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STAFF STUDIES

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CENTRAL BANK OF CEYLON

හතරවෙනි කලාපය අංක 1 — 1974 අප්‍රේල්
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The views presented in these papers are those of the authors and should not be interpreted as necessarily indicating the views of the Central Bank of Ceylon.

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THE WORLD ENERGY CRISIS AND ITS IMPLICATIONS FOR SRI LANKA

By

CRISHANTHI ABEYNAYAKE & DAYAPALA WIJEWARDANE

1. Introduction

The sharp increase in oil prices put into effect recently by the Organisation of Petroleum Exporting Countries will have very serious consequences on the world economy, in particular the less developed countries. The latter countries are already experiencing difficulties resulting from this price increase. It is estimated that the price hike would increase the oil import bill of the less developed countries by $9·7 billion in 1974 causing large deficits in their balances of payment which will enforce severe cut-backs in essential imports, particulary food, raw material and fertilizer.

The price hike is likely to affect all oil importing countries adversely; but its impact would be felt with different degrees of intensity in different regions. As one writer explains "In the U.S.A. it means having to ride the bus instead of drive; in Europe and Japan it would mean recession; in Asia, Africa and Latin America it would mean disaster." In Sri Lanka, the crude oil import bill alone is likely to increase from the 1973 level of Rs. 274 million to Rs. 1076 million in 1974.

2. World Energy Situation

World energy consumption has been increasing at an annual average rate of around five per cent in the 1950s and 1960s. Energy consumption in the U.S.A., U.S.S.R., and Western Europe accounted for about 70 per cent of the total energy consumed in 1968. The use of oil and natural gas has been increasing in importance in the last few decades, while the consumption (percentage share-wise) of coal has decreased in practically every country – see Table 2·1. Oil possesses qualities superior to coal and these desirable qualities of oli

appear as well and sometimes better in natural gas.[1] Although hydro-electricity and nuclear power generation contribute a relatively minor share of total energy consumption, there are ecological advantages[2] of energy produced by these sources over that generated by conventional plants burning oil and coal. The consumption of nuclear power in particular is expected to increase appreciably in the eighties and nineties. For instance, the U.S. expects to generate 25 per cent of its electric power with nuclear energy by 1980 and almost 50 per cent by 1990.[3]

Even if the recent war in the Middle East had not triggered off the present energy crisis, the progressive diminution of coal and oil reserves had been reported as far back as the 1950s by the Paley Report. Energy would in any case have become more expensive with the U. S. becoming a major force in the market as a large importer of oil. Furthermore, it has been estimated that at best it will take three to five years before world oil production and refinery capacity could be increased adequately to bring energy supplies abreast of demand given a relaxation of the Arab oil embargo[4]. The high rates of growth of G. N. P. in the U. S., Western Europe and Japan particularey, created unprecedented demands for energy. As a result, the world's capacity to consume energy resources has threatened to outrun its capacity to produce them. Unless technology achieves a

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1 "A ton of oil possesses less volume than a ton of coal, while yielding 50 per cent more energy. As a liquid it can be more easily handled and is less easily damaged than coal. It burns more cleanly – coal when burned is a major pollutant of the atmosphere–and in more controllable fashion and in numerous applications its thermal efficiency is higher."

Source; Joel Damstadter World Energy Demand and Supply Impact Vol No 2

2 Of cource, mishaps in nuclear power plants could release radioactivity.

3 John Uhler "The Energy Crisis: Can it be Resolved" *Horizons Vol. XXII No. 4'*

4 Prediction attributed to John A. Love - former U. S. Energy Chief, *Time Magazine*, December 3, 1973.

TABLE 2–1

World Energy Consumption by Source and Region

	Solid Fuels		Liquid Fuels		Natural Gas		Hydro-Electricity	
	1925	1968	1925	1968	1925	1968	1925	1968
	World Consumption (million metric tons of coal equivalent)							
	1230	2315	197	2702	48	1157	10	132
	Percentages of World Energy Consumption in given year (%)							
	82·9	36·7	13·3	42·8	3·2	18·3	0·7	2·1
	Percentages of total energy consumption in each region (%)							
North America	74·5	21·9	18·9	43·6	6·0	32·6	0·6	1·9
Western Europe	96·0	37·3	3·2	54·3	—	4·7	0·7	3·5
Oceania	92·6	48·6	6·9	48·6	—	—	0·5	2·8
U. S. S. R.	64·9	43·1	34·2	33·0	0·7	22·6	0·1	1·3
East Europe	91·2	78·2	6·5	15·2	2·2	6·4	0·1	0·2
Communist Asia	94·0	91·9	6·0	7·2	—	—	—	0·9
Japan	92·4	27·9	4·4	67·1	0·1	1·4	3·1	3·6
Other Asia (including the Middle East)	73·7	33·5	24·6	56·2	1·5	8·3	0·2	2·1
Latin America	37·6	6·5	56·6	70·6	4·2	19·2	1·6	3·7
Africa	91·6	54·9	8·3	41·2	—	2·0	0·1	2·0

Source: Joel Damstadter "Word Energy Demand and Supply" Impact Vol No. 2

sudden breakthrough in the development of a relatively cheap source of power, the price of energy is likely to rise even further. Dependence on oil and gas for around three quarters of energy consumption together with heavy dependence on a single area for oil production have intensified the problem (See Tables 2·1 and 2·3).

TABLE 2–2 : World Oil Reserves

	Country/Area	Th. Mn. Tons	% Share of Total
1	Western Hemisphere ..	11·4	12·6
	a. United States ..	5·6	6·2
	b. Canada ..	1·3	1·4
	c. Carribean ..	2·5	2·7
	d. Other ..	2·0	2·3
2	Eastern Hemisphere ..	79·5	87·4
	a Western Europe ..	1·7	1·9
	b. Africa ..	13·9	15·3
	c. Middle East ..	48·5	53·3
	d. U.S.S.R., Eastern Europe, China·	13·4	14·7
	e. Other ..	2·0	2·2
3	World ..	90·9	100·0

Source : Bank for International Settlements: Press Release, 29th November, 1973.

Table 2·3 contains data on world energy consumption. North America is the major energy consumer and producer in the world, both in absolute and per capita terms. The adoption of wage–price controls in the United States in 1971 tended to keep the prices of petroleum products down and discourage the building of new refineries which had been needed for years. Other factors discouraged the exploitation of and exploration for oil domestically. The fact that oil companies could credit taxes paid to foreign governments against U. S. income tax is reported to have given an incentive to explore oil overseas rather than in the United States. Environmental considerations delayed the construction of the Alaska pipeline which was to carry oil from the Alaska North Slope oil fields discovered in 1968; while an oil spill forced a shut down of the Santa Barbara oil fields soon after drilling began on this large offshore field in California. Environmental and safety laws also slowed coal production in the

U. S. The relatively low price for natural gas gave little inducement to increase its output. The policy of the Federal Power Commission in setting very low ceiling prices on natural gas led to the excessive use of natural gas and discouraged exploration for gas or opening up of new reserves, Natural gas costs 22 cents per 1,000 cubic feet in the United States. This is equivalent to pricing a barrel of crude oil at 72 cents. The estimated price of imported natural gas (on the basis of a recent agreement made by a U. S. company with Algerian producers) to the consumer is put at one dollar per 1,000 cu. ft.[1]

TABLE 2-3

World Energy Consumption (Selected years)

	Energy Consumption (Millions of metric tons)*a*				Per Capita Energy Consumption in 1968
	1925	1950	1965	1968	(Kilograms)*a*
Noth America	749	1276	2040	2359	10,629
Western Europe	517	584	1117	1242	3,543
Oceania	16	29	61	72	3,927
USSR	25	303	881	1025	4,309
Eastern Europe	55	161	375	408	3,920
Comunist Asia	24	43	323	332	434
Japan	31	46	189	280	2,770
Other Asia (incl. of Middle East)	30	60	197	242	244
Latin America	25	66	200	245	916
Africa	14	42	93	102	303
World*(b)*	1485	2611	5475	6306	1,810

Source: Joel Darmstadter "World Energy Demand and Supply" Impact No 2.

a. All figures based on coal equivalents

b. Because of certain statistical problems, world consumption totals do not precisely agree with world production totals in Table 2-4.

1 Facts relating to the energy situation in the United States have been gathered largely from various issues of the Time Magazine.

TABLE 2-4

World Energy Production - 1925 - 68

	Production (million metric ton coal equivalent)		Percentages of World Production	
	1925	1968	1925	1968
North America ..	779	2221	49·7	33·7
Western Europe ..	532	542	34·0	8 2
Oceania ..	16	52	1 0	0·8
U. S. S. R. .	27	1168	1·7	17·7
East Europe ..	65	386	4·2	5·8
Communist Asia ..	23	330	1·4	5·0
Japan ..	33	60	2·1	0·9
Other Asia ..	31	152	1·9	2 3
Midd e East ..	8	860	0·5	13·1
Carribean ..	34	391	2·2	5·9
Other Latin America ..	6	74	0·4	1·1
North Africa ..	0·3	276	—	4·2
Other Africa ..	13	76	0·8	1·1
World ..	1567	6582	100·0	100·0

Source: Joel Damstadter "World Energy Demand and Supply" Impact Vol No 2.

As all the indications are that energy will be more expensive in future, consumers will be forced to stop wasting a valuable resource and to seek economies. High prices will make the development of alternative sources of energy more competitive and attractive. Potential new resources for energy development – nuclear, solar and geothermal may be developed rapidly. The search for new oil,[1] gas and coal reserves will also be given a boost by the high price.

1 Proven reserves of oil are increasing with exploration. Africa is a new source of oil supply; the oil resources of South American countries have not yet been fully realized; there is the prospect of significant new additions to reserves in South East Asia - production of oil in Indonesia already matches production in Algeria and is rising fast; it is estimated that there are vast resources off-shore in the China sea - B. I. S. Press Review, November 29, 1973.

There are many problems associated with increasing the production of energy. These involve the cost[1] and other difficulties connected with extraction or development and the pollution problems connected especially wiih coal. But these are mostly technological problems which are capable of solution over a period of time. Major energy sources to be developed are nuclear–the fast breeder reactors which would extend the life of natural uranium fuel supplies from decades to centuries because of their efficient use of nuclear fuel, i. e. the recycling of fuel by LMFBR[2] and production of massive quantities of clean low cost electricity[3]–coal gasification and liquefaction, extraction of deep sea-bed oil, harnessing of solar energy, and the development of fusion reactors.

3. Oil Producing Countries

Oil producing countries are not without problems. Their natural oil resources are being fast depleted and the time will come when they will have no oil reserves. On the other hand, the financial surpluses now accruing to them from very high oil prices, are vulnerable to currency devaluations. A further increase in output inmmediately could only aggravate the latter problem. Hence, Arab oil producers have begun asking for sufficient safeguards against the value of their assets being undermined as well as outlets for investments which will yield a satisfactory return and be a source of income after the oil wells have run dry. If these conditions are not satisfied, there will not be an adequate incentive to raise production especially because the greater the scarcity of oil, the more valuable the oil becomes. Arab policy and thinking is increasingly along these lines. The Director-General of the Arab Fund for Social and Economic Development

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1. Extraction of oil in other areas could be extremely costly. For instance in the North sea, the costs of operation are heavy. The average capital investment needed has been estimated at £1,000 per barrel per day of capacity compared with £30 to £40 in the on - shore fields of the Middle East. Costs are also expected to escalate further as activity moves into deeper water.

   Source: Barclays Bank Review August, 1973

   The cost of energy research is also heavy. The U- S. has made a commitent of $ 10 billion for energy research in the next 5 years. Research into removal of sulphur from coal and coal gasification and liquifaction is to be given $ 405 million in 1974.

2. Liquid metal fast breeder reactor (LMFBR)

3. The initial cost of building the plant however is high - a large commercial plant estimated to cost between US $ 300 to $ 400 million. John Uhler 'Energy Crisis' Horizons Vol. XXII No. 4.

(AFSED) has stated that "what we Arab financiers are after is definitely not speculative ventures and at best risky windfalls, but rather sound opportunities for long term investment capable of both preserving the value of our financial assets and enchancing the capacity to transform our lop-sided economies into viable modern entities."[1] The Economic Council of the Arab League has decided that Arab funds in foreign banks should be transferred gradually to Arab financial institutions. The Saudi Arabian Minister of Petroleum has stated that production increases in his country would be linked to help from the receiving country in developing the Saudi Arabia Economy and suggested a price index for oil linked to prices of industrial goods. Iran is also increasing pressure on major oil companies to give priority to distributing Iranian oil to those nations willing to supply Iran with scarce raw materials and industrial commodities.

Arab producers are now attempting to diversify their economies with assistance from oil importing developed countries. Some examples of present activity are British, French and Iranian interests combining in a company which is to assist a 20 year scheme intended to make Iran self sufficent in sugar; Irano-British Investment which includes 8 joint venture projects involving investment of around $600 million for the formation of a company for the development of dairy and beef output, construction of a steel rolling mill, production of tractors, a heavy industry complex and production of amino-plastic moulding materials. There are five new ventures with Japan including the production of textiles, cement, agro-industrial material, synthetic rubber goods etc.[2]

A Japanese firm, Sanyo, is trying to raise a U.S. $ 40 million loan for Iraq from the Japanese government and institutions to finance a U.S. $ 80 million agricultural project, which the company hopes to carry out. Iraq and Hungary are to set up a joint planning committee.

Libya has asked for technical aid from Japan for a number of industrial projects in return for concessions to prospect for oil in Libya. These projects include steel mills, oil refineries, petro-chemical

1 Middle East Economic Digest Vol. 17: 48, 30 November 1973 pp 1390-1391

2 Facts relating to oil production are from various issues of the Financial Times and the Middle East Economic Digest.

plants and prospecting for minerals. A British firm has been awarded the contract to build two composting plants and a West German firm for an ammonia complex.

Furthermore, Arab countries are refining an ever-increasing proportion of oil produced in their countries. Even as early as 1971 practically all the major producers with the exception of Libya and Qatar were refining in excess of domestic requirements - See Table 3.1 below.

