Changing Economic Relationships in Southeast Asian Agriculture, and their Implications for Small Farmers

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The last 25 years have seen radical changes in agriculture in Southeast Asia. The traditional labour-intensive subsistence farming on small holdings has been increasingly replaced by new technologies involving capital inputs, such as fertilizers, agrochemicals, and machinery. This article reviews these developments and their economic, political, and social implications.

Southeast Asian agriculture, as practised in Indonesia, Malaysia, Thailand, the Philippines* and Indo-China, involves one of the most productive areas of the world. It ranges in nature from extremely labour-intensive cultivation, as undertaken in Java, Luzon, and the Mekong, to land-intensive practices in the sparsely populated regions of Sumatra, Borneo, West Irian, and North Thailand. Apart from some large estates and land development schemes growing tree crops in Indonesia and Malaysia, together with the huge collectivized enterprises in socialist Vietnam, it predominantly comprises small farms of up to a few hectares based on nuclear families.

With the widespread adoption of new technological innovations and with additional use of land, labour, modern inputs, and improved infrastructures, Southeast Asian agriculture has expanded rapidly over recent years. In 1970–85 this was at an overall annual growth rate of 3–5 per cent in the real value of output. Now, however, problems are arising from this very expansion and its parallels in other parts of the world. These are leading to the over-supply of many agricultural commodities, and to consequent falls in their prices. There are, further, substantial segments of agriculture in each country which have largely missed out on economic growth. Those living in these segments are still under conditions of poverty, from which some relief is urgently needed.

The approach in this paper is first to review the recent broad changes in economic relationships in the various Southeast Asian countries and their agricultures, and the effects of these changes on major farm subsectors. Some key economic and social implications of the adoption of new technologies by small farmers are then discussed, and the position of disadvantaged groups is examined. The main official policy measures impinging on what has happened are also scrutinized. Some conclusions on the direction of change as it concerns small farmers, and on the role of government in agricultural improvement, are finally offered.

Broad changes

Excepting the Indochinese countries whose economies were ravaged by war, the periods of the 1970s and early 1980s were featured by generally strong economic growth, which was reflected in rising gross domestic products (GDPs) (Table 1). In all cases the share of agriculture in GDP declined and, again excepting Indochina, stood at around one-quarter of the total by 1980. The share of manufacturing had grown especially fast in Malaysia, with consequent pressures on other sectors, while large petroleum booms in Indonesia and Malaysia during the 1970s generated substantial increases in export revenues. The least change in GDP shares was in the Philippines which, although possessing a more diversified economy than the other countries in 1960, had subsequently not altered them much. Indonesia and Thailand had by far the largest agricultural sectors in terms of total value of output (Table 2), total cultivated land area, and total labour force involved (Table 3).

In the 1980s, rice is still the most significant agricultural product in all Southeast Asian countries except Malaysia, and its production has expanded very substantially in response to deliberate government programmes, most of which have aimed to achieve self-sufficiency. In fact, the 'average food production index' has risen greatly in every case except that of Kampuchea (Table 1). Despite this, however, the relative share of basic food crops in total agricultural output has fallen markedly in almost all cases. This is actually a rational economic trend in light of the real price declines experienced by rice and other staples (figure 1), as they have moved towards oversupply and mounting stock levels. Indeed, whilst this was not yet evident in the 1980 figures for cereals (Table 1), the imports of rice into Indonesia and the Philippines have declined drastically in the 1980s as these countries have approached self-sufficiency.

Other high-value crops including palm oil, pineapples, bananas, and cocoa have expanded more rapidly, in response to relatively high prices in both domestic and export markets. Crops such as these have much higher income elasticities of demand than the traditional staples, and are logical candidates for expansion under conditions of rapidly rising *per capita* incomes. To a considerable extent such crops can be grown effectively by small farmers, especially where appropriate processing and marketing services are available. More traditional cash and export crops such as sugarcane, tea, and rubber have generally been subject to oversupply problems for some time, with particularly low recent prices (figure 1). Their areas and outputs have accordingly increased little.

It should further be mentioned that the prices received by farmers whose products are exported to international

* These first four nations may be collectively termed the 'Asean' countries. Asean stands for the Association of South East Asian Nations, and includes the non-agricultural Singapore as a fifth member.

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TABLE 1 POPULATION AND STRUCTURE OF PRODUCTION, SOUTHEAST ASIAN COUNTRIES, 1960–80

	Indonesia			Malaysia			Thailand		
	1960	1970	1980	1960	1970	1980	1960	1970	1980
Population									
Total (m. persons)	93.5	116.2	147.5	6.3	10.4	13.7	26.4	36.4	47.7
Share workforce in agriculture (%)	75	66	58	63	56	40	83	67	76
Gross domestic product[b]									
Total (US$m.)	8,670	8,925 (3.9)[c]	69,800 (7.6)	2,290	3,438 (6.5)	23,600 (7.8)	2,550	6,503 (8.4)	33,450 (7.2)
Shares (% in									
Agriculture	50	45 (2.7)[c]	25 (3.8)	36	30 (−3.6)	23 (5.1)	14	28 (5.6)	25 (4.7)
Manufacturing	–	8 (3.3)[c]	12 (12.8)	9	14 (2.1)	19 (11.8)	13	17 (11.4)	20 (10.6)
Other industry	25	12 (5.2)[c]	31 (11.1)	18	13 (5.9)	12 (9.7)	19	10 (11.9)	9 (10.0)
Services	25	35 (4.8)[c]	32 (9.2)	46	43 (−0.4)	46 (8.2)	41	45 (9.1)	46 (7.3)
Gross National Product[d]*/head* (1982 US$m.)	n.a	n.a	430	n.a	n.a	1,620	n.a	n.a	670
Agriculture value added (1975 US$m.)	n.a	7,896	12,168[e]	n.a.	2,049	3,554[e]	n.a.	3.591	5,666[e]
Cereal imports[f] ('000 t)	1158	1,447	3,500	945	953	1,104	33	81	213
Fertilizer consumption (kg/ha arable land)[g]	n.a.	119	630	n.a.	436	1,051	n.a.	76	162
Average food production index[h] (1967–71 = 100)	80	102	133	65	99	160	60	100	165

	Philippines			Vietnam			Kampuchea			Laos		
	1960	1970	1980	1960	1970	1980	1960	1970	1980	1960	1970	1980
Population												
Total (m. persons)	27.4	36.9	48.4	14.1	18.3	52.3	4.7	7.1	8.9	2.3	3.0	2.7
Share workforce in agriculture (%)	61	57	46	81	79[a]	71	70	80[a]	74	83	81[a]	75
Gross domestic product[b]												
Total (US$m.)	6,960	7,185 (5.1)[c]	35,490 (6.3)									
Shares (% in												
Agriculture	31	29 (4.3)	23 (4.9)									
Manufacturing	19	23 (6.7)	25 (7.2)		n.a.			n.a.			n.a.	
Other industry	5	7 (6.0)	12 (8.7)									
Services	45	41 (5.2)	40 (5.4)									
Gross National Product[d]*/head* (1982 US$m.)	n.a.	n.a.	690		n.a.			n.a.			n.a.	
Agriculture value added (1975 US$m.)	n.a.	3,682	6,149[e]		n.a			n.a			n.a.	
Cereal imports[f] ('000 t)	350	511	1,053	94	944	1098	18	23	373	9	73	53
Fertilizer consumption (kg/ha arable land)[g]	n.a.	214	337	n.a.	512	407	n.a.	13	27	n.a.	4	78
Average food production index[h] (1967–71 = 100)	73	101	154	98	100	137	n.a.	117	52	n.a.	101	130

Notes:
a. In 1965.
b. Total final output of goods and services produced by the national economy, generally valued at factor cost. Values are nominal, being converted to US$ by using the average exchange rate for the particular year.
c. Figures in brackets ( ) in this line are annual growth rates over the previous 10 years.
d. Gross domestic product (as defined in note 'b', *plus* factor incomes accruing to residents from abroad *less* income earned in the domestic economy and accruing to persons abroad. Converted to 1982 US$ by the method described in World Bank (1980–85).
e. In 1981.
f. In grain equivalents
g. Including land under permanent crops.
h. Quantities produced of all goods, *less* components used for animal feeds, and processing and distribution losses.
Sources: World Bank (1980–85) [48]; United Nations (1971–83) [49]; United Nations (1960–84) [50]; Philippines (1979–82) [51]; Indonesia (1975–83) [52].

