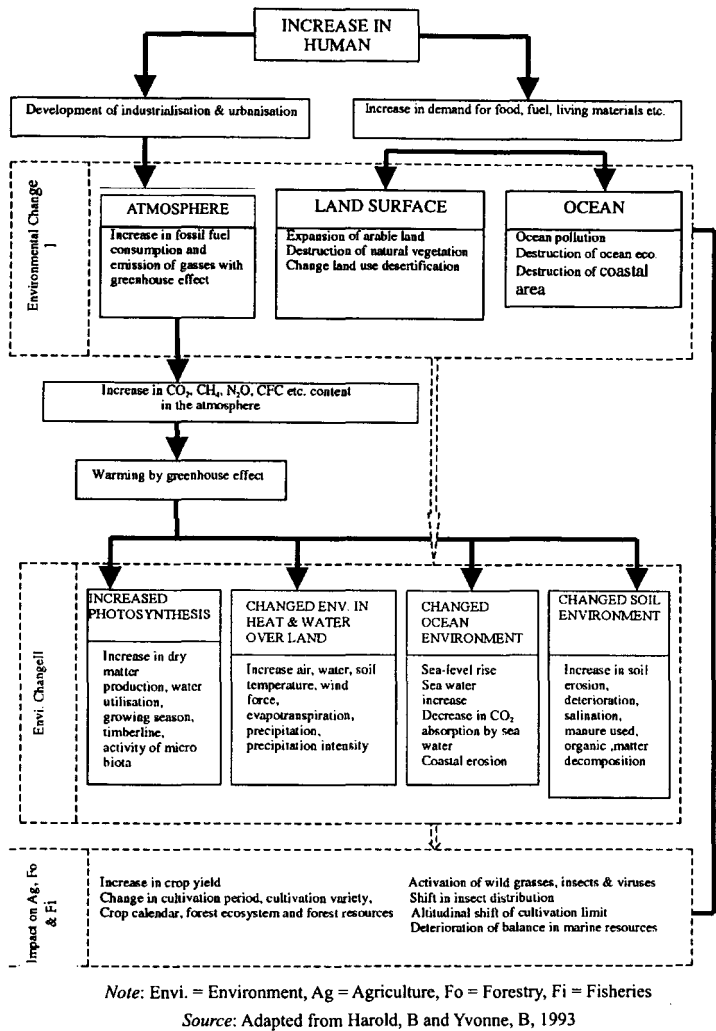


Figure 40.1: Flow of Impacts of Environmental Change on Agricultural Production

Environmental Change and Agricultural Production

A trend that is threatening sustainable agricultural development, and hence food security, has to do with the widespread effects of human activities on the environment. The impact of global environmental change since the 1960s caused by human activities on agriculture and forestry can be seen in Figure 40.1. The striking acceleration of human activities, including population increase during those years, is the starting point of the flow (Harold and Yvonne 1993). It results in the set of effects labelled as environmental change. Through global warming by greenhouse effects, these lead directly to the second group of consequences. The increase in photosynthesis is an important element, being a response of plant and is

tentatively of equal weight with changes in the atmosphere, ocean and soils. The second set of changes then leads to impacts on agriculture and forestry, which in turn feeds back to the beginning stage of the whole process, caused by the expansion of arable lands, destruction of natural vegetation, change of land and accelerating desertification. As a result, agriculture and forestry production is deteriorating as a whole. The problems listed in the box (*) of the figure are particularly important in the Asian tropics.

Natural and Non-natural Resources for Agricultural Production

Agricultural production depends absolutely on the availability of natural resources like arable and permanent cropland and sustainability of man made non-natural resources such as patterns of land use, irrigation and fertiliser consumption and other related chemicals. The impacts of these variables mentioned above on Southeast Asian agricultural production can be elaborated as below:

Arable and Permanent Crop Land

Southeast Asia’s population has been increasing by millions every decade, and the natural resources available for food production are shrinking. This is because the region’s ongoing urbanisation and industrialisation have reduced arable land per capita from today’s 0.15 hectares to only 0.09 hectares by 2025. Looking at Table 40.1, the countries of the Southeast Asian region such as Indonesia, Malaysia, the Philippines and Thailand vary in terms of population size and per capita cropland. There is a high increase in the population of all these countries. On the other extreme, per capita cropland 1990 and projections in 2025 has sharply decreased from 1960. The decrease of per capita cropland in 2025 is higher than that of 1960 or 1990.