TABLE 3-1

Oil Production and Refining in the Middle East 1971

('000 Barrels)

Country	Production	Domestic Demand	Total Refined in own country	Refined Exports	Crude Oil Exports	Crude Oil exports as % of production
Iran ..	1,661,901	123,619	208,708	85,156	1,452,335	87
Saudi Arabia ..	1,641,615	79,206	205,977	119,742	1,443,343	88
Kuwait ..	1,067,795	51,515	152,490	101,189	946,897	89
Libya ..	1,007,687	7,476	2,817	—	1,006,000	99
Iraq ..	624,312	28,164	29,262	1,266	593,414	95
Neutral Zone ..	199,068	8,649	19,505	10,979	182,346	92
Qatar ..	156,882	895	—	—	156,439	99

Source: International Petroleum Annual 1971. Published by the Bureau of Mines, U.S. Department of the Interior.

Saudi Arabia and Kuwait export large quantities of refined oil. Kuwait refines around three times her domestie needs and Saudi Arabia approximately two and a half times her needs, as shown in Table 3.1.

Domestic requirements of refined oil are rising in Arab countries as they invest increasingly in petro-chemical industries as well as other industries. However, oil refining capacities are also rising fast and the new trend will be to export refined oil or to participate with other countries in refining oil elsewhere. For instance, Japanese concerns are reported to be sounding out some Arab oil producing countries about participation in an oil refining project on Batam Island with Pertamina, the Indonesian state-owned oil company. The project is to refine crude oil from Arab countries, aiming at exports of the products to Japan. The initial capacity is set at 100,000 barrels per day

and construction could start next year.[1] Present activity in the field of oil refining and the establishment of petro-chemical plants can be observed from the following.

The National Iranian Oil Company's refinery at Shiraz was opened in November. Construction of a Saudi Arabian oil refinery is under way at Port Sudan. An Arab-Japanese refinery project being negotiated envisages transport by pipeline of crude oil from Saudi Arabia, Abu Dhabi, and Oman to a site on the Gulf of Oman where a refinery would be constructed with the participation of the Saudis, Omanis, Japanese and the leading oil companies. Taiwan is to set up an oil refining complex and urea and methanol plants in Saudi Arabia[2]. The sharp increase in oil prices is partly the result of this new urgency felt by the Middle East oil exporting countries to diversify their economies.

4. Implications for the World Economy

Prior to the emergence of the present energy crisis – towards the latter part of 1973 – it became evident that the widespread boom conditions in the industrial countries which showed a growth in average real output of over six per cent in 1973 would give way to a rate of around four per cent in 1974. At the same time the price level was expected to increase at some seven per cent as in 1972 and 1973. In other words, a combination of slower growth and serious inflation was already apparent even before the emergence of oil supply constraints.

It is estimated that the market prices of crude oil would increase by around 200 per cent from 1973 to 1974. Such an increase following one of 45 per cent between 1972 and 1973 would seriously aggravate inflationary pressures in many industrial and primary producing countries at a time when prices were already advancing at exceptionally high rates.

4·1 Balance of Payments

The IMF estimates that the combined current account balance of the oil exporting countries would be in the region of $ 66 billion in 1974 as against $ 6 billion in 1973 and $ 1·5 billion in 1972.[3] The counterpart of this surplus is a deterioration of similar magnitude for

1. Middle East Economic Digest vol. 17 : 47 23 November 1973.
2. Middle East Economic Digest, various issues.
3. Assuming the posted price of a barrel of crude oil to be $ 11·65

all other countries combined. Of these, the United States is likely to breakeven while the entire deficit has to be absorbed by the other countries. Among the industrial countries, especially large deficits are likely to be recorded by France, Italy, the United Kingdom and Japan, while the combined deficit of the primary producing countries would exceed $ 30 billion. Of this too, the combined deficit of less developed countries would soar to $ 25 billion from the estimated 1973 level of $ 10 billion. If oil supply conditions should change in such a way that economic activity in the industrial world would tend to grow at a slower rate this would have a particularly adverse impact on the balance of payments of primary producing countries. Unless there is a substantial decline in crude oil prices these conclusions are likely to remain valid though the size of balances may change somewhat.

5. Impact on Sri Lanka

The main sources of energy utilized in Sri Lanka are electricity-hydro and thermal, and oil. Other sources of energy like gas, fuel-wood, charcol etc., are utilized to a lesser degree. Electricity generation and distribution are the responsibility of the Ceylon Electricity Board. The Ceylon Petroleum Corporation refines imported crude oil both for domestic use and for re-export particularly in the form of bunkers and aviation fuel. Gas coke is obtained through carbonising imported coal by the Colombo Gas and Water Co. Coke, coal and gas are also imported by a few dealers.

Data on total energy use in Sri Lanka are not available. The following table provides some statistics of actual energy use and future requirements of Sri Lanka.

TABLE 5-1

Electric Energy* (Mn. KWh)

Year	1969	1970	1971	1972	1973	1974	1980
Hydro	564	741	825	846	711	1072	2120
Thermal	146	45	24	98	272		

* 1969 – 1973 units generated
1974 & 1980 load forecast

Source: Ceylon Electricity Board.

Ninety-four per cent of electricity generated within the country is based on hydro-power which is a domestic resource. Unharnessed water power in the country is reported to be more than adequate to cope with the totality of existing requirements.[1]

TABLE 5-2

Manufactured Gas (Mn. Cubic Metres)

1960	1965	1970	1974*	1980*
7·1	5·9	6·1	6·0	5·9

Source: Based on U.N. Statistical Yearbook 1971.

* Projected figures (exponential growth rates)

Oil utilized for a variety of domestic uses and in the thermal power station, in industry and for re-exports of bunkering and aviation fuel, etc. is imported. Coke and coal are also imported.

6. Petroleum Products

The petroleum refinery at Sapugaskanda was established in 1969 at a cost of Rs. 180 million, of which Rs. 125 million was the foreign exchange cost. It processes 1·8 million metric tons of crude oil a year. The refinery has a maximum capacity for refining 5,600 metric tons of crude oil a day, while its daily minimum requirement is 2,500 metric tons.[2]

The output obtained depends on (a) the type of crude oil used, its sulphur content etc., and (b) the final products desired within the margins in which variations are possible. Production at present is programmed to obtain the kerosene requirement of the country. The output of other products is determined basically by this need but wherever possible the quantities are varied to meet the local need or export potential.

Since the refinery went into production in October, 1969 the major proportion of crude oil has been imported from Iran with some imports being obtained from Egypt and Iraq under bilateral arrangements. The average prices and the total expenditure on crude oil are shown in table 6·1.

1. M. D. W. Perera, 'Water Power-Answer to energy crisis' *Ceylon Daily News*, January 14, 1974.
2. One metric ton contains 7·425 barrels of crude oil.

TABLE 6-1

Prices and Values of Crude Oil Imports, 1969 - 74

Year (end December)	Price (US $ per barrel)	Value (Rs. Mn.)
1969 ..	1·410	42·1
1970 ..	1·447	131·5
1971 ..	1·793	131·6
1972 ..	1·910	177·8
1973 June ..	2·462	273·7
1973 November ..	4·060	
1974[1] ..	12·00	1020·02

Source: Ceylon Petroleum Corporation and Press Reports.

1. Estimated. A small proportion of this is expected to be available at $ 9·25.
2. US $1 = Rs. 6·18

The net foreign exchange outlay on crude oil imports has been considerably lower than what is shown in the table since the Corporation has been able to recoup a part of the expenditure through exports. Table 6·2 carries this information.

TABLE 6-2

Value of Petroleum Exports and Bunkers, 1971 - 73 (Rs. Mn.)

	1971	1972	1973
1. Exports	86·5	18·8	23·6
2. Bunkers & Aviation fuel		69 9	110·0
3. Total (1 + 2) ..	86·5	88·7	134·4
4. Oil Imports ..	164·0	186·5	273·7
5. Net (4 − 3) ..	77·5	97·8	139·3
6. All exports (Sri Lanka) ..	1930·0	1993·0	2596·0
7. 5 as % of 6 ..	4·02	4·91	5·37

Sources: Customs, Sri Lanka
Ceylon Petroleum Corporation.

Owing to the relative stability of crude oil prices until towards the end of 1973 and the progressive increase in exports, the net foreign exchange spent on the import of crude oil has never been in excess of 5·4 per cent of Sri Lanka's export earnings.

7. The Future

The picture that emerges for 1974, and perhaps for many years thereafter, stands in sharp contrast to the situation hitherto. The net foreign exchange outlay on oil would depend on several factors. The more important of these are –

(a) the extent to which domestic consumption can be curtailed,

(b) the price at which Sri Lanka could purchase crude oil,

(c) the range of prices of bunkers that would prevail in the other parts of the zone and

(d) the capacity of the refinery to reorient production so that foreign exchange earnings could be maximised while meeting the reduced domestic requirements.

TABLE 7-1

Inland Sales – Volume and Value, 1970 – 1971 – 1972

(in millions)

Products	Year 1970			Year 1971			Year 1972		
	M/T	I.G.	Rs.	M/T	I.G.	Rs.	M/T	I G.	Rs.
Super Petrol	·091	26·329	92·159	·084	24·353	99·485	·081	23·429	118·399
Regular Petrol	·057	17·381	54·189	·053	16·143	60·448	·051	15·360	71·307
Auto Diesel	·250	65·110	97·030	·249	64·891	104·280	·264	68·685	112·974
Kerosene	·273	76·302	55·080	·269	75·419	61·787	·278	77·884	76·376
Heavy Diesel	·088	22·881	24·192	·085	22·070	21·966	·071	18·591	23·578
Furnace Oil	·134	30·997	20·890	·112	25·868	25·714	·179	41·434	34·367
Bitumen	·031	6·710	9 830	·006	1·290	2·235	·028	6·023	12·441
	·924	245·710	353·370	·858	230·034	375·915	·952	251·406	449·642

Source: Ceylon Petroleum Corporation

Any attempt to assess the relative effects of the increase in oil prices on our economy can only be tentative owing to the fact that the behaviour of these variables is virtually unpredictable. As the Arab oil exporting countries have not evolved a final policy regarding oil production and pricing, the situation is rendered volatile and does not lend itself to easy analysis. In the balance of payments estimate

for 1974 given below (Table 7·5) it is assumed that the price of a barrel of crude oil would be U.S. $ 12·00 (c & f) with a small proportion of the country's requirements expected to be available at $ 9·25 during 1974. Any change, which is not likely to be substantial, would make only a marginal difference to the magnitudes since they are very large.

With regard to (a), domestic consumption is concentrated heavily on kerosene and automobile diesel, and on fuel oil and gasoline to a lesser extent. Of the total output of petroleum products, total domestic consumption is around 53 per cent aud consumption of kersosene and automobile diesel alone form around 30 per cent (i.e. around 60% of total domestic consumption).

TABLE 7-2

Price Increase of Fuels

PRODUCTS	PRICES			
	1971	1972 (end)	1973 (from 24, August)	1974 (9th/10th January)
1. Lanka Kerosene ..	0·92	1·32	1·92	3·60
2. Diesel oil ..	1·30	1·63	2·23	4·90
3. Heavy Diesel ..	1·15	1·53	2·13	4·60
4. Lanka Auto Diesel ..	1·81	2·14	2·74	4·80
5. Lanka Super Petrol ..	4·10	5·75	6·55	12 50
6. LanLa Regular Petrol ..	3·75	5·30	6·10	12·00
7. Lanka Furance oil 500 Secs. ..	0 95	1·28	1·88	4·00
– do – 800 Secs. ..	0·90	1·23	1·83	3·90
– do – 1000 Secs. ..	0·85	1·18	1·78	3·80

Source: Ceylon Petroleum Corporation

At the time of writing it is not possible to make an estimate regarding the extent of the reduction in domestic consumption consequent upon the price increases of January, 1974. From Table 7·1 (which shows the inland sales of petroleum products), it would appear that only petrol consumption shows any significant degree of price elasticity. Kerosene which is the main parameter that determines local production has shown a steady rise in consumption despite price increases. One reason for the difference in responses has been the sharp increase in gasoline prices in previous years as against the modest changes for kerosene as shown in table 7·2. But, on the other hand,

it also points to the essential nature of the product. Kerosene is the most used, if not the only, source of energy for illumination in rural areas. In towns, where it is largely used for purposes of cooking, a change to any other source in the short run could be costly and / or inconvenient. Hence, a sharp reduction in consumption cannot be envisaged. However, the income effect of the unprecedented rate of increase in the price of kerosene, within the context of the general increase in the price level of other goods and services as well as income limitation may result in a reduction in consumption.

Any reduction in the use of these and other products should also be considered within the context of their impact on the economy in general. The sectoral distribution of purchases from the Petroleum Corporation (Table 7·3) provides some insights in this direction. A noteworthy feature is the 36 per cent consumption of industrial diesel by the estate sector.

The Ministry of Plantation Industries has made a preliminary estimate that the higher fuel prices would add, on average, 15 cents to the cost of producing a pound of tea. This would leave the tea industry at a net loss of around at least 9 cts. per lb[1] on the basis of 1973 prices. The ultimate effect of these developments is a further impairment of the country's import capacity[2]. In any event it would be optimistic to envisage a weighted average reduction of more than 15 per cent in the consumption of petroleum products within the country in terms of the measures taken so far.

Assuming that the other factors affecting the supply and export of these products could be organised in an optimum manner, the foreign exchange aspect of petroleum refining in 1974 could be somewhat as follows:–

		Rs. Mn.
1.	Value of 1·850 mn. metric tons of crude oil and other petroleum imports	1076
2.	Estimated exports including bunkers	543
3.	Net imports (1–2)	553
4.	Value of all exports	2906
5.	3 as % of 4	18·3

1. Total estimated cost of production (after oil price increase) – Rs. 1·98 (per lb.)
Net price of tea at the Colombo Auctions (average for 1973)– Rs. 1·89 (per lb.)
Net loss per lb. – Rs. 0·09 (per lb.)
2. This would be partly offset by the likely increase in the price of natural rubber.