TABLE 2 OUTPUTS, VALUES OF OUTPUTS[a], AND EXPORTS OF MAJOR AGRICULTURAL PRODUCTS, SOUTHEAST ASIAN COUNTRIES, 1960–80

	Indonesia					Malaysia				
	Volume ('000 t)			Value (US$m)	Exports % of value)	Volume ('000 t)			Value (US$m)	Exports (% of value)
Product	1960	1970	1980	1980	1980	1960	1970	1980	1980	1980
Rice	12,814	19,331	28,680	12,444	–	644	1,681	2,129	924	–
Cassava	11,376	10,478	12,400	1,860	–	n.a.	288	420	63	–
Sugarcane	8,160	9,748	17,085	579	–	–	–	610	14	–
Maize	2,460	2,825	3,600	507	–	2	12	15	1	–
Copra	636	744	991	501	46	64	201	215	109	21
Rubber	619	815	919	1,100	107	771	1,269	1,600	1,915	64
Palm oil	174	266	750	380	67	116	523	3,114	1,576	64
Sweet potatoes	2,670	2,175	2,025	n.a.	–	9	72	36	–	–
Groundnuts	427	469	750	433	–	2	5	23	21	–
Soybeans	443	498	600	133	–	–	–		–	–
Tea	79	64	92	140	80	3	3	3	5	–
Cocoa	1	2	9	23	156	n.a.	4	33	83	96
Coffee	96	186	240	661	99	6	7	9	25	22
Pineapples	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	283	210	92	24
Bananas	n.a.	n.a.	1,622	201	–	n.a.	364	455	56	5
Tobacco	n.a.	74	84	174	38	–	3	10	21	–
Jute	–	–	11	3	–	–	–	–	–	–
Potatoes	n.a.	115	219	23	–	–	–	–	–	–
Fruit and nuts	n.a.	n.a.	n.a.	n.a.	–	n.a.	n.a.	n.a.	n.a.	–
Totals[c]				19,162					4,905	

	Thailand					Philippines				
Rice	7,834	13,270	17,400	7,550	16	3,740	5,233	7,836	3,400	3
Cassava	1,222	3,431	12,665	1,900	–	547	442	2,276	341	–
Sugarcane	5,382	5,102	12,600	521	4	10,825	16,271	19,846	824	53
Maize	544	1,938	3,150	444	70	1,165	2,008	3,123	440	–
Copra	20	n.a.	n.a.	n.a.	n.a.	1,075	1,656	1,853	937	7
Rubber	172	287	508	608	90	3	19	68	81	11
Palm oil	–	–	60[b]	30	–	–	–	–	n.a.	–
Sweet potatoes	138	250	614	n.a.	–	739	731	1,048	–	–
Groundnuts	152	125	137	79	2	15	17	50	29	–
Soybeans	26	50	129	29	–	n.a.	1	9	2	–
Tea	–	–	–	–	–	–	–	–	–	–
Cocoa	–	–	–	–	–	3	4	4	10	–
Coffee	n.a.	n.a.	10	28	22	26	49	125	345	13
Pineapples	256	242	2,000	878	6	134	233	1,280	562	15
Bananas	*425*	*1,200*	*2,164*	*268*	*27*	*307*	*896*	*3,977*	*493*	*24*
Tobacco	74	93	71	147	54	64	61	42	87	48
Jute	–	6	228	56	–	–	–	–	–	–
Potatoes	–	–	7	1	–	7	20	22	2	–
Fruit and nuts	n.a.	n.a.	n.a.	n.a.	–	177	288	524	n.a.	–
Totals[c]				12,539					7,553	

Notes:
a. Values determined at relevant border prices, which are taken as the *same* for all countries. These border prices are as follows: Rice: Bangkok, 5% Broken fob. Cassava: Thailand fob. Sugar: Raw, Philippines fob. Maize: Indonesia fob. Copra: Indonesia fob. Robber: Indonesia fob. Palm oil: Malaysia fob. Sweet potatoes: n.a. Groundnuts: Any origin, European ports cif, adjusted to fob (70% of oil price, 30% of meal price). Soybeans: European ports cif, Adjusted to fob. Tea: Indonesia fob. Cocoa: Malaysia fob. Coffee: Indonesia fob. Pineapples: Philippines fob. Bananas: Philippines fob. Tobacco: Indonesia fob. Jute: Thailand fob.
b. 1982 figure.
c. Totals of available figures.
Sources: World Bank (1985) [53]; Food and Agriculture Organization (1960–1981) [54] *plus* sources for Table 1.

[Table 2 continued on p. 170

markets have been affected through local currency exchange rates which, although tending to decline in real terms for all Asean countries except the Philippines (figure 6), have fluctuated considerably. Thus Indonesia in particular saw a great rise in exchange rates (and accordingly adverse effects on agricultural producers), fuelled essentially by its petroleum boom in the mid-1970s.

As indicated, the major increases in agricultural output are only partly attributable to new technologies, and have also been influenced by great extensions in the use of both land and labour (Table 3). Although with land there have at the same time been advances in irrigation, and thus in quality, there has been much encroachment of cultivation on to areas of inferior potential, notably in regions of higher population density. The consequently emerging scarcity of land has been accompanied by considerable gains in its real value. The extensions in use of agricultural labour have varied considerably between countries; Thailand appears to have had a big growth in the 1970s, while Malaysia with its rapidly expanding manufacturing sector has seen little recent rise. In fact, the growing demands for workers in the manufacturing and services sectors of Indonesia, Malaysia, and Thailand have caused some labour

TABLE 2 – continued

	Vietnam					Kampuchea					Laos				
	Volume ('000 t)			Value (US$m)	Exports (% of value)	Volume ('000 t)			Value (US$m)	Exports (% of value)	Volume ('000 t)			Value (US$m)	Exports (% of value)
	1960	1970	1980	1980	1980	1960	1970	1980	1980	1980	1960	1970	1980	1980	1980
Rice	4,955	5,715	11,000	4,773	–	1,544	3,814	1,200	521	–	500	903	1,000	434	–
Cassava	220	216	3,900	585	–	16	30	150	1	–	9	15	68	0.01	–
Sugarcane	1,000	336	3,600	50	–	n.a.	n.a.	130	8	–	–	–	9	1	–
Maize	27	31	540	76	–	118	137	100	14	–	12	25	52	7	–
Copra	8	n.a.	n.a.	n.a.	–	n.a.	n.a.	n.a.	n.a.	–	n.a.	n.a.	n.a.	n.a.	–
Rubber	78	33	50	60	55	37	13	16	19	–					
Palm oil	–	–	n.a.	–	–	–	–	–	–	–	–	–	–	–	–
Sweet potatoes	221	220	2,600	n.a.	–	5	23	15	n.a.	–	–	15	28	n.a.	–
Groundnuts	24	22	90	52	16	2	17	13	8	–	1	2	6	16	–
Soybeans	3	26	25	5	–	3	4	3	1	–	–	4	3	1	–
Tea	5	6	22	33	41	–	–	–	–	–	–	–	–	–	–
Cocoa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Coffee	3	4	12	33	33	–	–	–	–	–	1	3	4	11	15
Pineapples	54	n.a.	n.a.	–	–	n.a.	n.a.	n.a.	n.a.	–	n.a.	n.a.	n.a.	n.a.	–
Bananas	n.a.	204	895	111	1	n.a.	n.a.	65	8	–	n.a.	n.a.	8	1	–
Tobacco	8	8	22	46	–	6	10	5	10	–	10	–	2	4	2
Jute	2	n.a.	53	13	8	1	n.a.	4	1	–	–	–	–	–	–
Potatoes	n.a.	10	826	92	–	–	–	–	–	–	13	17	34	4	–
Fruit and nuts	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Totals[c]				5,929					591					479	