Table 40.1: Arable and Permanent Cropland by Country, 1960-1990 and 2025 Projections

Country	Population			Per capita cropland		
	1960	1990	2025	1960	1990	2025
Indonesia	96,194	182,812	275,598	0.18	0.12	0.08
Malaysia	8,140	17,891	31,577	0.49	0.27	0.15
Philippines	27,560	60,779	104,522	0.24	0.13	0.08
Thailand	26,392	55,583	73,584	0.43	0.41	0.31
Vietnam	34,743	66,689	118,151	0.17	0.10	0.05

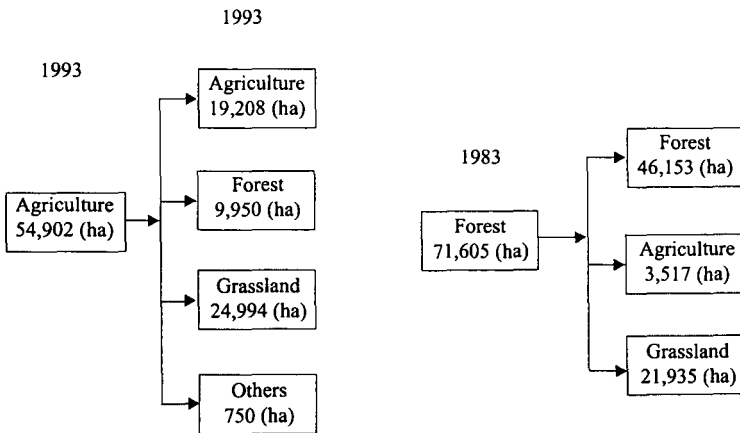
Source: Population action international and UN projections, 2000.

Land Use

Southeast Asian countries are now experiencing the consequences of rapid economic and development growth founded on unsustainable exploitation of environmental resources. The changes in land use and cover in Indonesia, Malaysia, the Philippines, Thailand, and Vietnam coincided with the period of 1974-1996 and its phenomenal economic growth.

Forestlands in Southeast Asia had decreased at 3,690 ha yr⁻¹, with rates ranging from 1,750 ha yr⁻¹ in Indonesia to 5,689 ha yr⁻¹ in Thailand from 1974 to 1996. Deforestation in Malaysia and the Philippines took place at an average rate of 2,500 ha yr⁻¹. While agricultural land decreased at an average rate of 3,650 ha yr⁻¹ in the Philippines and Indonesia, it increased at about 1120 ha yr⁻¹ in Malaysia and Thailand. Urbanisation and industrialisation consumed about 5,100 ha yr⁻¹ in Indonesia and 2170 ha yr⁻¹ in Malaysia; even in the upland portion of Thailand watershed, settlement areas grew at about 340 ha yr⁻¹. The construction of two water reservoirs upstream of the Upper Citarum Watershed magnified by ten times the areas covered by water in 1974 (T. B. Moya, 1998).

Detailed changes in forest and agricultural lands in the Magat watershed, Philippines between 1983 and 1993 are depicted in Figure 40.2. Agricultural lands in the watershed decreased by 62 per cent; of the percentage decline, 41 per cent was accounted for by marginal agricultural lands that were rendered unproductive by long-term cultivation and hence, left to become grassland, and 20 per cent went into forest re-growth in the rugged terrain and upland areas. The remaining lands were converted into settlement sites. In the same period, forestlands in the watershed decreased by 36 per cent (Figure 40.2), i.e., a 31 per cent increase in grassland and a 5 per cent increase in agricultural land. Almost the same trends can be seen in Upper Citarum in Indonesia, Klang Langat in Malaysia and Chiang Mai, Thailand in the same period.



Source: T. B. Moya, 1998

Figure 40.2: Trends in Land Use Change 1983-1993

Irrigation

Although irrigation potential varies from country to country, in many countries of this region, irrigation is viewed as an important input to the agricultural production systems. It is because irrigation is a major factor in increasing agricultural productivity, facilitating multiple cropping and the use of high-yielding varieties, and reducing loss from drought; there is

little doubt that it will be pressed further to its economic limits. However, as shown in Table 40.2, there has been an important increase in the irrigated proportion of arable and permanent cropland land in all the countries. The expansion of the irrigated area, however, may be approaching its limits, and there are growing problems due to the siltation of dams, and loss of irrigated land caused by silting of valleys and changing hydrological regimes below deforested areas. Moreover, the rising demands of cities and industry are increasingly competing with agricultural needs. The holding back of water to provide urban supplies is already leading to inadequate dry-season flow into the sea, resulting in problems of salt-water intrusion.