TABLE 7-3

Sectoral Distribtion of Island Sales January - November, 1973

In Imperial Gallons

	Lanka Super I.G.	%	Lanka Regular I.G.	%	Kerosene I.G.	%	Au o Diesel I.G.	%	Heavy Diesel I.G.	%	Furnace I.G.	%	Marine Diesel I.G.	%
Retail-Other than Kerosene	21,131,807	98	12,289,642	90	44,056,513	63	25,444,780	38	5,260,277	32	92,715			
Retail-Kerosene	98,710	0·5	87,250	0·6	25,318,725	36	1,869,355	3	540,831	3	5,040			
Consumer-Estate	5,200	—	61,200	0·4	2,870		114,450	0·4	5,889,146	36	3,689,505	3		
Consumer-Private	84,710	0·4	229,750	2	116,048	0·4	587,240	0·9	2,120,258	13	7,748,273	5		
Consumer-Govt. Corporation	186,765	0·9	625,905	5	119,214	0·4	33,935,220	50	2,208,760	13	28,305,150	20		
Bunkers-International	—		—		—		4,195,382	6	45,360		93,522,959	65	16,553,464	97
Own Use	—		—		—		—		—		—		—	
Local Councils	42,735	0·2	300,405	2	90,180	0·2	780,470	0·1	423,145	3	7,380,800	5	—	
Bunkers-Local	—		—		—		337,827	0 7	23,017		2,450,016	2	490,467	3
Depot Transfers	—		—		—		—		—		—		—	
Total	21,549,927	100	13,594,152	100	69,728,750	100	67,264,722	100	16,510,790	100	143,190,458	100	17,043,931	100

Source. Ceylon Petroleum Corporation.

This would mean that Sri Lanka would require, in 1974, a net amount of Rs. 400 million more than in 1973 to meet the oil import bill.

The hike in crude oil prices though basic and pervasive, is only one of several major influences that would tend to bring about in 1974 the worst foreign exchange crisis Sri Lanka has ever faced. The more important of these are:

(*a*) The sharp escalation in the prices of petroleum-based products, in particular fertilizer, agro-chemicals, plastics and synthetic fibres;

(*b*) The adverse impact of any reduction in the application of fertilizer and other agro-chemicals on the plantation sector and on the green revolution in general;

(*c*) The sharp increase in commodity prices in the world market in recent months which is not related in any direct way to the rise in oil prices. Among these are rice, flour, wheat grain and sugar. Table 7·4 shows the movement of prices of some of these commodities. It is estimated that the Food Commissioner's purchases of rice, flour and sugar alone, in 1974, would cost at least Rs. 837 million more than in 1973.

(*d*) The likely increase in the prices of imports from industrial countries resulting from:

i. higher fuel prices,

ii. lower capacity utilisation,

iii. increased freight rates and

iv. general inflationary situation (see section 4·1)

(*e*) Possible increase in the cost of short term credits as well as the likely rise in interest rates on supplier's credits,

(*f*) The probable decline in the demand in advanced economies for some of the goods and services provided by the less developed countries resulting from a lower level of economic activity induced by higher prices for fuel oil. The already apparent decline in the rate of growth of gem exports and a possible deterioration in tourist earnings can be cited as two such instances.

The balance of payments forecast for 1974 given in table 7·5 has been prepared taking into consideration some of these developments which are already apparent. The last three items have in particular been largely excluded since it is premature to quantify their effects. But as indicated by IMF forecasts, the payments situation in less developed countries could be severely affected by developments of this nature.

On this basis, export earnings for 1974, are estimated to be Rs. 2,906 million while the minimum import requirements would cost Rs. 5,413 million resulting in a trade deficit of Rs. 2,507 million. With the invisibles account expected to be in surplus amounting to Rs. 205 million, the current account deficit for 1974 could be in the region of Rs. 2302 million. Capital payments during the year are estimated at Rs. 948 million. The total resource gap for the year would thus reach an unprecedented level of Rs. 3,250 million.

It is in meeting an enormous resource gap of this order that Sri Lanka would have to face insurmountable problems. Under best possible assumptions Sri Lanka may be able to draw on the spill-over from all previous aid programmes and short term and supplier's credit commitments which could total a sum of Rs. 1,676 million. This would leave a gap of Rs. 1,574 million unfinanced.

The major form of assistance, the flow of foreign aid, appears to have been much reduced by the oil price decision. Industrialised countries would be saddled with their own balance of payments problems in facing a prospective combined deficit of $ 38 billion in 1974.

TABLE 7–4

World Market Prices of Selected Commodities

Item	1972	1973	Estimate for 1974 on the basis of world market prices
Fertilizer* ..	£ 21·7 per ton (*weighted average of all fertilizer)	£ 27·9 per ton	
Rice ..	£ 34·8 per ton	£ 56·34 per ton	£ 159·0 per ton
Flour ..	£ 42·76 per ton	£ 88 per ton	£ 160 per ton
Sugar ..	£ 74·87 per ton	£ 108·7 per ton	£ 200 per ton
Textiles			
Printed Fabric ..	1·11 per yd.	1·18 per yd.	
Poplin ..	1·26 per yd.	1·32 per yd.	

TABLE 7·5

Balance of Payments, 1968–74

(Rs. Mn.)

	1968	1969	1970	1971	1972	1973	1974[1]
1. Merchandise Account	- 380	- 746	- 315	- 287	- 255	- 298	-2507
Imports	2356	2665	2332	2217	2153	2644	5413
Exports	1976	1909	2017	1930	1898	2346	2906
2. Services Account	- 3	- 97	- 110	- 34	- 41	+ 57	+205
Port, transportation etc.	104	94	66	96	93	115	+293
Travel	- 9	- 5	1	5	16	49	60
Investment Income	- 53	- 109	- 142	- 121	- 115	- 110	- 150
Government Expenditure	14	2	7	11	12	13	12
Private transfers	- 13	- 7	- 6	- 20	- 26	2	—
Other	- 46	- 72	- 36	- 5	- 22	- 12	- 10
3. Capital Payments	- 266	- 392	- 656	-1051	- 995	-1277	- 948
Loans: Long term	- 70	- 87	- 126	- 132	- 133	- 146	- 161
Short term	- 175	- 284	- 523	- 905	- 824	-1020	- 787
Other	- 21	- 21	- 7	- 14	- 38	- 111	—
4. Resource Gap (1+2+3)	- 649	-1235	-1081	-1372	-1291	-1518	-3250
5. Financing	649	1235	1081	1372	1291	1518	1676
Loans Long term	297	665	699	799	425	335	673
Short term	345	388	231	523	820	1159	910
Grants & SDRs	28	46	153	168	162	83	93
Assets	- 14	86	- 25	- 96	- 240	- 125	—
Other	9	32	52	- 16	124	- 66	—
5. Unfinanced	—	—	—	—	—	—	1574

Source: 1968–73 Central Bank. 1974 Estimate

1. estimated.

Only the oil producing nations will have the capacity to provide aid. The export income of oil exporting countries is estimated to increase from $ 40 billion in 1973 to $ 115 billion in 1974. The Arab nations, in fact, have shown a willingness to help the less developed countries. But the extent of these funds mentioned by the Arabs appears insignificant in comparison with the combined deficit of less developed countries which is estimated to be in the region of $ 25,600 million in 1974. (Sri Lanka's deficit alone would be $ 338 million).

In this situation Sri Lanka has the critical choice of either reducing oil consumption considerably and suffering a decline in production, growth and employment or cutting back imports of other essential products including food and fertilizer. As the country is dependent

primarily on agriculture which accounts for around 34 per cent of GNP and nearly 90 per cent of export income, the repercussions of a shortage of fertilizer would be severe and widespread. Curtailment of other imports will have equally devastating effects on the economy. Either alternative points to a situation where the economy could be wrecked within a short time. Even if the economy could be managed in 1974 with severe squeezes, the prospects for 1975 do not appear to be any better.

In the long run, the obvious solution would be total reliance on domestic sources of energy wherever substitution is posible. The immediate appointment of a competent "Energy Authority" to effectively coordinate production, development and pricing of energy is essential in this respect. Besides these, self reliance for essential requirements of the country could be the ultimate answer to world inflation and the current scarcities of essential commodites. But the immediate balance of payments crisis facing the country is not amenable to an easy solution.

AN ANALYSIS OF FERTILIZER MARKETING IN THE CONTEXT OF SRI LANKA'S PADDY SUBSECTOR DEVELOPMENT*

by

S. N. SAMUEL AND G. M. ABAYARATNA

The paper commences by examining the role and significance, both theoretically and empirically, of fertilizer in agricultural development, where development is viewed in multi-dimensional terms and defined to include both growth and equity (including employment) components. The paper then surveys the temporal fertilizer consumption pattern in Sri Lanka, and looks at changes in the fertilizer consumption pattern in the paddy subsector in relation to changes in the consumption pattern in the plantation and subsidiary food crop subsectors. It proceeds to analyse the fertilizer marketing channels as well as to identify and assess the characteristics of fertilizer supply in Sri Lanka. It assesses the structure of the distribution channel and evaluates price and subsidy issues in the context of economic development. It thereafter proceeds to examine the problems in fertilizer marketing including those posed by the present world shortages. Finally the paper identifies some implications for policy and briefly suggests some measures that may be considered for alleviating the problems identified.

Role and Significance

Inorganic or chemical fertilizer for paddy is one of the pillars of the "green revolution" and together with complementry inputs such as high yielding seed varieties, water control and pesticides, constitutes an input which is fundamental to the very process of agricultural development. There is very limited growth potential in using additional traditional seed varieties and organic fertilizers like manure, compost and husks, or in reallocating such traditional factors more efficiently. These are both changes along lower production functions that promise only low returns at the margin.

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Organic fertilizers from animal manure, husks, ashes, compost and the production of green manure crops can be expected to yield only low net returns in paddy because of their very high production and supply costs. The available evidence[1] indicates that while the use of organic fertilizer will generally have some positive effect on paddy yields (except in ill-drained conditions where it may have a negative effect), and even higher yields would be forthcoming if such organic fertilizer is used in conjunction with inorganic fertilizer, organic fertilizer does not appear to be *economically* substitutable for inorganic fertilizer due to higher costs. The following Table 1 indicates that a very large quantity of organic fertilizer is needed for obtaining a nutrient content equal to that in a given quantity of inorganic fertilizer. Not only does an unit of organic fertilizer have much less than one-eighth the nutrient content in an equal unit of inorganic fertilizer, but it also releases such nutrients at a much slower rate. It is reported in fact that only about one half of nitrogen, one sixth of phosphoric acid and one half of potash are available for crops in the season of application. There is also difficulty in ensuring balance in the nutrient mix in organic fertilizer. Moreover, since well over eight times as much of organic fertilizer than inorganic fertilizer has to be used for a given yield response, transportation and handling charges must be considerably higher for organic fertilizer. More important, the expansion of manure production conflicts with the use of crop land for direct production and hence involves very high opportunity costs. Therefore the supply of organic fertilizer must initially be of high cost and inelastic in supply response. The conclusion which emerges from the presently available evidence is that given available paddy technology, paddy subsector development seems inevitably dependent to a large extent on an adequate and timely availability of inorganic fertilizer for maintaining and increasing yields.

1. The technical information in this paragraph is from the "Report of the Sub Committe on Organic Manures in Agriculture in Sri Lanka", Sri Lanka Fertilizer Corporation, October, 1973.

TABLE 1

Water and Nutrient Content in Organic and Inorganic Fertilizers

Fertilizer	Per cent Range			
	Water	N	P_2O_5	K_2O
Manures ..	20·0—87·0	0·5— 1·0	0·2— 0·8	0·3— 0·6
Composts ..	Nil	0— 0·6	0·3— 0·6	0·2— 0·8
Ashes ..	Nil	Nil	1·0— 2·0	2·0—30·0
Organic Fertilizers ..	0—87·0	0— 1·0	0·2— 2·0	0·3—30·0
Inorganic Fertilizers ..	Nil	20·6—46·0	27·0—46·0	50·0—60·0

Source: Report of the Sub-Committee on Organic Manures, Ceylon Fertilizer Corporation, October 1973.

The close relationship between world agricultural development and world nitrogen fertilizer consumption is evident in the cross-section data in Table 2. The per capita consumption of fertilizer in the U. S. A. is nearly eight times as much as in Sri Lanka, and as much as thirteen times as much as in India.

TABLE 2

Nitrogen Fertilizer Consumption Per Capita, Selected Countries, 1970/71

Country	Per Capita Fertilizer Comsumption (Pounds)
U. S. A. ..	77·16
Netherlands ..	68·85
U. S. S. R. ..	41·81
Japan ..	18·43
Sri Lanka ..	10·21
India ..	5·95

Source: F. A. O., Production Year Book, 1971.

A dramatic illustration of the importance of inorganic nitrogen can be shown from the wartime experience of Taiwan[1]. The second world war completely eliminated inorganic fertilizer from Taiwan and caused rice yields to drop 30 per cent. When fertilizers became available following the war, yields increased to above previous levels. In examining a cross-section of countries over time Mellor concludes that the average response to fertilizer has been an added ten pounds of food grains for each pound of inorganic nitrogen. This response thus gives something on the order of a 100 per cent return on the farmer's investment in fertilizer. Information in a study of nine colonization schemes in Sri Lanka indicates that "normally" an increase of 9 bushels or 24 per cent can be expected from a dose of 1·7 cwt of fertilizer per acre when yields are around 38 bushels. On the whole the farmers studied received a high net return amounting to Rs. 3 to Rs. 4 for every rupee spent on fertilizer. With the recommended dose of 3.5 cwts, properly applied, farmers could expect a 50 per cent increase in yields[2].

What such high physical response rates suggest is that although inorganic fertilizer consumption involves the use of high opportunity cost foreign exchange resources, the benefits from fertilizer application are so large that they may justify the costs. This aspect is examined in further detail in a subsequent subsection.