Note:
c. Totals of available figures.
Sources: World Bank (1985) [53]; Food and Agriculture Organization (1960–1981) [54] *plus* sources for Table 1.

scarcity. There have thus been substantial advances in real agricultural wages (figure 2), albeit with wide annual fluctuations in line with commodity price changes. On the other hand, real wages have tended to fall in the less dynamic economic situation of the Philippines.

As well as land and labour there have, except in Vietnam, been huge increases in fertilizer use (Table 3), which are also reflected in the much enhanced consumption of this item per hectare of arable land (Table 1). This change has been further stimulated by a drop in real fertilizer prices (figure 2). There has again been a huge upsurge in the use of agricultural machines, as indicated by the figures for tractors (Table 3). The generally adverse market position of agricultural producers, where the prices of their outputs have tended to decline and the costs of their inputs to rise, is reflected by the worsening terms of trade figures (Figure 6).

There has finally in all countries been a major effort by government to improve the physical infrastructures of roads and communications, and the social infrastructures of education and health, all of which can be considered as exercising important positive effects on agricultural performance. These efforts of government have been reinforced by the influence of burgeoning economic development in Indonesia, Malaysia, and Thailand, but have been counteracted by war in Indochina.

Economic and social implications of new technologies

The wide impact of new technologies in Southeast Asian agriculture is reflected in the rising average yields per planted hectare of many major crops since 1960 (Table 4). These increases followed what had previously been extremely slow growth, but even so were small when set beside the doubling or tripling of traditional yields secured by researchers on experimentally managed plots (for example, International Rice Research Institute, 1981–84 [1]; Rubber Research Institute of Malaysia, 1981–84 [2]). The gap between actual and experimental results reflects such factors as the relatively slow pace of diffusion; the steady encroachment of cropping on to less productive lands; the unsuitability of the new methods in many places; the frequent difficulties in securing complementary inputs; and the situation with tree crops where improvement through planting new materials takes place only once in a life-cycle of many years.

Yet there is little doubt that the technological advances in Southeast Asian agriculture will continue as strongly, especially in light of attempts to move from the earlier focus on catering for improvement under selective conditions to addressing a wider range of agronomic and social circumstances [3, 4]. As well, advances in biotechnology and tree cloning techniques promise further large increases in yields, while steady progress is also being made in improving the quality of products and of complementary material inputs, such as fertilizers and machinery.

This major technological progress has flowed from the widespread establishment of research facilities in Southeast Asian countries over the past twenty-five years. In these facilities, new ideas have been generated, and new technologies from elsewhere further adapted to the particular problems of the region. To the extent that resulting innovations have been adopted, producers have been able to earn considerably higher net revenues, even when account is taken of lower prices in response to enhanced output. The facilities have accordingly earned a good rate of return on investment [5], and continuing further emphasis in this direction seems well justified. It should be noted that gains from agricultural research expenditures do not solely accrue to agricultural producers and those involved in marketing their products domestically, but are almost always shared with consumers. These latter typically secure about one-third of the gain, given the price inelastic supply and relatively elastic demand for most agricultural products [6]. The share of consumers declines as demand becomes more elastic, which is indeed the trend with the widening development of markets and substitutability of products.

TABLE 3 AGRICULTURAL LAND, LABOUR, AND FERTILIZER USE, SOUTHEAST ASIAN COUNTRIES, 1960–80

	Indonesia			Malaysia			Thailand			Philippines		
	1960	1970	1980	1960	1970	1980	1960	1970	1980	1960	1970	1980
Land ('000 ha)												
Irrigated	5,975	6,679	7,059	214	243	330	1,363	1,758	3,171	808	830	1,300
Rice	7,285	8,135	9,000	460	705	766	5,643	6,727	9,145	3,307	3,113	3,676
Cassava	1,417	1,398	1,410	n.a.	31	41	72	224	1,011	100	83	204
Sugarcane	125	69	175	–	–	18	157	116	480	242	366	425
Maize	2,640	2,939	2,900	n.a.	11	8	285	749	1,562	1,846	2,420	3,201
Copra	14,960[a]	1,810	n.a.	189	241	300	n.a.	n.a.	n.a.	1,059	1,884	3,126
Rubber	2,103[a]	2,299	2,552	1,707	1,730	1,810	384	1,276	1,538	5	22	54
Oil palm	111[a]	127	256	50	280	929	–	–	53[b]	–	–	n.a.
Root crops	n.a.	681	1,784	n.a.	18	58	n.a.	98	1,053	289	255	486
Cocoa	11[a]	12	27	–	4	58	–	–	–	7	8	5
Coffee	*278*	*390*	*410*	*3*	*10*	*9*	–	–	*n.a.*	*31*	*54*	*102*
Bananas	n.a.	n.a.	n.a.	n.a.	21	23	64	180	275	162	235	318
Tea	137	89	84	3	3	3	–	–	–	–	–	
Totals[c]	15,603	17,949	18,598	2,412	3,054	4,023	6,605	9,370	15,117	7,048	8,440	11,597
Labourers (m. workers)	23.5	28.1	30.5	1.4	2.0	2.3	11.3	13.5	15.7	5.7	7.3	7.7
Fertilizers ('000 t)												
N	46	202	865	21	66	139	4	43	154	22	119	225
P_2O_5	9	32	277	5	51	119	2	24	102	7	44	53
Tractors ('000)	1	9	12	2	5	8	2	8	35	4	8	17

	Vietnam			Kampuchea			Laos		
	1960	1970	1980	1960	1970	1980	1960	1970	1980
Land ('000 ha)									
Irrigated	613	1,000	1,700	59	89	89	n.a.	17	78
Rice	2,318	2,510	5,740	1,353	2,399	1,200	627	665	690
Cassava	34	30	160	1	3	25	1	1	5
Sugarcane	33	12	74	–	–	3	–	–	1
Maize	28	28	500	88	86	130	10	15	38
Copra	–	n.a.	n.a.	n.a.	n.a.	n.a.	–	–	–
Rubber	109	106	86	n.a.	n.a.	12	12	n.a.	n.a.
Oil palm	–	–	53	–	–	–	–	–	–
Root crops	n.a.	2	11	n.a.	2	28	n.a.	2	11
Cocoa	–	–	–	–	–	–	–	–	–
Coffee	10	9	20	–	–	–	1	6	10
Bananas	–	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tea	8	8	49	–	–	–	–	–	–
Totals[c]	2,540	2,725	6,640	1,442	2,490	1,398	639	689	756
Labourers (m. workers)	13.7	15.5	17.3	n.a.	2.2	1.8	1.1	1.2	1.4
Fertilizers ('000 t)									
N	20	173	156	–	1.8	7.2	–	0.1	6.9
P_2O_5	–	99	45	–	1.1	0.9	–	0.1	0.0
Tractors ('000)	0.5	4	24	–	1	1	0.02	0.3	0.4

Notes:
a. 1965 figures.
b. 1982 figure.
c. Totals of available figures.
Sources: Food and Agriculture Organization (1960–1981) [54], *plus* sources noted for Table 1.