Table 40.2: Growth in Irrigation in 1975-1995

Country	1975 (million ha)	1985 (million ha)	1995 (million ha)
Indonesia	2.70	3.45	4.40
Malaysia	0.31	0.44	0.45
Philippines	3.85	4.00	4.30
Thailand	2.00	3.24	4.24
Vietnam	2.00	2.21	2.30

Source: Water Resource Department, Indonesia, 1996; National Identity Office, Thailand, 1996; Philippines Department of Agriculture, 1999; World Bank, Vietnam, 1997; Population Action International and UN, 2000.

Fertiliser Consumption

A robust 122 per cent growth of fertiliser consumption took place in Southeast Asia, due to high growth rates in Vietnam, Thailand, and Malaysia. Indonesia was slightly behind, while the Philippines recorded a more modest growth (Table 40.3). In more recent years, the increase in fertiliser use has been tapering off in this region; consumption may have already peaked. The general regional increase over 29-year period is, nevertheless, a very notable feature of this Table. Together with the heavy use of herbicides and pesticides, this chemicalisation indicates both major changes in farming practice and a cause for serious concern due to the environmental consequences.

Table 40.3: Fertiliser Consumption in Kg per Hectare 1970-1998

Country	1970	1998
Indonesia	9.20	89.5
Malaysia	43.60	184.9
Philippines	26.90	62.8
Thailand	5.90	81.5
Vietnam	50.7	268.6

Source: UNDP, 2001.

Forestry Situation

Nearly half of the Southeast Asian region is covered with tropical forest, accounting for about six per cent of the forest area of the world. Therefore, this region's forests have global significance in terms of biological diversity conservation. 46.2 per cent of the land of Southeast Asia is under forest with annual change in forest of -1.3 per cent or -2748 thousand hectare during the period 1990-1995. In Indonesia and Malaysia, more than 50 per cent of the land was recorded as forest in 1985. Even on the basis of the FAO data, there have been steep reductions over the 15-year period in Malaysia, the Philippines, Thailand and Vietnam, while other studies record much loss. Thus, in the Philippines, about 70 per cent of the country was forested at the end of the Spanish period and 57 per cent in 1934, but by 1969 the forest area had fallen to only about 35 per cent and by 1985 to 40 per cent to 21.5 in 1990. In Vietnam, a reduction of from 48 to 29 per cent of the country under forest was recorded between 1943 and 1985. The recent decline in Thailand has been even more dramatic, the forested area falling from 53 per cent of the country in 1961 to only 29 per cent in 1985. A comparison of the forest covers of Peninsular Malaysia between 1973 (70%) and 1990 (56%) shows clearly the scale of transformation that has taken place. The Peninsula's forests have been greatly reduced by large-scale land-settlement schemes in this period, as well as selective logging, which has extended over huge additional areas in that one decade, making deep inroads into the largest remaining block of primary forest in the Peninsula.

Table 40.4: Area under Forest as Percentage of Total Land Area in 1973-1990

Country	1973	1985	1990
Indonesia	67	63	56
Malaysia	70	62	56
Philippines	46	40	21.5
Thailand	40	29	28
Vietnam	42	29	28

Source: Adapted from Harold B. and Yvonne B. 1993.

Conclusion and Policy Implication

Shortfalls in food security can and do result from various interlinked adverse conditions in a country's environmental and socio-economic system; the only pathway to eventual food security is sustainable development. This means breaking the vicious circle of continuing poverty, environmental degradation and acute institutional deficiencies. To aim for a commensurate food production volume within the framework of such a development strategy, adapted to specific local circumstances, is a must.

Strategies for Sustainable Development

As a strategy for preserving natural resources and changing production practices, sustainable agriculture requires a commitment to changing public policies, economic institutions, and

social values. Strategies for change must take into account the complex reciprocal and ever-changing relationship between agricultural production and the broad society.

Strategies for Achieving Food Security

The 'food system' extends far beyond farm and involves the interaction of individuals and institutions with contrasting and often competing goals including farmers, researchers, input suppliers, farm workers, unions, farm advisors, processors, retailers, consumers and policymakers. Relationships among these actors shift over time as new technologies spawn economic, social and political changes.

A wide diversity of strategies and approaches is necessary to create a more sustainable food system. These will range from specific and concentrated efforts to alter specific policies or practices, to longer-run tasks of reforming key institutions, rethinking economic priorities, and challenging widely held social values. It could provide the research and extension system with an enormous opportunity to guide the shaping of an expanded and highly relevant meaning for the 21st century.

Strategies for Poverty Alleviation

Agricultural intensification that increases the productivity of scarce resources is crucial to poverty alleviation and improved natural and man made non-natural resource management. Broad-based agricultural growth involving small and medium-sized farms and driven by productivity enhancing technology can offer a way to create productive employment and alleviate poverty on the scale required.

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