Consumption Pattern

The temporal fertilizer consumption pattern in Sri Lanka reflects the increasingly important role of the paddy subsector in the development process. As the following data indicate, fertilizer consumption in the paddy subsector has increased in both absolute and relative terms (when compared to the plantation subsectors).

1. The examples cited are from John W. Mellor's "The Economics of Agricultural Development", Cornell University Press, Ithaca, U. S. A., 1966. pp. 302–3.

2. Rainer Schickele, Socio-economic Survey of Nine Colonization Schemes in Ceylon, 1967–68 in "Ceylon Papers" AER Unit, Faculty of Agriculture, University of Ceylon, Peradeniya.

TABLE 3

Fertilizer Issues Through Multipurpose Cooperative Societies. Area under Improved Varieties and Yield – Paddy Subsector.

Cultivation Year†	Fertilizer Issues (Tons)	Area under Improved Seed Varieties (Acres)	Yield Per Acre
1957/58	16,942	n. a.	35·15
1958/59	26,341	n. a.	35·95
1959/60	20,130	n. a.	36·46
1960/61	28,394	n. a.	36·18
1961/62	38,078	n. a.	37·85
1962/63	47,068	n. a.	37·94
1963/64	60,158	n. a.	38·76
1964/65	42,046	n. a.	34 40
1965/66	40,485	n. a.	35·47
1966/67	52,855	n. a.	41·43
1967/68	84,231	1,082,839	47·50
1968/69	86,066	1,108,4 9	51·20
1969/70	85,357	1,325,327	51·31
1970/71	89,975	1,204,499	45·91
1971/72	121,021*	1,252,317	46·51
1972/73	96,816	n. a.	44·58

Sources: Department of Census & Statistics & Ministry of Agriculture & Lands.

† October–September

* October 1971 – Decemeber 1972

The data in Table 3 show that in 1971 fertilizer issues increased about 272 per cent over the average issue in the five year period 1958–1962, while yields increased about 27 per cent[1].

1. The data available are unsatisfactory for deriving through econometric analysis a fairly reliable coefficient indicative of the change in yield for a given change in fertilizer application at an identified level of probability. This is because the data relate to issues through multipurpose cooperatives and not to actual field level application. A divergence between the two is likely to be considerable due to the difficulty of ensuring crop specificity in fertilizer use (an aspect examined later). Moreover, upto 1964 fertilizer was also distributed through private marketing channels, in respect of which no data are available.

TABLE 4

Cropwise Pattern of Fertilizer Consumption 1965–73 (Tons Per Calendar Year)*

Year	Tea	Rubber	Coconut	Paddy	Others	Total
1965	156,749	23,344	48,420	42,046	45,898	316,457
1966	156,767	22,357	52,184	44,112	54,082	329,502
1967	142,189	21,929	49,377	73,185	49,468	336,148
1968	133,233	17,723	62,664	85,246	64,336	363,202
1969	110,848	20,182	59,259	83,506	63,927	337,722
1970	106,705	20,420	63,769	87,069	59,152	337,125
1971	110,963	17,076	58,197	95,406	61,615	343,247
1972	n. a.	n. a.	48,193	88,164	n. a	n a.
1973	n. a.	n. a.	38,605	125,532	n a.	n. a.

Source: Fertilizer Corporation.

* These figures have been graphed in Figure 1.

The data on the cropwise pattern of fertilizer consumption in Table 4 show that in 1971 fertilizer for tea declined 29 per cent from the 1965 level and rubber 27 per cent. The fertilizer for coconut increased 20 per cent in 1971 (from 1965 levels), but subsequently declined. Fertilizer for paddy on the other hand increased 130 per cent between 1965 and 1971 and a further 52 per cent since then. Also, fertilizer for "others" (mainly subsidiary food crops) increased about 9 per cent between 1965 and 1971.

TABLE 5

Inter-Subsectoral Distribution of Fertilizer in 1965 and 1971

Subsector	Percent of Total Allocation	
	1965	1971
Tea	49·5	32·3
Rubber	7·4	5·0
Coconut	15·3	17·0
Paddy	13·3	27·7
Others	14·5	18·0

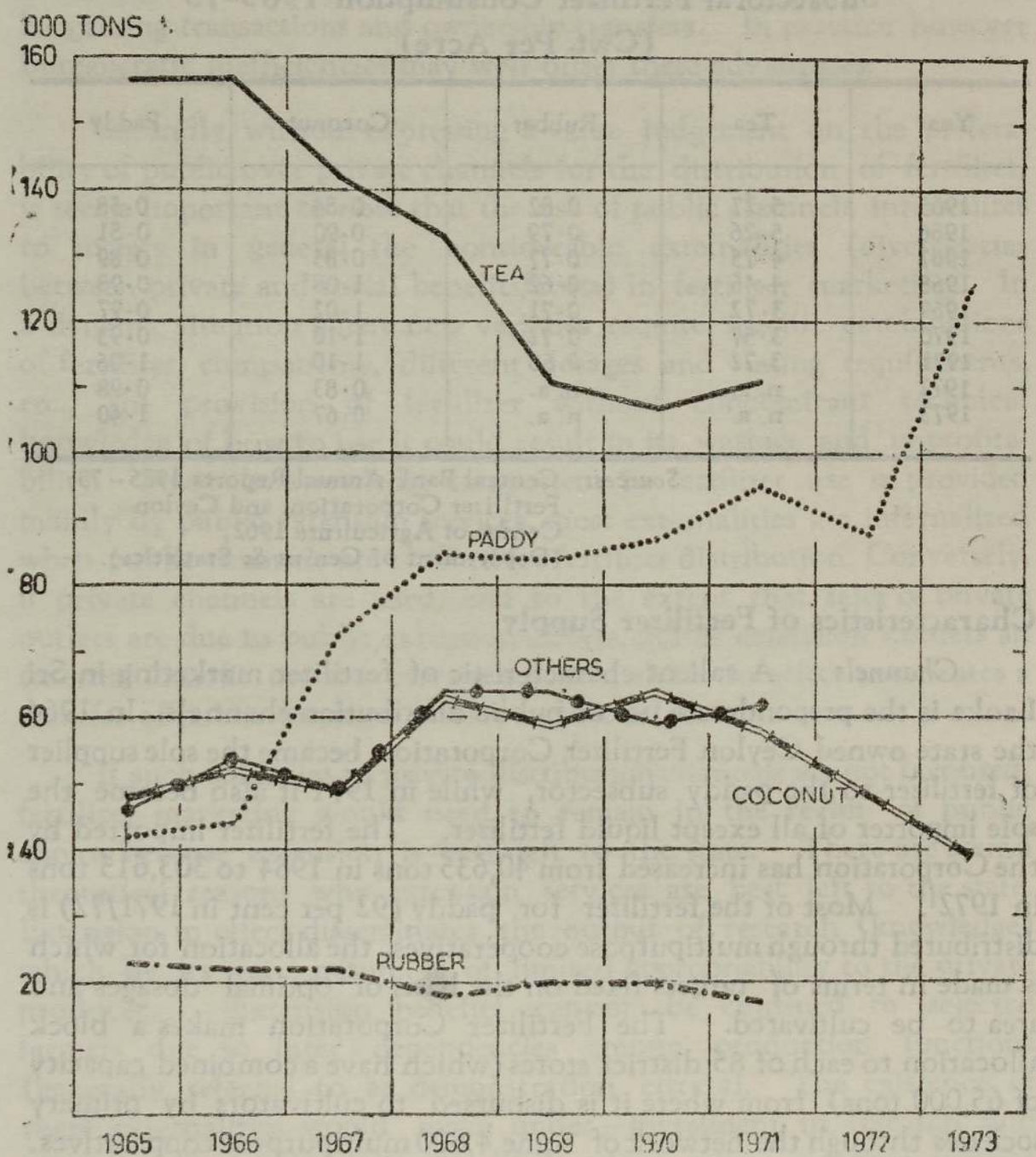
Source: Table 4.

Table 5, which shows changes in the inter-subsectoral distribution pattern, indicates there has been a decline in the proportion of fertilizer allocated for tea and rubber between 1965 and 1971, while

FIGURE 1

FERTILIZER CONSUMPTION

1965 - 1973



Department of Economic Research. Source: Fertilizer Corporation.

the allocations for coconut and "others" increased somewhat. The significant increase in the proportion of fertilizer for paddy reflects the policy emphasis on that subsector. This is also reflected in the information in Table 6 which shows the temporal pattern in per acre fertilizer consumption between 1965 and 1973.

TABLE 6

Subsectoral Fertilizer Consumption 1965–73
(Cwt. Per Acre)

Year	Tea	Rubber	Coconut	Paddy
1965	5·27	0·82	0·84	0·58
1966	5·26	0·79	0·90	0·51
1967	4·75	0·77	0·85	0·89
1968	4·46	0·62	1·08	0·98
1969	3·72	0·71	1·02	0·97
1970	3·57	0·72	1·10	0·93
1971	3·72	0·60	1·10	1·06
1972	n. a.	n. a.	0·83	0·98
1973	n. a.	n. a.	0·67	1·40

Sources: Central Bank Annual Reports 1965 – 73, Fertilizer Corporation, and Ceylon Census of Agriculture 1962, (Department of Census & Statistics).

Characteristics of Fertilizer Supply

Channels: A salient characteristic of fertilizer marketing in Sri Lanka is the preponderate use of public distribution channels. In 1964 the state owned Ceylon Fertilizer Corporation became the sole supplier of fertilizer to the paddy subsector, while in 1971 it also became the sole importer of all except liquid fertilizer. The fertilizer imported by the Corporation has increased from 40,635 tons in 1964 to 303,615 tons in 1972[1]. Most of the fertilizer for paddy (92 per cent in 1971/72) is distributed through multipurpose cooperatives, the allocation for which is made in terms of targets fixed on the basis of optimal dosages and area to be cultivated. The Fertilizer Corporation makes a block allocation to each of 85 district stores (which have a combined capacity of 65,000 tons) from where it is disbursed to cultivators by primary societies through the network of some 4,800 multipurpose cooperatives.

1. R. A. P. Malalasekera, "Distribution of Fertilizer in Sri Lanka", Sri Lanka Fertilizer Corporation, Colombo, 1972.

The use of public channels at least theoretically provides scope for economies of scale through vertical integration of successive stages of marketing processes and from bulk purchases and bulk shipments. Integration vertically has the effect of shortening the marketing chain by centralizing the critical decision-making power into the hands of a single management. It therefore theoretically gets an improved fertilizer flow through the marketing channel by enabling better inventory and merchandising control and reducing the number of bargaining transactions and ownership transfers. In practice however bureaucratic inefficiencies may well offset these advantages.

Secondly, without expressing a value judgement on the preferability of public over private channels for the distribution of fertilizer, it seems important to note that the use of public channels internalizes to society in general the considerable externalities (divergencies between private and social benefits/costs) in fertilizer marketing. In a dynamic situation where new varieties require specific combinations of fertilizer components, different dosages and timing requirements, etc., the provision of fertilizer without concomitant technical knowledge of how to use it could result in its wastage and unprofitability. Since the knowledge component in fertilizer use is provided mainly by public extension services, most externalities are internalized when public channels are ultilized for fertilizer distribution. Conversely, if private channels are used, and to the extent that sales of private outlets are due to public extension efforts, public extension confers an external benefit on the private sector (which in effect constitutes a transfer of public funds to private individuals)[1].

If such subsidies to private distribution channels are not favoured, fertilizer marketing would need to remain in the realm of public choice because extension is best left to the state. There are sound theoretical reasons why extension services are best left to the state. Extension in effect disseminates the output of research (knowledge) which by its very nature is of limited appropriability to the private producer. Extension benefits cannot be confined to selected farmers due to inter-dependencies among production functions (generally referred to as demonstration effects). The existence of these externalities would make under-investment in research and extension by private investors likely since when marginal private

1. Whether this is desirable or not depends ultimately on political values. The state would in effect be bearing the advertisement costs of private suppliers.

gains have fallen to zero, marginal social gain will still be positive. There are also indivisibilities in extension which give rise to economies of scale. Therefore the low rate of capital formation in traditional agriculture will probably preclude private pricing policies that will cover private costs.

It needs to be emphasized that the existence of external effects of private behaviour is neither a necessary nor sufficient condition for an activity to be placed in the realm of public choice. For instance a tax may be imposed on private distributors which will yield a revenue equal to the costs of extension. But this does not appear to be a practical alternative in this instance because of the difficulty in ensuring incidence on private suppliers and the very high tax rate that would be required due to the high financial cost of extension.

Subsidy and Price: The provision of a subsidy for fertilizer acknowledges the existence of social benefits from increases in private agricultural output. Fertilizer for paddy, tea, coconut and minor export crops receive a common subsidy of 50 per cent of cost. However, the subsidy element is much larger if the FEEC-free exchange rate applied to fertilizer imports is regarded as being over-valued and not reflective of the true opportunity (social) cost of foreign exchange resources. Table 7 shows the rupee cost of fertilizer to the State, excluding the cost of administrative overheads.

TABLE 7
Government Expenditure on Fertilizer Subsidy

(Million Rupees)

Year	Tea	Coconut	Paddy†	Total
1965	1·5	8·0	7·4	16·9
1966	0·8	9·1	8·0	17·5
1967	2·5	8·5	9·6	30·6
1968	3·1	14·6	17·7	35·4
1969	2·6	14·9	24·5	42·0
1970	3·1	15·1	28·2	46·4
1971	3·2	13·8	29·6	46·6
1972	3·1	10·5	46·5**	n. a.
1973	3·0*	n. a.	40·0	n. a.

Sources: Tea Control Department, Coconut Cultivation Board, Ministry of Agriculture and Lands.

† Cultivation Year (October—September) except 1972 & 73.
* Provisional.
** 15 months.

Notwithstanding a common subsidy of 50 per cent for fertilizer for paddy, tea, coconut and minor export crops, price differentials arise due to the need to apply different mixtures for different crops and paddy varieties. This has implications for fertilizer leakages (see below).