Yet it must also be recognized that the growing use of new technologies has economic and social implications for small farmers other than enhancing their net revenues. These implications spring from the nature of the technologies themselves. Thus the traditional low-yielding technologies, which small farmers used almost exclusively until the 1950s (figure 3), were essentially very labour-intensive, requiring little cash input beyond a few hand tools which were sometimes accompanied by an animal. They were also 'robust' to poor management, in that they would still give fair yields when handled poorly. In contrast, the various new technologies are almost all less labour-intensive, requiring a relatively smaller share of this input with proportionately more cash inputs, notably fertilizers, pesticides, and some machines. They are also far less robust, and in general necessitate good management if they are to give satisfactory economic results.

The less labour-intensive nature of the new technologies raises socioeconomic questions about the effects of their adoption on employment and wages. Although the share of labour amongst resources used has certainly declined, the change in absolute labour use is far

TABLE 4 YIELDS[a] OF MAJOR CROPS, SOUTHEAST ASIAN COUNTRIES, 1960–80 (T. PER PLANTED HA)

	Indonesia			Malaysia			Thailand			Philippines		
Crop	1960	1970	1980	1960	1970	1980	1960	1970	1980	1960	1970	1980
Rice	1.8	2.3	3.2	1.4	2.4	2.8	1.4	2.0	1.9	1.1	1.7	2.1
Cassava	8.0	7.5	8.8	12.6[b]	9.3[b]	10.2[b]	17.0	15.3	12.5	5.5	5.3	11.2
Sugarcane	65.3	141.3	97.6	–	30.6[b]	33.9[b]	34.3	44.0	26.3	44.7	44.5	46.7
Maize	0.9	1.0	1.2	0.7[b]	1.9[b]	1.0[b]	1.9	2.6	2.0	0.6	0.8	1.0
Copra	0.4[b]	0.4[b]	n.a.	0.3	0.8	0.7	n.a.	n.a.	n.a.	1.0	0.9	0.6
Rubber	0.3	0.4	0.4	0.5	0.7	0.9	0.4	0.2	0.3	0.6	0.9	1.3
Palm oil	1.6	2.1	2.9	2.3	1.9	3.4	–	–	1.1	–	–	n.a.
Cocoa	0.1	0.2	0.3	n.a.	1.0	0.6	–	–	–	0.4	0.5	0.8
Coffee	0.3	0.5	0.6	2.0	0.7	1.0	–	–	0.5[b]	0.8	0.9	1.2

	Vietnam			Kampuchea			Laos		
Crop	1960	1970	1980	1960	1970	1980	1960	1970	1980
Rice	2.1	2.3	1.9	1.1	1.6	1.0	0.8	1.4	1.4
Cassava	6.2	7.2	24.4	16.0	10.0	6.0	9.0	13.0	13.6
Sugarcane	30.3	28.0	48.6	–	70.8[b]	43.3[b]	–	7.8[b]	9.0[b]
Maize	1.0	1.1	1.1	1.3	1.6	0.8	1.2	1.7	1.4
Copra	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Rubber	0.7	0.3	0.6	–	–	n.a.	–	–	–
Palm oil	–	–	n.a.	–	–	–	–	–	–
Cocoa	–	–	–	–	–	–	–	–	–
Coffee	0.3	0.4	0.6	–	1.4	0.4	1.0	0.5	0.4

Note:
a. Except as noted under 'b', obtained by dividing outputs in Table 2 by relevant land areas in Table 3. With tree crops the yield is underestimated, owing to inclusion of immature areas.
b. Obtained from source noted below
Source: Food and Agriculture Organization (1960–1981) [54].

from clear. The evidence is hard to disentangle, moreover, in that other significant changes (such as increases in the use and quality of land, and alterations in the relative prices of all resources), have also been occurring and have influenced what has happened.

With annual crops in many South and Southeast Asian countries, the adoption of new technologies appears to have gone through a 'first phase' involving a strong increase in absolute labour absorption [7]. This was necessary to cope with the demands of both higher yields and enhanced cropping intensities (two crops rather than one, figures 4, 5), which were further associated with land-augmenting improvements such as irrigation. The early increase was subsequently followed by a 'second phase' decline in labour absorption, however, as new chemical and mechanical innovations (such as cultivation with mini-tractors, the use of weedicides, and harvesting with small portable machines) were introduced. These latter cash inputs were taken up to overcome seasonal labour bottlenecks resulting from new technologies adopted in the initial phase. Such bottlenecks occurred during planting, particular stages of cultivation, and harvesting.

The introduction of second phase innovations was economically efficient from farmers' viewpoints at given costs of labour and cash inputs, in that it enabled their net returns to be raised further. At changed resource prices which involved labour becoming more expensive than fertilizers, pesticides and fuels (figure 2), the economic gains from introducing them were even greater. It should be added that in all Asean countries prices of the various cash inputs including machines were often depressed below their international market rates by government subsidies and other measures (see below), which acted to impart an unduly 'capital intensive bias' into the economic behaviour of agricultural producers [8]. Capital inputs were greater, and labour absorption lower, than they would have been in the absence of such measures.

The social consequences of second phase declines in labour absorption have certainly been adverse for landless workers in the less dynamic economy of the Philippines [9]. With the lack of alternative economic opportunities, these declines may well have acted to reduce total employment as well as wage levels (figure 2), although a fall in the latter can in itself be expected to slow any further movement towards labour-saving innovations. Excepting the disadvantaged groups discussed below, however, the consequences of second phase innovations have been far less serious in the expanding economic situations of Indonesia, Malaysia, and Thailand. Here the rises in wages, and the consequent declines in agricultural labour use, have actually been desirable adjuncts to overall structural change.

With perennial (and notably tree) crops, the increase in absolute labour absorption due to higher-yielding technologies is generally likely to have been more sustained, in that there are still limited technical possibilities of substituting other resources for labour in the predominant operation of harvesting. Indeed, this very limitation is increasingly acting to the comparative disadvantage of tree crop industries in situations with relatively high labour costs. This is notably true of Malaysia, which has much higher wages than any Southeast Asian country except Singapore. As might be anticipated from this, Malaysia has seen a relative shrinkage of its labour-intensive rubber industry, as well as the greatest degree of tree crop labour substitution [10]. The latter is instanced by the widening application of chemical yield stimulants in tapping natural rubber [11].

Pecuniary economies

The more cash-intensive nature of new technologies, and the consequent expansions in fertilizer and tractor use

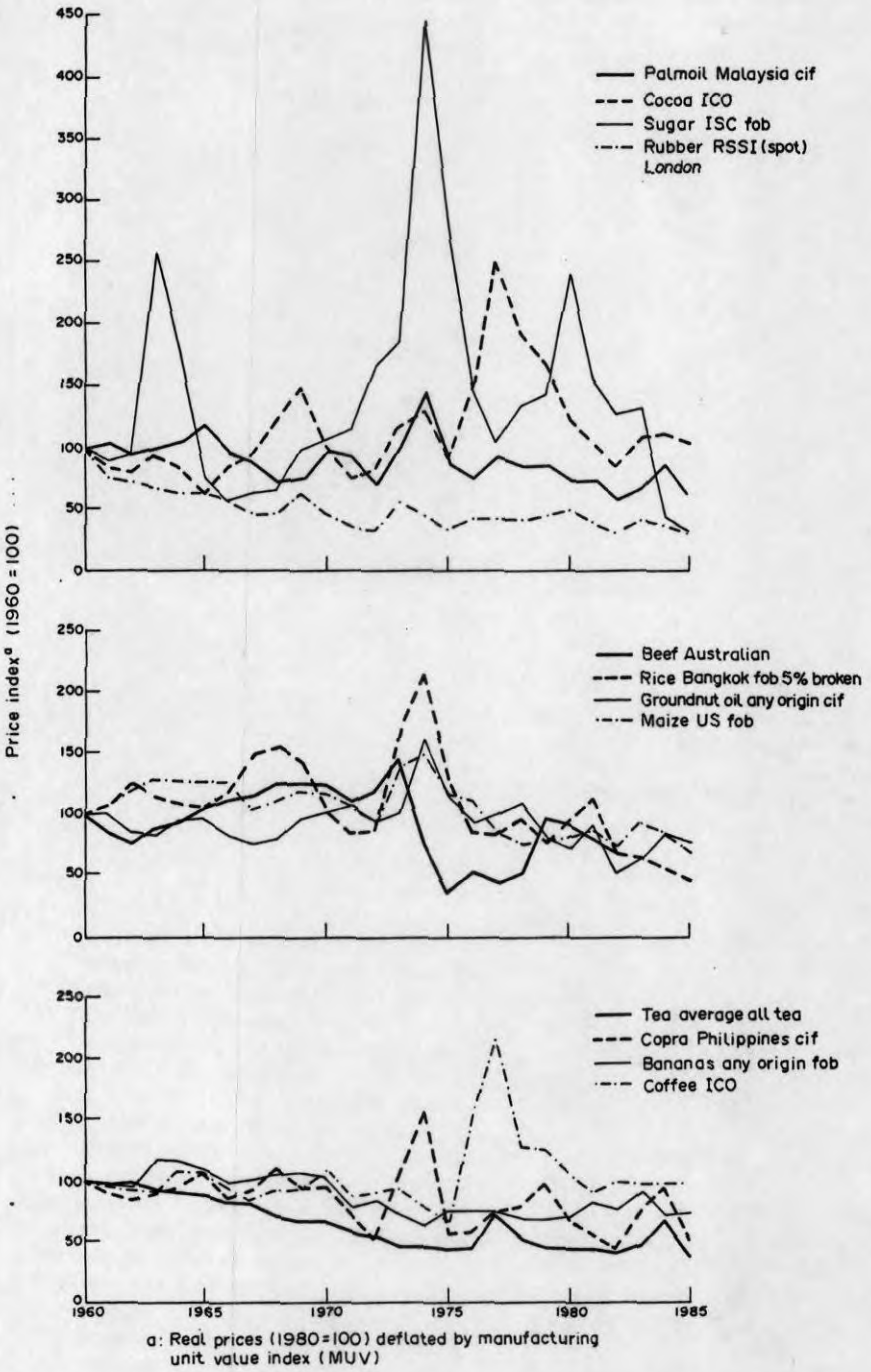


Figure 1 Price indices of major agricultural commodities 1960–85. Source: World Bank (1985) [53].

(Table 3), led some earlier analysts to forecast undesirable social effects in that these technologies would favour large farmers with superior capital resources [12, 13]. The traditional techniques with their minimal requirements of cash had been equally suited to both big and small operators. Accumulating evidence has in fact demonstrated some 'pecuniary' (and political) economies of scale in this aspect, with large farmers usually being faster in adoption [14]. The evidence has also shown, however, that smaller operators have taken up the innovations in a wholesale manner at the rather later stage [15, 16]. This is partly explained in terms of a reduction in perceived risk as evidence mounts from the larger farm adoptions, and as information becomes generally more available. [17, 18]. This reduced risk affects both the small farmers themselves and those who lend to them, for the latter now make loans available at lower (and much more acceptable) interest rates.

The circumstances of credit with tree crops are less flexible, since the necessary long-term finance to cover immaturity periods of several years has just not been available to smallholders from private sources in any country. Such finance has been accessible to 'larger farmers', but unlike their 'large farm' counterparts with annual crops (who might have 5–10 planted hectares), these are estate operators whose enterprises usually cover hundreds of hectares. The characteristic failure of the private market in supplying long-term credit to small farmers has been a major constraint on the adoption of new tree crop technologies by small farmers. Where there has been official intervention in helping to arrange loans, however, rapid adoption of these technologies by such farmers has occurred [19].

It is significant to note that the relative disadvantage of small farmers in their access to credit and information has lessened with the economic development and growing commercialization of rural areas in the 1960s and 1970s. Thus the reducing fragmentation of capital markets has caused the interest rates of small rural borrowers to converge with, and accordingly fall towards, the level charged to larger clients. The widening availability in all Asean countries of education and information [20] has further made it easier for persons throughout the rural community to acquire the necessary skills to handle new technologies.

Technical economies and other aspects

In contrast to the situation with pecuniary economies, it seems that most new technologies (like their traditional predecessors), exhibit no 'technical' economies in the production stage. This basically means that the various production operations from planting to harvesting do not differ in their costs per unit of product as the scale of operation changes. In addition, the operations involved are highly divisible, in that they are readily subdivided into small segments. Many studies have illustrated this, showing little difference in technical and economic efficiency between large and small farms which have already adopted new technologies [21]. In addition, the relative flexibility of most new technologies in terms of allowing a wide substitution between resources used has enabled economic results to be secured with a considerable variety of resource combinations [22]. Thus smaller farms employ relatively lower proportions of cash inputs and higher proportions of labour than their larger counterparts (figures 7, 8), reflecting the rather different opportunity costs of these items to each party.

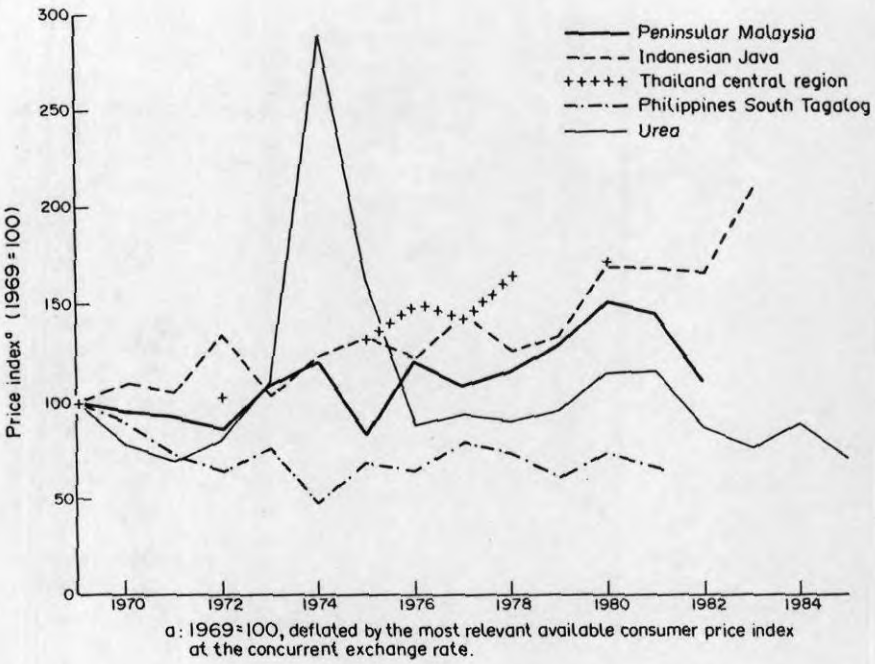


Figure 2 Indices of agricultural wages and fertilizer prices 1960–85.*
* Peninsular Malaysia – average monthly earnings of rubber tappers.
Indonesian Java – average monthly earnings for agricultural workers.
Thailand – average agricultural wage in the Central Region.
Philippines – average wage rate without meals of labourers in maize production.
Sources: Malaysia (1960–85) [56]; Indonesia (1975–83) [52]; Puapongsakorn (1981) [57]; Philippines (1970–81) [58]; World Bank (1985) [53].