There is consensus that a low fertilizer price greatly accelerates the diffusion pattern during early stages of adoption of improved agricultural technology. It would, by introducing farmers to a new input, enable them to discover its marginal value product for themselves. Low fertilizer prices will reduce average costs of production, increase the expected profitability of cultivation, and induce technological changes by making their benefit–cost ratio attractive to farmers.

However, fertilizer competes for high opportunity cost foreign exchange resources in the economy. Hence it is only if the paddy subsector can pay a high price that it should be allowed to direct these resources away from other subsectors. Therefore it appears the subsidy for fertilizer may be justified only in the early stages of paddy subsector development in order to introduce farmers to the benefits (MVP) of fertilizer. Also, if the price of fertilizer is established at artificially low levels through subsidization, it is conceivable that the point can be passed beyond which the marginal returns from additional applications of fertilizer will be lower than their marginal opportunity costs to society, given available technology, due to the coming into operation of the law of diminishing returns. Moreover, a permanent fertilizer subsidy will tend to get capitalized into land values and consequently lose its benefits as an incentive.

Providing a subsidy for the fertilizer input seems preferable to increasing the subsidy on paddy output (by revising upward the present "guaranteed" price for paddy).[1] It needs to be acknowledged that an effective guaranteed floor price has a necessary role to play in fostering agricultural development. What farmers need for uncertainty-reduction is a guarantee against a downward fluctuation of output prices rather than one against an upward fluctuation of input prices. Moreover, since changes in output prices tend to be more perceptible to farmers than changes in input prices, the former tend to engender greater farmer response than the latter.

Nevertheless, a fertilizer subsidy, unlike an output subsidy, is conducive to coincidence in private and social objectives. For one thing, the fertilizer subsidy ensures that public expenditure on the subsidy is directly proportional to the adoption of improved technology, while an output subsidy does not. A related point is that while both input and output subsidies contribute to private profitability in cultivation, the latter does not necessarily ensure that paddy performance in terms of yields will improve. On the other hand, a fertilizer subsidy by accelerating the diffusion of new agricultural technology would significantly increase yields and result in the social objective of increasing production coinciding with the private objective of increasing profits.[2]

Furthermore, a fertilizer subsidy contributes more to congruence between growth and equity objectives[3] than an output subsidy. While both subsidies benefit larger (high income) farmers more than either

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1 An output subsidy would exist if the international price is below the administratively fixed local ("guaranteed") price. In Sri Lanka all farmers are required by law to sell their marketable surplus of paddy to the state-owned Paddy Marketing Board (the sole legal outlet) at an administratively fixed "guaranteed" price of Rs. 30 per bushel.

2 An increase in the guaranteed (farm gate) price will probably only result in output increasing along existing marginal cost curves. The fertilizer subsidy by encouraging more widespread use and applications closer to recommended (optimal) dosages, will increase output along new rightward and upward shifting cost curves. There is a theoretical presumption that the cost per unit of output under improved methods of cultivation is lower than the cost per unit under traditional methods. The proportionate increase in output following the adoption of an input package must be greater than the proportionate increase in total cost for technological change to be regarded as an improvement.

3 These objectives are embodied in the social welfare function implied in the Five Year Plan. Ministry of Planning and Employment, "The Five Year Plan", Colombo, 1971, p. 2.

smaller (low income) farmers (who have smaller holdings and a smaller marketable surplus) or agricultural labourers (who have neither), the fertilizer subsidy is less antagonistic to equity. The fertilizer subsidy, by stimulating a more widespread use of fertilizer (and other allied inputs) and applications closer to recommended doses, pushes out the production functions in paddy cultivation, and thus has the capacity for increasing the marginal value product (MVP) of the abundant resource, which is labour, generating greater agricultural employment, and thereby benefitting landless and landpoor categories of persons. Increase in the output subsidy, on the other hand, to the extent that it increases the consumer level price of rice, exerts upward pressures on the cost of living and constitutes a proportionately larger transfer of income from low income non-producers of rice who spend a larger proportion of their income on rice, to high income larger farmers who market a larger proportion of their output. When the transfer is from low income non-producers of rice to high income large farmers, income disparities are increased.

Moreover, when fertilizer and other concomitant inputs are applied, the theoretical case for increasing the guaranteed price is weak, ceteris paribus. Since new technology will be applied only if the consequent increase in output is more than proportionate to the increase in total costs, unit cost per bushel must fall. Hence it follows that a guaranteed price level that covers the costs of production prior to the adoption of new technology will automatially cover the cost of production under the new methods of cultivation, ceteris paribus. To the extent that new varieties are riskier, however, the guaranteed price will tend to be discounted by a risk fraction.

Problems in Fertilizer Marketing

Three categories of problems in fertilizer marketing in Sri Lanka are:-

(i) lack of timeliness in fertilizer availability,
(ii) leakages to other crops,
(iii) sharp increases in world market prices.

(i) It is important that fertilizer be applied at the appropriate time for maximum benefits in terms of yield. But in the past delays in fertilizer availability have been endemic. One reason was the lack of adequate storage faciilities at the multipurpose cooperative society (MPCS) level which made cooperatives reluctant to bear the risks of

prolonged storage. Also, cooperatives prefer to utilize their funds for obtaining fast-moving consumer goods, rather than forego larger profits by tying up their capital in fertilizer stocks. Further, cultivation loans from the People's Bank are often delayed because of delays on the part of farmers in submitting loan applications. This problem was eased somewhat in Maha 1973/74 by the provision of a block allocation of Rs 30,000 to each MPCS, pending finalization of credit applications, so that the MPCS could purchase at least a portion of its fertilizer requirements without delay.

(ii) Fertilizer issued for a particular crop may be used for another crop. Ensuring crop specificity in fertilizer use is not possible owing to the substitutability within limits among fertilizer mixtures. The information in Table 3, which shows a 272 per cent increase in fertilizer issues for paddy in 1971 over the average issue in the five year period 1958-62, but only a 27 per cent change in yields, reflects the existence of the leakage. This evidence is substantiated by the small increase in the fertilizer issued for other (mainly subsidiary) crops in the same period (Table 4).

Leakages of fertilizer may occur for several reasons. One reason already mentioned is that although the fertilizer subsidy for paddy, coconut and tea are an equal 50 per cent of cost, mixtures containing relatively higher priced fertilizer components will be more expensive to the farmer than others. A major reason for leakages is because fertilizer for subsidiary food crops and rubber does not qualify for a subsidy. Hence subsidized fertilizer for paddy and coconut, for instance may be re-sold to cultivators of subsidiary food crops, as is widely occurring. Some farmers and cooperative managers may inflate acreage figures in order to get a larger allocation than needed for their own use, and then sell the surplus at a profit. Delays in fertilizer availability or in rainfall also contributes to leakages in circumstance where the prospective returns from re-sale exceed the expected return (properly discounted) from using it on the recipient's own field.

From the standpoint of aggregate agricultural output, leakages may not reduce total agricultural production significantly. Some loss may result from the application of mixtures with unbalanced nutrients. The economic objection to re-sale may arise however if the subsidy for fertilizer is designed, by discriminating among crops, to contribute

to a desired pattern of national production. Then leakages would increase the output of some crops at the expense of other crops that have a higher national priority.

(iii) Technological change in agriculture makes domestic agricultural production more dependent on purchased inputs and exposes it to the uncertainties of the world market. The present shortages of fertilizer in the world market have increased world fertilizer prices to high levels, and delayed fertilizer imports into Sri Lanka, causing disruptions in local distribution channels. For instance, the January 1974 quota for tea was distributed 2 to 3 months later, while shortfalls in fertilizer availabiliiy for the paddy subsector were met from stocks transferred from the plantation subsectors.

Prices were already rising in the world market prior to the "oil crisis" chiefly due to demand factors (outward shifts in the demand curve for fertilizer). An upward trend in fertilzer prices, which commenced in the latter part of 1971, reached the high levels of the mid-1960s in late 1972[1]. World demand increased by about 8 per cent between 1971 and 1972[2]. In such a situation of increasing world demand, the "oil crisis" in October 1973 caused a further escalation in fertilizer prices by curtailing supplies (shifting inward the short run supply curve for fertilizer and also making the curve less elastic), due to petroleum being a major source of fertilizer.

The rising trend in fertilizer prices induced by this combination of demand and supply factors is discernible in the data in Table 8 which indicate that the (unweighted) average fertilizer price increased 245 per cent in 1974 over that which prevailed in 1971, and 92 per cent over last year's price. This situation has caused a decline in fertilizer stocks held by the Corporation from 70,000 tons in early 1973 to zero in March, 1974.

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1. Data for the subsequent period are not yet available.

2. Between 1961 and 1971 fertilizer prices in the world market have risen much less than those of other purchased farm inputs. While the former increased about 15 per cent upto 1971, the latter increased about 60 per cent. *Monthly Bulletin of Agricultural Economics and Statistics*, No. 6 Volume 22 (June 1973) FAO, Rome.

TABLE 8

Fertilizer Prices 1971–74

Type of Fertilizer	Amount in Dollars Per Ton				Percentage Increase			
	1971	1972	1973	1974	71->72	72->73	73->74	71->74
Ammonium Sulphate ..	37	44	60	117	18·9	36·4	95·0	216·2
Urea ..	72	82	186	350	13·9	126·8	88·1	386·1
Muriate of Potash ..	59	53	99	123	–10·2	86·8	24·2	108·5
T. Saphos Phosphate ..	73	96	118	290	31·5	22·9	145·8	297·3
Rock Phosphate ..	33	33	33	70	00·0	00·0	112·1	112·1

Source: Fertilizer Corporation.

These increases in prices are reflected in Table 9 which shows that the foreign exchange cost of fertilizer in 1973 increased 76.2 per cent over the previous year and 27.6 per cent over the average cost of fertilizer for the five year period 1965 to 1969. It would be more meaningful however to look at the per unit (cwt) foreign exchange cost. The data in respect of this (Table 9) show that in 1973 the per unit foreign exchange cost of fertilizer was 42 per cent higher than the per unit cost in the previous year and 53 per cent higher than the average per unit cost in the five year period 1965 to 1969.

TABLE 9

Volume of Imports and Foreign Exchange Cost of Fertilizer, 1963–73

Year	Quantity ('000 cwt)	Total Foreign Exchange Cost (Million Rupees)	Per cent of Total Imports	Per unit (cwt) Fereign Exchange Cost (Rupees)
1965	6313	88	6·0	13·9
1966	6529	91	4·5	13 9
1967	5545	80	4·6	14·4
1968	6768	110	5·1	16·2
1969	4309	66	2·6	15·3
1970	5183	81	3·5	15·6
1971	4117	59	3·0	14·3
1972	3953	63	3·1	15·9
1973	4922	111	4·1	22·5

Sources: Central Bank of Ceylon and Sri Lanka Customs.

The relative scarcity of fertilizer caused by world shortages may worsen at the farmer level in Sri Lanka due to a sudden increase in the domestic demand for fertilizer. The local demand for fertilizer is likely to receive an impetus and be sustained at high levels for at least the following two or three seasons, due to the greatly increased availability of agricultural credit which has placed purchasing power in the hands of cultivators. The introduction of the recent Comprehensive Rural Credit Scheme and the Bank of Ceylon agricultural credit scheme[1] has resulted in a sharp reversal of a declining trend in credit utilization, with credit utilization increasing 200 per cent from 20.3 million in Maha 1972/73 (upto December 31, 1973) to about 61 million in the corresponding period of Maha 1973/74,[2]

A shortage of fertilizer at the local (farmer) level will excacerbate the problem of leakages. Given demand, a curtailment in fertilizer supplies will cause a gap to develop or widen between supply and demand at previous levels of administered prices. This will necessitate some form of rationing. However it is unlikely that administratively allocating scarce fertilizer to individual farmers will preclude leakages through resale. The more affluent farmers may bid away scarce fertilizer from less affluent farmers. This they would do if the prospective buyer finds it worthwhile to pay a price for the fertilizer which is at least equal to the present value of income foregone by the seller. This present value is in turn a function of the expected change in income from the application of fertilizer (equal to foregone income if the fertilizer is sold), the rate of time preference used by the seller to discount the prospective change in income, and the time lag from the time of sale of fertilizer to the expected time of sale of output.[3] Such transfers may or may not contribute to a more rational allocation of the fertilizer resource. If the transfer of the fertilizer is intra-subsectoral and actuates at least an equal increase in output from the buyer's holding, aggregate subsectoral output will not be

1 Credit under the Comprehensive Rural Credit Scheme was to be disbursed through multipurpose cooperatives, while credit under the Bank of Ceylon Scheme was to be disbursed through sub-offices located at various agricultural service centres. Further details regarding these schemes are in the Central Bank of Ceylon Annual Report for 1973.

2 Maha, the main season, extends from September/October to April/May.

3 Theoretically the sale will occur if $P_o \geq PV = \frac{R}{(1+r)}$ where R is the income foregone due to the non-application of fertilizer, P_o the offer price, PV the present value of expected future change in income dsicounted back to the time of sale of fertilizer, and r the rate of time preference (discount rate) from the time of sale of fertilizer to the time of sale of output.

adversely affected. In the case of inter-subsectoral leakages of fertilizer, divergencies are likely to arise between social and private benefits if the fertilizer subsidy is designed to contribute to a desired pattern of national production, as discussed earlier.

Leakages attributable to the gap between demand and supply may be reduced by increasing fertilizer prices to partially reflect the world fertilizer price trends, without significant loss in fertilizer application. This is because the available evidence points to a highly inelastic demand curve for fertilizer. This inelasticity attribute, which may be near zero within certain price ranges, stems partly from the high degree of technical complementarity of inorganic fertilizer with high yielding varieties which causes large foregone profits if fertilizer is not used. A further factor that contributes to the inelasticity attribute in the demand curve for fertilizer is the relative insignificance of fertilizer costs in the total paddy cost structure, given present levels of "guaranteed" (farm gate) prices. Fertilizer costs constitute only between 5 to 10 per cent of total costs of production in Sri Lanka. Therefore, even if the cost of fertilizer to the farmer doubles, total cost of paddy production per acre will not increase by more than 10 per cent[1]. Therefore the most important factor associated with fertilizer use is solving problems of supply and distribution rather than price.