Figure 4 Planting high-yielding maize after high-yielding rice and between low-yielding coconuts, Batangas, Philippines. More intensive cultivation raises the returns from increasingly valuable land.

While there are usually very substantial technical economies of scale in the processing stage, the possible difficulties for small farmers from this have been customarily overcome through the juxtaposition of their 'production nexus' with a 'processing and marketing nexus' of private dealers. The latter has been able to sustain processing economies, as well as being forward in adopting new technologies. It has accordingly proved a viable institutional arrangement in all Southeast Asian countries [23].

Two further aspects associated with economic change, and very relevant to small farmers, should also be considered. First, it must be recognized that the more management-intensive nature of new technologies makes it hard for less able farmers to secure economi results from them, despite positiv developments in respect of credit an information. While such farmers ar comfortable with the traditional tech nologies, they cannot really cope wit their more demanding successors. Thi constraint imposed by personal skill becomes increasingly severe a economy-wide structural changes in volving the rapid development o manufacturing and services, and quickly rising real wage, mean tha farmers must secure even higher earn ings to meet their 'opportunity costs [19]. The best course for less abl persons under these circumstances is t enter relatively unskilled employmen as hired workers, either inside o outside agriculture.

Second, the widening availability o off-farm employment in some regions and notably in Java, Peninsula Malaysia, Central Luzon, and Centra Thailand, has been a significant econo mic element enabling rural household to enhance their total incomes, and t buffer themselves against changes i commodity prices. In some instances and especially for very small house holds, off-farm incomes have consti tuted well over half the total earne [24, 25].

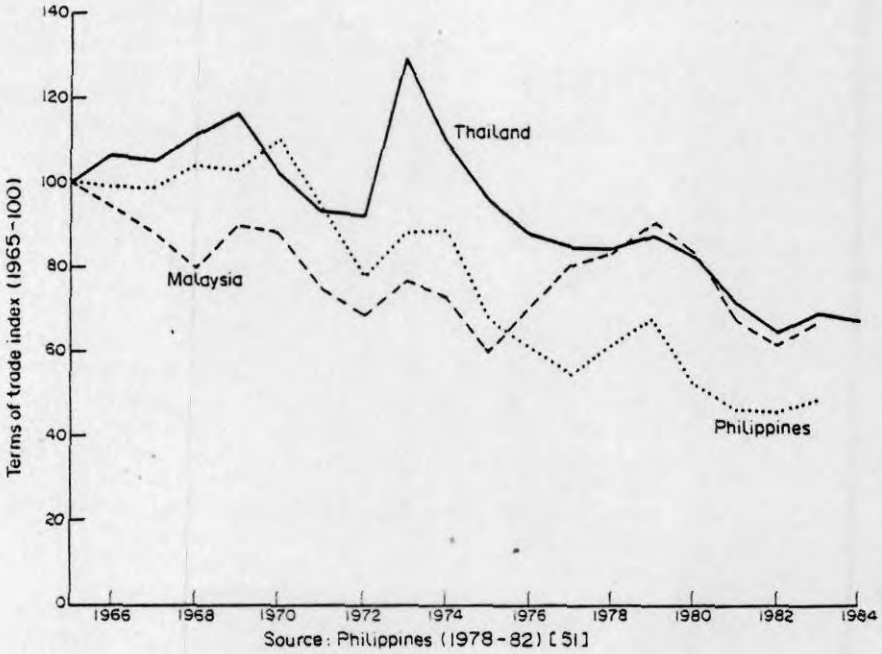
Figure 3 Foot threshing, Iloilo, Philippines. A labour-intensive task which becomes a bottleneck to economic cultivation when quick turnaround is needed. Small portable threshers cut the labour input by four-fifths.

Disadvantaged groups

This relatively optimistic assessment o the economic viability and responsive ness of small farmers must be severel conditioned by recognition of the vas

Figure 5 Irrigated rice with fringes of coconut, Central Plains, Thailand. Here irrigation has enabled 2 crops of high-yielding rice, followed by a legume.

Figure 7 Planting garlic, Batangas, Philippines. This and other high value crops for the Manila market are tending to replace traditional staples.



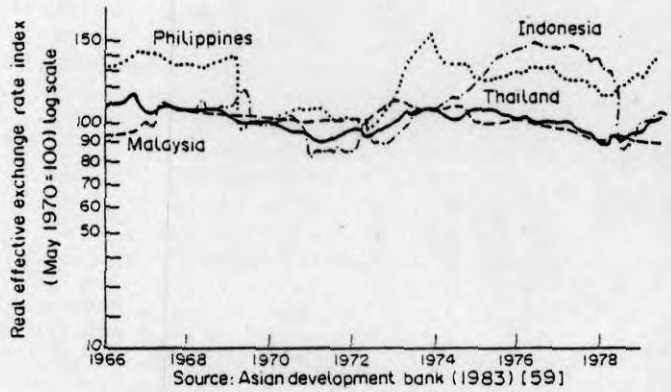


Figure 6 Terms of trade (1965–83) and exchange rates (1967–79) Southeast Asian countries.

Figure 8 Sickle harvesting of high-yielding rice, Central Luzon, Philippines. This crop gives 3–4 t/ha of paddy.

economic and social problems still attached to small farming and those associated with it in the rural areas of all countries of Southeast Asia. There remain huge numbers of persons who have benefited little or not at all from the advances described. The limited capacity of new technology adoption to enhance long-run absolute labour absorption, has already been discussed. Especially where large population increases have acted to swell the labour force and there are, further, no locally suitable new technologies, no new lands, no modern infrastructures and inputs, and no off-farm opportunities, the wages of labour will certainly decline. An 'involutionary' situation of ever more intensive labour utilization, paralleling the circumstances of *Javanese rice farming in the 1950s* [26], will then be seen.

Situations tending towards the latter still exist quite widely in particular localities of many regions which, from an overall performance viewpoint, have much enhanced their productivity and achieved a more economically desirable combination of agricultural enterprises. This is illustrated in all the more prosperous areas including West Java, Central Luzon, and Central Thailand [27, 28, 29, 30, 31, 32]. There may also be 'pockets' of less able farmers who, owing to associated cultural and other problems which constrain mobility, have been left as a depressed class. This is exemplified by certain small Malaysian farmers, who have neither been able to handle the new technologies nor take up alternative economic opportunities [33].

There are also whole regions which have missed out almost entirely from the new developments, due to some of the elements just detailed. These notably involve an absence of modern infrastructures and inputs to support the new technologies, owing to physical or political remoteness from the main administrative centres. An instance is provided by the natural rubber sector of several Sumatran provinces, where the lack of government intervention with infrastructures and long term planting credits has almost entirely prevented independent smallholders from adopting new rubber technologies [34]. The case of coconut smallholders in the Philippines is quite similar, and a further illustration comes from the farmers of North Thailand [35].

Wherever they are, those farmers unaffected by improvement find themselves in a worse position than previously, in that while not benefiting from enhanced economic performance they still suffer from the reduction in output prices occasioned by the very success of the economic improvement policy in other spheres.