Third, the fertilizer crisis creates the prospect of a trade-off situation arising between the growth and equity objectives embodied in the social welfare function enunciated in the Five Year Plan. Since the fertilizer response rate is higher on irrigated paddy fields able to effect water control, and the majority of irrigated paddy land (82 per cent) is in the dry zone where the average size of paddy holdings is more than twice as large (over 2 acres as against less than 1 acre in the wet zone), to divert a given amount of fertilizer to where it is likely to have the maximum impact on production may be at the cost of reducing incomes and employment, at least relatively, of smaller (low

1. According to the Central Bank "Survey on Cost of Production of Paddy" (Department of Economic Research, Central Bank of Ceylon, 1968) Table 37 (page 57), fertilizer accounts for 4·7 per cent of the cost of production per acre. According to some 1973 unpublished data on the cost of production in the Batticaloa district, fertilizer cost constitutes about 8 per cent of total costs of production. The validity of this point depends on the validity of the costs imputed for family labour in the cost of production computation.

income) farmers in the wet zone. If the latter happens, the increase in rural income disparities will contribute to further skewness in the distribution of personal income in Sri Lanka.

If foreign exchange constraints necessitate a cutback in fertilizer imports it would be economically wasteful to subsequently import rice or other food commodity to meet the resultant shortfall in output since world prices of these commodities are likely to already embody the high fertilizer price. If such imports are made it would be tantamount to buying the high priced fertilizer after all while losing the beneficial multiplier effects of domestic agricultural production. If rice imports are envisaged it would be more advantageous to import the fertilizer in the first place, even at a high price, because the high yields and greater output would directly increase the Gross National Product significantly and also increase incomes and employment of those directly engaged in agriculture, and through higher expenditure levels of the farming community, generate further income and employment in the manufacturing and service sectors. To import fertilizer rather than rice would therefore prevent the leakage of these multiplier benefits to the economies of countries exporting rice to Sri Lanka. From a policy standpoint, if a decision is taken to reduce the quantity of fertilizer imported, it would also need to be decided at the same time that the consequent shortfalls in rice output will not be met out of imports, if resources are not to be wasted.

Summary and Conclusions

Given present agricultural technology, fertilizer is a critical input which contributes substantially to providing both the incentive and opportunity for investment in agriculture by greatly increasing output along higher production functions. Hence the temporal fertilizer consumption pattern in Sri Lanka reflects the increasingly important role the paddy subsector has played in Sri Lanka's economic development.

Fertilizer distribution channels in Sri Lanka are publicly owned or controlled and this characteristic theoretically promises economies of scale through vertical integration and bulk purchases, and the internalization of external benefits that would have otherwise been lost to the public system.

The provision of a subsidy for fertilizer acknowledges the existence of social benefits from increases in private agricultural output. The case for a permanent fertilizer subsidy however is weak. The

common fertilizer subsidy does not safeguard against price differences in fertilizer mixtures–thus contributing to inter-subsectoral leakages of fertilizer. Providing a subsidy for fertilizer is preferable to increasing the subsidy on paddy output because the provision of the fertilizer subsidy is conducive to coincidence in the private objective of increasing profits and the social objective of increasing production. A fertilizer subsidy also contributes more to congruence between growth and equity objectives than an output subsidy, because it is more certain to benefit landless and landpoor farmers, and low income consumers who have a high income elasticity of demand for rice.

Fertilizer marketing in Sri Lanka is affected by the difficulty in ensuring timely deliveries at the local level and that of administratively preventing subsidized fertilizer for paddy from leaking to other subsectors that are not entitled to subsidized fertilizer. The third problem of more recent origin is the increase in the international fertilizer price due to upward shifts in the fertilizer demand and supply curves. The domestic demand for fertilizer is likely to increase due to an increased availability of rural credit. A relative scarcity of fertilizer in the paddy economy is likely to aggravate the problem of leakages both intra-subsectorally and inter-subsectorally. It is difficult to say *a priori* whether such transfers will contribute to a more rational allocation of the fertilizer resource. Since high response farms are in the dry zone where farms are larger, the shortage may pose a dilemma for policy markers who may have to choose between promoting growth and achieving equity.

If foreign exchange constraints necessitate a cut back in fertilizer imports, it would be economically wasteful to subsequently import rice or other commodity to meet the resultant shortfall in output because then domestic multiplier benefits will leak to rice exporting countries.

The impact of fertilizer shortages on yields can be minimized by timely deliveries at the farmer level. Late applications of a given quantity of fertilizer results in lower yields than if the same quantity had been applied on time. The corollary to this is that these same yields may have been achieved by a more timely application of a smaller quantity of fertilizer. In other words, fertilizer is wasted if applied too late. Institutional and other modifications designed to improve supply in this respect may take the form of increasing storage capacities

at the secondary cooperative level and of providing People's Bank loans before loan applications are finally processed. Consideration may be given to encouraging farmers to build their own storage facilities

Leakages may be reduced by providing all (including subsidiary) crops with a common fertilizer subsidy. The burden on the public exchequer may be reduced by reducing the per unit subsidy somewhat and increasing the price to farmers correspondingly. Such action may be taken within limits without significant loss in application because of the highly inelastic nature of the demand curve for fertilizer.

Increases in the world fertilizer price can be curbed by reducing the pressure of world demand, increasing fertilizer plant capacity and obtaining oil based fertilizer raw materials on concessionary terms till substitutes are developed. Reducing world demand depends on the success of biological research in developing high yielding strains that are less dependent on fertilizer application for yields. This admittedly is a medium to long term prospect. In the immediate future it would be possible to induce the building of sufficient fertilizer plant capacity to ensure that increases in demand are matched by at least equal increases in supply. To the extent that the high fertilizer price is influenced by the high cost of petroleum based raw materials, it may be necessary to obtain such raw materials on concessionary terms till such time as cheaper substitutes are found or developed through calculated research. The Sri Lanka Prime Minister's proposal for a world fertilizer fund would meet this need. Research projects currently underway have developed a means of using blue-green algae in paddy fields as a technical substitute for synthetic nitrogen. It is not known however whether blue-green algae is an *economic* substitute for synthetic nitrogen.

THE FAKING OF FOREIGN TRADE DECLARATIONS*

By

WIMAL WICKRAMASINGHE

This study has been stimulated by Professor Bhagwati's writings on the faking of foreign trade declarations[1]. Professor Bhagawati has emphasised the importance of over-invoicing of exports and under-invoicing of imports in the foreign trade declarations of developing countries and he has made use of examples from Turkey and India for his analysis. This paper on the other hand attempts to show that in countries where exchange and trade controls play a prominent role in dealing with balance of payments difficulties, the under-invoicing of exports and over-invoicing of imports are likely to be more important. The main reason for this is that in countries where the demand for foreign exchange typically exceeds the supply, both exporters and importers prefer to hold their wealth in foreign rather than in domestic currency. A corollary to this is that the value of foreign cxchange in the unofficial exchange market is higher than the official rate of exchange. The present writer's line of argument has been largely influenced by the experience of Sri Lanka. It is

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1. Jagdish Bhagwati, 'On the Under-invoicing of Imports' *Bulletin of the Oxford University Institute of Economics and Statistics*, Vol. 26, No. 4, November 1964, pp. 389-397; and 'Fiscal Policies, the Faking of Foreign Trade Declarations and the Balance of Payments', *Ibid.*, Vol. 29 No. 1, February 1967, pp. 61-67. An amalgam of these two papers constitutes Chapter 10 of Bhagwati's recent book, *Trade, Tariffs and Growth*, (London: Weidenfeld and Nicholson, 1969), pp. 266-294. Also see, Jagdish N. Bhagwati and Padma Desai, *India: Planning for Industrialization*, (published for the OECD by Oxford Univesity Press, London, 1970), pp. 453-457.

admitted however that the experience of a particular country need not have a general application but conditions in many developing countries are such that the theoretical points that emerge from the discussion of faked invoicing of export and import values in Sri Lanka may hold more generally.

It is self-evident that in many developing countries the most important "growth-limiting" factor is the acute shortage of foreign exchange. The origin of exchange and trade controls and complex types of multiple exchange practices have inevitably emanated from the acute difficulties in the balance of payments and their adverse effects on the foreign exchange situation. The rationalization in the use of foreign exchange has therefore become a **sine qua non** for development planning. This constitutes the principal means of ensuring the import of capital and intermediate goods required for development. Towards this end the emphasis has normally been placed primarily on the efficient use of scarce foreign exchange that is available and not on the blocking of leakages of foreign exchange. An important instance of the latter is the faked declaration of import-export values which is examined in this paper. In what follows we shall discuss the practical significance of the under-invoicing of exports and over-invoicing of imports as against the theory of faked foreign exchange declarations. This is identified as the real problem that confronts many developing countries.

Effective steps towards the elimination of under-invoicing of exports and over-invoicing of imports would to a large extent help to bridge the existing gap in the balance of payments of many developing countries. Such a task is not as easy as one would generally think because it involves the scrutiny of all or suspected import and export applications and other connected documents. They are invoices, business contracts, bills of lading, letters of credit, documents against acceptance or payments, business receipts, cables, certificates of origin,

or weight, of quality, or of analysis, and documents with regard to miscellaneous disbursements, etc.[1] Moreover, the availablity of personnel having an exhaustive knowledge about domestic and world market prices of respective commodities is a pre-condition to effective price-checking. The absence of such a knowledge would naturally reduce the power of effective implementation of the authority to whom the task of examining faked declarations is entrusted.

Whatever the circumstances that induce exporters and importers to engage in faked declarations, the ultimate aim is often to transfer capital in violation of exchange control regulations. The advantages of holding foreign exchange abroad are many; among these the more important are the distribution of their assets and minimising of risks probably associated with the fear of expropriation, ability to travel abroad when stringent exchange controls are in force, to acquire other property, business or otherwise, abroad, evasion of tax and the need

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1. These are the documents that are normally used for the financing of import and export trade. The *invoice* carries a short description of the quantity, quality and price of goods to be exported; it may also include the number of units or packages, the size of each package, the country of origin, consular fee, if certified, etc. Further, if it is a c.i.f. invoice, the charge of packing, insurance and freight are also given in the invoice.

A *bill of lading* which includes, *inter alia*, the name of the vessel, name and address of the consignee, weight of goods, number and identification marks of packages, country of destination and port of destination, amount of freight charged etc., shows that the goods are loaded on board. *Uniform Customs and Practice for Documentary Credit*, published by the International Chamber of Commerce, stipulates terms and conditions to be inserted in the bill of lading. See Articles 17-21.

Letters of Credit may be either revocable or irrevocable, and therefore, they should clearly indicate whether they are revocable or irrevocable, because in the absence of such an indication the letter of credit is deemed to be revocable. A documentary (letter of) credit is defined as any arrangement whereby a bank, acting at the request and in accordance with the instructions of a customer, is to make to a beneficiary, or is to pay, accept or negotiate bills of exchange (drafts) drawn by the beneficiary, or authorises such paymencs to be made, or such drafts to be paid, accepted, or negotiated by another bank, against stipulated documents and in compliance with stipulated terms and conditions. For details, see *Uniform Customs and Practice* (quoted above), or Bankers Magazine, *Documentary Credits*, (London: Waterlow & Sons)

In the case of D/P bills, payment is required to be made by the importer before the documents giving title to the goods are released by the bank. But D/A bills do not stipulate such requirement; bills are handed over to the importer against acceptance and the payment can be made subsequently depending upon the agreement or the practice of the trade. The former is also referred to as sight or demand bills and the latter as usance bills. See Bankers Magazine, *Documentary Bills: Their Collection and Negotiation*, (London: Waterlow, 1966.)

to keep money abroad for any other precautionary purposes. Further, such an arrangement will enable them to derive a higher return by selling foreign exchange at a premium in the unofficial market[1]. Moreover, the holding of money or other assets in a more stable currency would also increase their value in relation to holdings in domestic currency. The reason for this is principally two-fold. One is that in the face of chronic balance of payments difficulties the exchange rates of many developing countries are more vulnerable to downward changes. The other is that even if it is ruled out in the short run, deficit financing and rigid exchange and import controls in the face of slow increase in productive capacity would give rise to inflation that would in turn reduce the purchasing power of the domestic currency.

The question of faked foreign trade declarations has been a neglected area of study. It is due in part to the complex nature of the transaction and in part to the lack of knowledge of the magnitude of exchange leaking out by way of faked invoices. In this sense Bhagwati's writings can be treated as a pioneering attempt to draw the attention of economists to this stimulating field of study. However, the present writer feels that he has attempted to look at the problem from the wrong end. An examination of export-import data between the country in question and the rest of the world would not be a fair indication of the extent of under-invoicing and over-invoicing and Bhagwati has done this without taking into consideration the large discrepancies that could arise in an exercise of this kind. Perhaps the correct way to undertake this analysis would be to examine export or import documents related to a particular consignment; each case needs to be examined in isolation without which all irregularities in the transaction would go unchecked.

Faked foreign trade declarations in the context of a developing country having restrictive exchange and import controls are generally directed toward outward remittances of foreign exchange and capital, and not vice versa. Therefore, while not dismissing the possibility of inward capital transfer described by Bhagwati, this paper will first argue that in a developing country, over-invoicing of exports is difficult and unprofitable, and under-invoicing of exports is preferred. Over-invoicing of exports means that the exporter will have to surrender to the exchange authority the declared value of foreign exchange that is well above the actual value of exports. If the

1. The terms black market and unofficial exchange market are used interchangeably in this paper.

exporter is required to receive proceeds of exports through an authorised dealer (i. e. a commercial bank to which the power of approving exchange applications and of engaging in outward and inward remittances is delegated by the exchange control authority of the country), as in the case of most countries having exchange control, then he is unable to purchase the difference from the unofficial market and surrender it to the authorised dealer making up the difference between declared and actual value of exports.

The authorised dealer or the banker is also unable to certify to the authority the amount of proceeds the exporter has received against a particular consignment of exports, unless proceeds are routed through the certifying authorised dealer. Bhagwati says that 'when there is exchange control, and the exporter must surrender to the exchange authorities the full declared value of exports, the exporter will have to purchase illegal foreign exchange in the black market to the amount of the excess declared over actual value of exports', But he seems to have overlooked the fact that in most countries the exporter is unable to do so as he is required to receive his proceeds through an authorised dealer. The exporter, who under-invoices, will have to purchase the difference from the unofficial market not to surrender to the exchange control authority but to re-imburse his buyer or agent abroad.

Another point which needs emphasis is that Bhagwati has narrowed down the scope of under- and over-invoicing that might occur in a country as follows: 'The presence of tariffs and subsidies on international trade transactions generally creates immediately an incentive to over-invoice or under-invoice the value of transactions'. This seems to imply that the absence of tariffs and subsidies on international trade transactions could completely eliminate such activity? This is presumably not correct, because tariffs and subsidies are only a part of the problem and it is possible for under-and over-invoicing to take place, in circumstances which are referred to in the following analysis.

This paper does not refute Bhagwati's argument that when the rate of **ad valorem** export subsidy is higher than the penalty payment that has to be made for the purchase of foreign exchange in the black market, over-invoicing will take place. But it is questioned whether this is at all probable. For example, exporters have the opportunity

of selling their consignments at a price below the cost price which would be compensated by the subsidy (or some 'certificate payment' to which exporters in some countries having multiple exchange rates are entitled). That is, they could deliberately under-invoice their exports to an extent that would not be challenged by the authority even upon detection of under-invoicing as long as they could show that they did not lose when the subsidy or certificate payment was added.[1] Moreover, there is no reason to believe that the rate of ad valorem export subsidy would normally be less than the premium in the unofficial exchange market. The effect of rigid exchange and import controls is often to raise the premium to high levels and a shortage of revenue often constrains governments from further raising the subsidy.

The importer has two courses of action in order to maximise his returns. One is to under-invoice his imports and the other to over-invoice his imports. In a situation where there are no controls on the release of exchange, the importer may tend to under-invoice imports if the tariff or import duty is higher than the premium which he has to pay for the purchase of the difference from the unofficial foreign exchange market. One could of course argue that if there is virtually no exchange control, the chances for the survival of any unofficial exchange market are very low or would not exist. However, no government will release foreign exchange upon request without having regard to the benefit that would accrue to the country and this is true even if the country concerned has a sound reserve position. When the government (or the Central Bank) becomes the monopolistic buyer or monopsonistic seller of foreign exchange, the use of foreign exchange would be subject to restrictions.

Bhagwati argues that when the tariff on imports exceeds the premium on illegal foreign exceange, there is a tendency on the part of importers, as in the case of Turkey, to under-invoice imports with a view to maximising returns from trade. If quotas are set in value terms, then

1. It is suggested that in Sri Lanka some exporters of non-traditional commodities who are eligible to a subsidy payment of 65% over and above the total proceeds of their consignments are inclined to charge a lower price and that this method is being used as a means of transferring the difference abroad. A co-ollary of this argument is that a higher subsidy-a subsidy even higher than the premium on foreign exchange in the black market-would not necessarily induce exporters to over-invoice their exports in order to enjoy the subsidy in local currency, as Bhagwati argues.

under-invoicing the prices of imports enables more to be imported in apparent consistency with the quotas. Bhagwati's analysis on the under-invoicing of imports in the Turkish experience during the early part of the 1960's falls into this category. This policy of under-invoicing of imports has a snag noted by Bhagwati himself in the concluding part of his 1964 paper. He showed that the accelerated depreciation allowance introduced by Turkey in 1963 "had the offsetting virtue of making undervaluation of capital goods imports less attractive". For the under-invoicing of imports to be profitable on the whole, the rate of tariff needs to be not merely higher than the premium on foreign exchange, but higher than this premium plus the depreciation allowances the importer cannot enjoy owing to his undervaluation of imported capital goods.

The above analysis applies only if the importer prefers to procure profits in domestic rather than foreign currency. If his intention is to build up foreign exchange for precautionary purposes and exchange controls prevent him from doing this legally, over-invoicing of imports will enable him to by-pass the controls. By over-invoicing imports he is able to collect foreign exchange (be it sterling or dollars or any other currency for which the demand is substantially higher than that for domestic currency) at the expense of domestic currency. In such a situation the importer is inclined to substitute foreign exchange for domestic currency because this 'substitution effect' will bring forth an added revenue or satisfaction to the importer. By the word 'satisfaction' we mean that he is inclined to possess or build up foreign exchange abroad at the expense of domestic currency with a view to making use of them for precautionary purposes. The experience would show that the established importing or exporting firms and foreign-owned companies are engaged in the act of over-invoicing not to sell foreign exchange at a premium in the unofficial market but to build up or transfer foreign exchange abroad. As a result, the consequential supply of foreign exchange by way of over-invoicing of imports (and under-invoicing of exports as well) will not come to the unofficial market, and therefore, availability of more foreign exchange to importers will not depress the rising price of exchange in the unofficial market.

In an attempt to formulate a theory of under-invoicing and over-invoicing, especially in the context of a developing country in which the government has resorted to severe exchange and import

controls with a view to alleviating difficulties in the balance of payments, it is relevant to take into account that under-invoicing of imports and over-invoicing of exports will prove to be the exception rather than the rule. On the face of it, it may appear that both exporters and importers lose from trade but this is only in domestic currency; they are, however, compensated by an increase in their foreign holdings which are more valuable to them. To put it differently, exporters and importers deliberately discard domestic currency in the hope of acquiring foreign currency, and in this way they try to maximise gains from the trade. In economic terms, the marginal rate of substitution of domestic currency for foreign currency is high as long as the price of foreign exchange in the free market is made artificially higher in relation to domestic currency.

The faking of foreign trade declarations which is considered to be one of the biggest malpractices in the export and import trade is a deliberate act undertaken secretely in collusion with the traders or agents abroad. It causes the country's terms of trade to further deteriorate and also aggravates difficulties in the balance of payments.

There are numerous methods by which foreign trade declarations are faked with a view to building up of foreign exchange reserves abroad or for the enjoyment of a premium on foreign exchange in the unofficial market.

In a bona fide invoice the sale price has to be higher than the price at which goods are bought or manufactured locally plus other normal charges including profit margin. Earlier it was shown that this need not be the case and there are instances where this requirement may not necessarily be followed. However, to establish the fact that the under-invoicing of exports has taken place in some particular consignment, it is essential to know precisely the value of all items that are marked on the invoice. These items may vary depending on the terms of contract i.e. ex factory or ex warehouse, free on rail (f.o.r.) free on board (f.o.b.) free alongside ship (f.a.s.) cost and freight (c & f), cost, insurance and freight (c.i.f.) and so on. However, the most widely used (and sometimes officially required) one is the c. i. f. contract. Some developing countries, for example, Sri Lanka might insist that insurance be paid locally with a view to conserving foreign exchange which would have otherwise gone out of the country. On the other hand, if the government has taken over the insurance by

way of nationalisation, as in the case of Sri Lanka, such an arrangement might enable the government to collect more revenue which could be used for current and capital expenditure.

In the case of goods that are bought from the local auctions for export, for example, tea, under-invoicing could be detected by reference to the purchase receipts. However, exports of tea present a difficulty when the tea exported is a blend of various grades. In such an event exporters could be asked to declare on the invoices the dates of purchase and the lot numbers of the tea comprising the blend. Then the blend sheets of any export can be examined in order to ascertain whether the exporting firm in question has engaged in under-invoicing However, it is not so easy to ensure that a blend would contain a particular mix of tea.

As for tea consigned to the London Auctions, proceeds that have been received by exporters could be checked, to a certain extent, by reference to tea catelogues issued by the London Tea Brokers' Association. Nevertheless, exporters are allowed to make some deductions from proceeds on account of some expenses such as brokerage, prompt discount, freight and interest (if not already paid), warehouse charges, agent's commission, postage and miscellaneous charges. Unless these items are vigilantly checked, they could be manipulated in such a manner that some amount of foreign exchange could be retained abroad with each consignment. This amount may be small for any worthwhile follow-up, but when the export trade is in the hands of a few, a single firm may be making a very large number of consignments each year. Therefore, it is essential to ensure that the foreign exchange that would actually accrue to any country from the sales at auctions abroad is in all the circumstances satisfactory in the national interest. The practice of allowing such deductions from proceeds was done away with in Sri Lanka after the introduction of the Foreign Exchange Entitlement Certificate Scheme. Instead, approval had to be obtained from the Department of Exchange Control for the remittance of head office expenses subject to the surrender of FEECs.

Sri Lanka's experience suggests that exporters can adopt the following strategies for the building up of foreign exchange abroad; there is no reason to suppose that these observations are not applicable to other developing countries.

(a) They can secretly have contacts with the buyers or agents abroad for the retention of some part of the export proceeds by entering into contracts in order to receive less for their exports.

(b) After declaring the value of their exports, some exporters can arrange correspondence with the buyers or agents in order to convince the exchange control authorities that they have failed to receive proceeds in full. Therefore, it is not always possible to say that the amounts written off are **bona fide** in character.

(c) There can be instances where some exporters deliberately fail to conform to the conditions and requirements of the letters of credit. Some agricultural commodities are such that a smooth flow of goods for export cannot be maintained owing to the lag in the supply. As long as the non-compliance can be justified when an explanation is called for, exporters can adopt this method: it may work a few times but not always. However, a few times may be sufficient to build up the required level of capital abroad.

The bills drawn against the letters of credit may sometimes be refused or dishonoured by the drawees. Then the shippers may seek approval of the Exchange Control for the bills to be drawn either on collection basis or against D/A terms.[1] This may possibly lead to a loss of foreign exchange to the country. When the genuine buyer refuses to accept the consignment owing to the terms of the letter of credit not being complied with, the shipper can seek approval for the delivery of documents to a third party. If the motive behind this is to retain some foreign exchange abroad, the allowance in price made on the ground of non-conformity would enable the shipper to do so.

(d) Certain commodities can be sold forward for delivery at a later date. Some shippers who engage in the act of building up foreign exchange abroad can register large contracts for forward delivery when the prices are low.

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1. If the shipper needs to change the mode of payment after exportation of goods, he should seek approval of the authority, giving reasons that have called for such a change.

(e) Foreign subsidiaries which have a fair domination over the country's international trade may receive less in domestic currency for exports and pay more for their purchases of imports from the principals. Unlike the arrangement between other sellers and buyers, transfer of capital from subsidiaries to their principals is comparatively an easy task. It is a matter of adjusting their accounts accordingly as the reciprocal understanding which is a sine qua non for faked trade declarations is at its height between them.

The illegal transfer of capital or retention of foreign exchange abroad will not supply foreign exchange to the country's unofficial exchange market. The supply of, and demand for, foreign exchange in the unofficial market has been lucidly described by Bhagwati.

> "The illegal foreign exchange market is being fed by supplies from over-invoicing of imports, under-invoicing of exports, diverted remittance and foreign tourist expenditure and foreign flight of capital. The demands for black exchange come from under-invoicing of imports, illegal tourist expenditure and transfer of capital and remittances abroad, and over-invoicing of exports".[1]

However, according to our analysis, some qualifications need to be made. In the first instance, over-invoicing of exports does not necessarily supply foreign exchange to the unofficial exchange market. In most developing countries having stringent exchange controls, exporters are required to receive their proceeds through an authorised dealer in foreign exchange. Hence the consequential effect would be to increase the supply of foreign exchange to the country per se or increase the demand for its domestic currency. On the contrary, exporters will have to pay the difference by buying foreign exchange from the unofficial market. In other words, they demand exchange from the market. When the premium they have to pay in the unofficial market is higher than that of ad valorem export duty, if there is any, they will lose on completion of the deal. Further, we have shown that contrary to Bhagwati's assertion, the subsidy would

1. Jagdish Bhagwati, 'Fiscal Policies, the Faking of Foreign Trade Declarations and the Balance of Payments', *Bulletin of the Oxford University Institute of Economics and Statistics*, Feb. 1967, p. 68; or *Trade, Tariffs and Growth* op. cit., p.277

sometimes induce exporters to charge less for their exports or engage in under-invoicing; the loss of domestic currency is now compensated by the subsidy.

According to our analysis, forces that are at work in the economy are to undermine the official rate of exchange, on the one hand and to raise the price of foreign exchange in the unofficial market, on the other. This can also be established by reference to the mechanism of over-invoicing imports. The above forces will become more intensified by the impact of the tourist expenditure. Now the tourists would prefer, if possible, to sell their currency in the unofficial market and obtain more domestic currency or purchasing power in the country concerned. This foreign exchange should normally come through the banking channels. However, this supply of foreign exchange would not dampen the price of exchange in this market to a greater extent, because local tourists are forced to buy the same from the unofficial market as they are prevented from buying exchange from the authority owing to rigid travel restrictions.

In conclusion, the difficulties in the balance of payments of many developing countries are not mostly due to under-invoicing of exports and over-invoicing of imports. These reasons have been extensively discussed in the economic literature. What is emphasised here is that faking of foreign trade declarations which has been overlooked by the economists is also equally responsible in creating or aggravating difficulties in the balance of payments.

However, Bhagwati's account of faking declaration, based on partner-country data, constitutes only a crude and preliminary analysis. The proper investigation of such activities lies in the examination of export-import documents relating to particular consignments of exports or imports. For example, the detection of under-invoicing of exports should be based on the information given on invoices in respect of the consignments concerned. It is essential to know precisely the value of all items that are in the invoices; these items may vary depending on the terms of contract that both parties have agreed upon. If the invoice is based on the c.i.f. quotations, then the items that generally enter into the invoice are the cost of the goods, collection charges, interest, bill brokerage, buying commission, marine and fire insurance and freight. In addition, checking of under-invoicing of exports would require a knowledge of local prices as well as day-to-day world market prices of the commodities concerned.