Policy measures

Just as one significant characteristic of the Southeast Asian farmer has always been his wish to produce a minimal supply of subsistence food for his family, so one feature of the official agricultural policies of all Southeast Asian countries has been the pursuit of food security. This has especially applied to rice and other staples. It has been sought through a range of measures, most of which are again similar in all countries and which involve administered rice prices (with a price above world levels to producers, and below those levels to consumers) and subsidized inputs. These latter have particularly concerned irrigation water, fertilizers, and machines, together with research and extension facilities. There has further been a wide emphasis on both physical and social infrastructures in the regions where such crops are grown. These and other aspects of national government policies, including those mentioned below, are analysed by various workers [36, 37, 38, 39, 40].

In contrast, the cash-earning export crops have generally not been treated so favourably by governments. Thus rice and rubber from Thailand, rubber and oil palm in Malaysia and Indonesia, and coconut in the Philippines, have all been subjected to substantial export taxes and, especially where small farmers are concerned, have often been almost entirely neglected. As already indicated, little support has been given to small independent tree crop farmers in Indonesia and the Philippines. Where farmers have received help in the crucial aspect of long-term credit for replanting with modern high-yielding materials, however, as in Malaysia and Thailand, much better economic results have been obtained [41]. Agricultural exportables in all countries have also been adversely affected by the further common policy measure of protection for domestically manufactured goods. This tends to appreciate the exchange rate, and to accordingly reduce the overseas prices of farm products [8, 10].

An aspect of policy implementation which is again noticeable in all countries is the predisposition towards a heavily administered bureaucratic approach, which has tended to be unduly expensive and cumbersome. Thus price administration and marketing for rice in all Asean countries is essentially in the hands of state monopolies exhibiting an endemic suspicion of private traders. A similar approach tends to be taken in the organisation of credit and irrigation facilities. Again, where tree crop development is prosecuted by government, it is often through large-scale and comprehensively managed development schemes or nucleus estates [42, 43]. At an extreme, centralization through collectives is being pursued through the whole agricultural economy in Vietnam. Failing the possibility of utilizing such state organizations, preference is then sometimes given to development through large agribusinesses, as has been done with pineapples and bananas in the Philippines.

Yet, as has been shown by the vigorous recent developments of maize, cassava, and oil palm in Thailand, cassava in Indonesia, and oil palm in Malaysia (Table 2), rapid progress on the basis of individual small farms can take place in response to economic stimuli, given the presence of certain basic infrastructures and supports. Indeed, even in Vietnam the individual small farm has come to assume greater importance as the focus of production since the late 1970s, and has been allowed to remain as the chief institutional form in the South [44].

It should finally be mentioned that while many of the general policies just reviewed also involve welfare goals, in all countries other measures specifically directed to improving the living standards of lower income rural groups have proved extremely hard to implement. Thus land reform which has sought a redistribution towards such groups has been largely ineffective in this respect in both Thailand and the Philippines [9, 45]. Again, programmes in Indonesia for assisting less privileged groups through transmigration have until recently had a chequered history and limited impact [46]. In addition, more direct welfare policies pursued by the Malaysian Government towards rural *bumiputra* (Malays) in the poverty class have failed to have much useful effect, although continuous efforts to this end have been made since the early 1970s [47].

It accordingly appears that subject to the concentration of official development policies on the key aspects discussed below, as well as on previously neglected localities and regions of the nature just outlined, welfare policies *per se* may have limited usefulness. Despite its relative slowness, reliance on 'trickle down', which involves stimulating rural development through focusing on the more progressive and better endowed members of the community, may still be the best way of achieving economic advance for the less privileged.

Conclusions

In the last twenty-five years Southeast Asian agriculture, which chiefly involves small farmers, has grown very rapidly in economic terms, with major increases in the outputs and values of many major crops. This has been enabled by the introduction of new technologies, taken with increases in the use of land, labour, and the previously almost unknown 'capital' inputs of fertilizers, pesticides, and machinery. A great improvement of rural infrastructures, and the dynamic economic development of other parts of most national economies, have also acted as stimuli to change. The constitution of output has altered, with a growing share occupied by higher value crops at the expense of the traditional staples, in which self-sufficiency has now been almost achieved. The increases in output, taken with parallel rises in production in other parts of the world, have resulted in oversupply and

substantial price declines for many commodities. They have also been accompanied by deteriorating terms of trade.

Considerable rises in crop yields have been secured over the period, with the prospect of continuing improvements. To the extent that such rises are attributed to new technologies, they represent an excellent rate of return on investments made in research facilities. The new technologies are generally less labour-intensive than their traditional predecessors, requiring sizeable cash inputs together with greater skills in management. While their adoption has often impelled some initial rise in absolute labour usage, with annual crops this has not persisted as further labour-saving innovations have been taken up. The cash-intensive nature of the new technologies has led to pecuniary economies, where larger farmers have been able to adopt them earlier. Smaller farmers have taken up the technologies at a later stage, however, once the perceived risks are less and lower interest credit becomes available. The new technologies rarely exhibit technical economies in the production stage, and there appears to be little difference in economic efficiency between large and small farmers who have already adopted them.

Small farmers in those regions where rapid agricultural growth has occurred have shown their ability to respond effectively to changing economic relationships, and to the opportunities offered by the availability of other technologies and other modern inputs. Further opportunities have been presented through the improved access to credit and information accompanying general economic development, and through the growth of off-farm employment. Against this, it must be recognized that there are still huge numbers of rural people who for various reasons have not benefited from the changes described, and have sometimes experienced declining incomes in progressively worsening economic circumstances.

Government policies towards promoting agricultural change have concentrated on securing national self-sufficiency in staple crops, where considerable success has now been achieved. In contrast, cash-earning export crops have often been neglected, and notably so in facilitating the crucial provision of long-term credit to enable the planting of high-yielding trees. Export crops have also been penalized through measures protecting domestic manufactures. There has further been a marked predisposition in all countries to implement policies through heavily administered institutions, which have proved to be expensive and cumbersome.

It is considered by the authors that official policies should now be modified towards greater flexibility and lighter administration, and should recognize the ability of many small farmers to respond effectively to economic stimuli. Production goals should essentially be guided by relative market prices, while input subsidies and protective tariffs should be minimized. Government interventions should address aspects demonstrably neglected by other agents, and should appropriately concern improved physical and social infrastructures, together with research, extension and some long-term credit to support the development and adoption of appropriate technologies. These interventions should especially involve neglected localities and regions of the nature discussed earlier.

Such policy modifications are judged the best approach towards dealing with changing economic relationships in Southeast Asian agriculture, and towards obtaining further advances in the living standards of small farmers.

Acknowledgment

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References

[1] International Rice Research Institute, Annual Reports 1980–83. IRRI, Los Banos, 1981–84.

[2] Rubber Research Institute of Malaysia, Annual Reports 1980–83. RRIM, Kuala Lumpur, 1981–84.

[3] Centro Internacional de Mejoramiento de Maiz y Trigo. 'Assessing farmers' needs in designing agricultural technology'. Int. Agric. Devlpmt Service, New York, 1981.

[4] Ryan, J. G. *Aust. J. Agric. Econ.*, **28**, 109, 1984.

[5] Scobie, G. M. 'Investment in international agricultural research: some economic implications'. World Bank Staff Working Paper No. 361, Washington, 1979.

[6] Johnson, D. G. 'World Agriculture in Discovery'. Fontana-Collins, London. 1973.

[7] Jayasuriya, S. K. and Shand, R. T. *World Development*, **14**, 415, 1986.

[8] David, C. C. Economic policies and Philippine agriculture. Working Paper 83–02. Philippine Institute for Development Studies, Manila, 1983.

[9] Ledesma, A. J. 'Landless Workers and Rice Farmers: Peasant Subclasses under Agrarian Reform in two Philippine Villages', IRRI, Los Banos. 1982.

[10] Barlow, C., Findlay, C., Forsyth, P. J. and Jayasuriya, S. K. *Singapore Economic Review*, in press. 1986.

[11] P'Ng, T. C. *Proc. Rubber Research Inst. Malaysia, Planters' Conference*, pp. 235. Kuala Lumpur, 1981.

[12] Griffin, K. 'The Political Economy of Agrarian Change. An Essay on the Green Revolution'. Harvard University Press, 1974.

[13] Palmer, I. 'The New Rice in Asia: Conclusions from Four Country Studies'. UN Res. Inst. for Social Development, Geneva, 1976.

[14] Berry, R. and Cline, W. (eds) 'Agrarian Structure and Productivity in Developing Countries'. Johns Hopkins University Press, Baltimore, 1979.

[15] Mukherjee, P. K. and Lockwood, B. In: Shand, R. T. 1973. pp. 51–79. [60].

[16] International Rice Research Institute. 'Changes in Rice Farming in Selected Areas of Asia'. IRRI, Los Banos. 1976.

[17] Lipton, M. *World Development*, **6**, 319, 1978.

[18] Feder, G. and O'Mara, G. T. *Econ. Devlpmt. Cult. Change*, **30**, 59, 1981.

[19] Barlow, C. and Jayasuriya, S. *Change and Development*, in press. 1986.

[20] UNESCO, 'Statistical Yearbook, 1985'. Paris, 1985.

[21] Hayami, Y. and Kikuchi, M. 'Asian Village Economy at the Crossroads. An Economic Approach to Institutional Change.' University of Tokyo Press, 1981.

[22] Barlow, C. and Jayasuriya, S. K. *J. Agric. Econ.*, **XXXV**, 85, 1984.

[23] Barlow, C. Bull. *Indonesian Econ. Studies*, **XXI**, 81, 1985.

[24] Mukhopadyay, S. and Lim T. L. 'Development and Diversification of Rural Industries in Asia'. Asian and Pacific Development Centre, Kuala Lumpur, 1985.

[25] Shand, R. T. (Ed). 'Off-farm Employment in the Development of Rural Asia'. Nat. Centre for Develpmt. Studies, Australian National University, Canberra, 1986.

[26] Geertz, C. 'Agricultural Innovation. The Process of Ecological Change in Indonesia'. Univ. California Press, Berkeley. 1963.

[27] Hüsken, F. *J. Contemp. Asia*, **9**, 140, 1979.

[28] Kikuchi, M., Hafid, A., Saleh, C., Hartoyo, S. and Hayami, Y. *Develping Economies*, **18**, 45, 1980.

[29] Sundrum, R. M. and Booth, A. In: Fox, J. J. *et al.* 1980. pp. 455–486. [61]

[30] Tan, E. A. *J. Econ. Change and Soc. Develpmt Asia and Pacific*, **XXX**, 46, 1980.

[31] Schlegel, C. C. *J. Developing Areas*, **15**, 85, 1981.

[32] Booth, A. and Sundrum, R. M. 'Labour Absorption in Agriculture. Theoretical Analysis and Empirical Investigations.' Oxford University Press, Bombay. 1984.

[33] Tuanku Shamsul Bahrin. The challenges facing smallholders. Paper presented at PETA Seminar on Recession and Resolution in Malaysian Agriculture, Kuala Lumpur, March, 1983.

[34] Barlow, C. and Muharminto, *Bull. Indonesian Econ. Studies*, XX, **17**, 86, 1982.

[35] van der Meer, C. J. L. 'Rural Development in Northern Thailand' Ph.D. thesis, State University of Gröningen. 1981.

[36] Bertrand, T. 'Thailand: Case Study of Agricultural Input and Output Pricing'. World Bank Staff Working Paper No. 385, Washington, 1980.

[37] Mears, L. A. and Sidik, M. In: Booth, A. and McCawley, P. (eds). 1981. [62].

[38] Appleton, J. In: Lea, D. and Chaudhri, D. (eds) 1983. pp. 273–298. [55].

[39] Hill, H. and Jayasuriya, S. 'The Philippines: Growth, Debt and Crisis'. Working paper 85/3. Nat. Centre for Develpmt Studies, Australian National University, Canberra. 1985.

[40] Panyatou, T. (ed) 'Food Policy Analysis in Thailand'. Agric. Develpmt Council, Bangkok. 1985.

[41] Association of Natural Rubber Producing Countries. 'The Progress and Development of Rubber Smallholders'. Kuala Lumpur, 1976.

[42] Mubyarto (ed). 'Growth and Equity in Indonesian Agricultural Development'. Yayasan Agro-Ekonomika, Jakarta. 1982.

[43] Barlow, C. 'Oil Palm as a Smallholder Crop'. Occasional paper, Palm Oil Res. Inst. of Malaysia, Bandar Baru Bangi, Selangor, 1986.

[44] McCarthy, G. The socialist transition in Vietnam. Paper presented at the 5th Nat. Conf. Asian Studies Assoc. of Australia, Adelaide University, May 1984.

[45] Ramsay, J. A. *J. Developing Areas*, **16**, 173, 1982.

[46] Hardjono, J. M. 'Transmigration in Indonesia'. Oxford University Press, Kuala Lumpur, 1977.

[47] Corner, L. *Kajian Malaysia*, **1**, 38, 1983.

[48] World Bank. 'World Development Reports 1980–84. 'Oxford University Press, New York, 1980–85.

[49] United Nations. 'Statistical Yearbooks for Asia and the Far East, 1970–82'. UN, Paris, 1971–83.

[50] United Nations. 'Statistical Yearbooks, 1960–84'. UN, Paris, 1960–84.

[51] Philippines. 'Statistical Year Books, 1978–81'. National Economic Development Authority, Manila, 1979–82.

[52] Indonesia. 'Statistik Indonesia 1974–82'. Biro Pusat Statistik, Jakarta, 1975–83.

[53] World Bank. 'Commodity Trade and Prices Trends'. Washington 1985.

[54] Food and Agriculture Organization. 'Production Yearbook'. FAO, Rome, 1960–81.

[55] Lea, D. A. M. and Chaudhri, D. P. (eds) 'Rural Development and the State. Contradictions and Dilemma in Developing Countries'. Methuen, London. 1983.

[56] Malaysia. 'Rubber Statistics Handbooks'. Dept. of Statistics, Kuala Lumpur, 1960–85.

[57] Puapongsakorn, N. Employment in Thailand: a survey of situations in the rural and urban areas. Paper presented at the Seminar on Employment in the Next Decade. Human Resources Institute, Bangkok, December 1981.

[58] Philippines. 'Data on Agricultural Wage Rates'. Bureau of Agricultural Economics, Manila, 1970–81.

[59] Asian Development Bank. 'The Impact of the Current Exchange System on Trade and Inflation of Selected Developing Member Countries.' Asian Development Bank Economic Staff Paper No. 18, Manila, 1983.

[60] Shand, R. T. 'Technical Change in Asian Agriculture'. Australian National University Press, Canberra, 1973.

[61] Fox, J. J., Garnaut, R. G., McCawley, P. T. and Mackie, J. A. C. 'Indonesia: Australian Perspectives'. Research School of Pacific Studies, Australian National University, Canberra. 1980.

[62] Booth, A. and McCawley, P. (eds). 'The Indonesian Economy during the Soeharto Era'. Oxford University Press, Kuala Lumpur, 1981.