AGRICULTURAL PRODUCTIVITY CONSIDERATIONS OF THE LAND REFORM LAW OF 1972

by

NIMAL SANDERATNE*

Introduction

The Land Reform Law of 1972 was the first attempt to alter the land tenure structure of Sri Lanka by a significant redistribution of privately owned agricultural land.

The explicitly stated objectives of the Land Reform Law of 1972 (henceforth Law) are :-

(a) limit ownership of agricultural land to the specified ceilings;

(b) utilize lands taken over so as to increase the productivity of such lands and increase employment.

A summary of the provisions of the Law – in so far as such provisions have a bearing on the productivity of agricultural land – is followed by estimates of the extents of land (by land use categories) declared, expected to be expropriated, and thus far expropriated. The distribution of the lands already alienated under different types of farming organization provides the other facet of data for discussion of the Law's likely impact on agricultural production. The discussion first focuses on the effects of the Law on the productivity of lands which will not be ultimately vested in the Land Reform Commission (henceforth Commission), but whose productivity may be affected by the enactment of the Law.

It then discusses the likely impact on production of lands whose ownership conditions are changed but the operational organization is retained as before. This is followed by a discussion of the Law's impact on lands whose tenure and agricultural orgnization are basically changed. Finally, the increases in production from lands not previously exploited are considered.

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* This article incorporates material contained in the author's: *The Political Economy of Asian Agrarian Reform: A Comparative Analysis with Case Studies of the Philippines and Sri Lanka.* (Ph.D. thesis University of Wisconsin, 1974).

The data on the productivity of lands vested in, and alienated by, the Commission are not available. Therefore the analysis is necessarily confined to a broad assessment of possible effects on productivity. This discussion is based on the changes in the types of land use and agricultural organization effected by the Reform.

Provisions of the Land Reform Law

A person over 18 years of age (defined so as to include a family consisting of the surviving spouse or spouses and any surviving children under 18 years of age) was permitted to retain paddy land up to a ceiling of 25 acres or other agricultural land up to a ceiling of 50 acres. While the category of agricultural land may include paddy land, the total extent of paddy land should not exceed 25 acres[1].

When any agricultural land is co-owned, each co-owner is deemed to be owner of his share as a separate entity. When land is held by a private company or co-operative society, the share holders are deemed to own land in proportion to the paid up shares of the company or society. Lessees of government lands are considered owners for the purpose of establishing the ceiling on land. Therefore those holding leases on public land in excess of the ceiling would have to renounce their rights to land in excess of the ceiling. Land held by public companies[2] and religious institutions and religious and chari table trusts are exempt from the provisions of the Law as long as such land was held by them on May 29, 1971 and continue to be held by them[3].

Land held in excess of the ceiling was deemed vested in the Commission on August 26, 1972 (The date of commencement of the Land Reform Law). Although the provisions with respect to the ceiling come into effect from that date, where the Commission finds that any agricultural land has been alienated on, and after, the 29th of May 1971 with the intent of defeating the objectives of the Law, the Commission has the discretionary power to declare such transactions null and void.

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1. An area not exceeding one half of an acre each is permitted for a residence of the owner and a family burial ground. Where there are staff quarters or labour lines, an eighth of an acre is permitted per resident family.
2. Companies registered under the Companies Ordinance other than private companies and any company to which Part XI of the Companies Ordinance applies.
3. Land held by religious and charitable institutions and trusts include, *Viharagam*, *Devalagam* and *Wakfs* and lands held in trust under the *Buddhist Temporalities Ordinance*.

Any person who alienated agricultural land above the ceiling extent on and after May 29, 1971, is required to report the alienation of such land to the Commission within three months of the enactment of the law. When a person gains land in excess of the ceiling after the enactment of the law, the provisions with respect to the ceiling would apply.

Leases to, or by, a person owning land above the ceiling on and after May 29, 1971 were terminated on 29th August 1972.[1] There is provision for the transfer of land in excess of the ceiling after the enactment of the law. Within three months of being declared a statutory lessee under the Commission an application could be made for the transfer of land to either a child over 18 years of age or to a parent. The Commission has the discretionary right of granting or rejecting such an application.[2] There is explicit mention that the Commission has the discretion to sell land vested in it to persons who were minors at the time the ceiling was imposed on their parents' lands. The bonds originally obtained form the Commission could be used for the repurchase of their parents' lands or other lands.

A statutory lease would run for one year initially but the Commission could terminate it at any time. The extension of the lease for a further year is at the option of the Commission. An extension beyond this period requires the express approval of the Minister of Agriculture. The Commission has absolute title to, but is free from all encumbrances of land vested in it.

The Commission could alienate land vested in it in many different ways. It could dispose of the land on rent purchase, lease or sale for agricultural development or animal husbandry. Such disposal could be to individuals who own less than the ceiling extent, co-operatives, collectives or State farms or plantations managed by the Commission. Land could also be alienated to any State corporation

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1. The compensation payable on such terminated leases for any improvement made by the leasee is payable by the leasor as determined by the Commission.

2. The Commission's decision has to be given within a year of the date of application. An appeal against the Commission's decision could be made to the Minister of Agriculture within three weeks. An order made by the Commission or, if an appeal is made against such order to the Minister, the order made on such an appeal shall not be called in question in any court.

established under the State Agricultural Corporations Act of 1972 or the State Plantations Corporation. Land could also be alienated for residential housing to individuals and be used for any public purpose.

Guidelines for the alienation of land includes the alienation of individual holdings such that the income derived from one is not less than Rs. 300 per month. Those resident in the same administrative district as where the land is situated are expected to be given particular consideration. There is no specific provision or mandatory requirement to transfer land to tillers of the soil, whether they be tenants, lessees or labourers on vested lands. Employees of the government, state corporations, and local authorities are debarred from obtaining land except for residential housing. Non-citizens of the country are not permitted to receive land for any purpose.

The Commission has the right to lay down any conditions which would ensure that land alienated is utilized in the manner intended by it. The Commission has the right to cancel the alienation of any land and re-vest the land in the Commission when the conditions stipulated in the alienation are not adhered to.

The sale price for alienated land is expected to be not less than the compensation paid. When land is given on rent purchase, the annual rent is expected to be not less than one-fifteenth of the compensation paid in the case of non-paddy land, and not less than one-tenth of the compensation paid in the case of paddy land.

The compensation payable for land vested in the Commission is the higher of the following two computations:

(1) An amount not exceeding 15 times the average annual profit of non-paddy land or 10 times the annual profit of paddy land during the previous 5 years as declared to, or assessed by the Commissioner of Inland Revenue.

(2) The value of land as declared to, or assessed by, the Commissioner of Inland Revenue for the purpose of Wealth Tax, for the year of assessment ending March 31, 1971.

When no assessment has been made, the Commission could make its own valuation in consultation with the Chief Valuer.

Compensation is paid in cash and bonds.[1] The exact proportion of each of the two forms is left to be determined with the concurrence of the Minister of Finance.

Extent and Types of Land Expropriated

The extents and types of land (classified by type of land use) as declared by the statutory lessees under the Law are given in Table 1. However, land declared does not constitute the amount of land that will be ultimately expropriated as the extents permitted to be held by the declarants are included in these figures.

TABLE 1

Extent of Land Declared by Statutory Lessees

Type of Land Use	Area in Acres	
Tea	203,504	
Rubber	149,299	
Coconut	520,199	
Total: Tea, Rubber & Coconut Lands ..	873,002	
Forest, Patna and Uncultivated Land among above lands ..		203,727
Cocoa	8,404	
Paddy	56,533	
Total Cultivated Land		734,212
Total All Land	937,939	

Source: Land Reform Commission, Progress Report till June 30, 1973

Note: Land declared does not constitute the amount of land available for expropriation. The above data relate to 937,939 acres declared till June 1973. Late declarations had increased this further to 1·3 million acres in 1974.

On the basis of decisions and determinations made on 5358 of the 5498 declarations received, about 375,000 acres have been vested in the Commission. Since the remaining 140 declarations are of large holdings, the Commission estimates that a further 75,000 acres will be vested. The total area of land expected to be vested is 450,000 acres. A break-down by the type of land use of the total land expected to be available for redistribution is given in Table 2. A more detailed and precise break-down of 196,033 acres or about 43 per cent of the expected land area to be vested in the Commission is given in Table 3.

1. The Land Reform Bonds are of 25 years maturity and bear an interest of 7 per cent per year. The bonds could be surrendered before maturity at par value for payment of any government dues such as income tax, capital levy, and estate duty. They may also be used for residential housing, agricultural or industrial development or any other purpose with the approval of the Minister of Agriculture.

TABLE 2

Estimate of Land Likely to be Available for Alienation by Type of Land Use

Type of Land Use	Extent Available in Acres
Well Managed Tea, Rubber and Coconut Lands ..	150,000
Abandoned, Unproductive and Uncultivated land ..	200,000
Jungle Land	75,000
Paddy Land	25,000
Total ..	450,000

Source: Land Reform Commission

TABLE 3

Distribution of Lands Alienated by Type of Crop

Land use	Acres	
Coconut	50,236	
Tea	41,566	
Rubber	24,574	116,376
Paddy	10,509	10,509
Cadju (cashew)	518	
Cardamom	2,917	
Cinnamon	305	
Coffee	236	
Cocoa	1,090	
Tobacco	2	
Citronella	3	5,071
Homegarden	475	
Mixed	2,419	
Unspecified	8,030	
Chena	2,401	
Vegetables	472	13,797
Forest	26,193	
Uncultivated	20,324	
Grass	1,103	
Patana	2,640	50,260
		196,013

Source: Land Reform Commission

The land vested in the Commission has been alienated as summarised in Table 4. A crop-wise distribution of these lands is not available. However, a rough idea of land use may be estimated by categories such as plantation crops, undeveloped lands and paddy lands. The large plantation holdings are kept intact and alienated as estate units to the State Plantations Corporation and the Udarata Co-operative Estate Development Board (USAWASAMA). Paddy Lands are alienated to tenant cultivators in units of 2 acres, if irrigated and up to 5 acres, if rainfed. In the case of other crops alienated to individuals the maximum area of each unit is 1½ to 2 acres. These lands are given on a rent purchase basis. Lands given for co-operative settlements are more varied in their land use.

TABLE 4

Distribution of Lands Alienated by Method

	Acres	
Developed Lands Alienated	101,815	
of which alienation to:		
State Plantations Corporation		30,568
Udarata Co-operatve Estate Development Board (USAWASAMA) .. .		31,901
Co-operative Settlement		16,064
Co-operative Society		16,532
Government Departments and Institutes* ..		3,255
Public Corporations (excluding State Plantations)** ..		2,940
State Sponsored Private Sector Ventures ..		525
Undeveloped and Abandoned Land Alienated	21,173	
of which alienation to		
District Land Reform Authority for Distribution ..		20,623
Temporary Lease to Individuals		50
Developed and Undeveloped Land Alienated	93,000	
of which alienation to:		
Individual Farmers		90,000
Agriculturrl Productivity Committees for Seed Farms ..		3,000
Total	215,888	

Source. Land Reform Commission.

* These include alienations of 125 acres to Police, 915 acres to the Rubber Research Institute, 785 acres to the Forest Department, 1043 acres to the Department of Agriculture, 200 acres to the Coconut Research Institute and 142 acres to Agricultural Productivity Committees.

** These include the Livesock Board, Sugar Corporation, Fruit Board, State Distillaries Corporation.

An Assessment on Productivity

The impact of the law on productivity may be analysed in terms of the following categories of lands affected by the law.

(a) Lands which will not be ultimately vested in, and alienated by, the Commission but whose agricultural organization and decisions on investment and agricultural exploitation are affected by the law.

(b) Lands which are alienated by the Commission to new owners or leased, rented or otherwise given on conditions different to those prevailing prior to the reform, but retained by the same agricultural operators and maintained in the same type of basic agricultural organization.

(c) Lands which are exploited under a different form of tenure. This would include lands formerly under plantations given to co-operatives or individuals on small units, or lands formerly under small scale peasant exploitation if given out on a co-operative or collective basis.

(d) Lands which were not agriculturally exploited previously, which are brought under cultivation.

Since each of these categories of changes is related to the nature of crops grown the following discussion is in terms of the crops grown.

Lands not vested in Commission The category of lands which will not ultimately vest with the Commission is of relevance in this analysis, as the law leaves a degree of ambiguity and discretion as to whether certain lands will be affected by the reform. The uncertainty created in the ultimate form of tenure of a significant extent of land creates a condition where the statutory lessees of such land will tend to neglect the upkeep of the land and reduce the investment on the land.

One of the major reasons for the uncertainty is that the owners are not certain of what portion of their lands will be expropriated. Although owners are generally permitted to retain the portion of land they have indicated a preference for, there is no certainty of this. Especially where a land holding has a processing unit (factory) attached to it, and the owner's retention extent is small in relation to the total

holding, the land with the processing unit is likely to be expropriated. The preference of the owner to retain the processing unit and the land contiguous to it may not be granted in such instances.

There are several other discretionary aspects of the law which create an uncertainty about the ultimate form of tenure of lands. This includes the right of an owner to transfer land to a child over 18 years of age or parent. Although such transference of land is permitted, it is not a right of the former owner but at the discretion of the Commission. Also the provision to permit the repurchase of land by children of expropriated owners, on their reaching 18 years, is not a right but at the discretion of the Commission.

A measure of the extent of land that will be affected is the statutory declared extent of 1·3 million acres. Although only 450,000 acres of this are expected to be vested in, and alienated by the Commission, since those who have made statutory declarations are not certain as to which portions of their land will be retained by them, their management of the entire area is affected. In other words, apart from the 450,000 acres which are estimated to vest with the Commission, the 850,000 acres which will be retained by their owners are likely to be affected. However, since a significant extent of the land declared is not cultivated, the actual extent of agricultural land to be affected is likely to be in the region of 1 million acres rather than 1.3 million acres.

This uncertainty of the ultimate form of tenure is particularly relevant for perennial crops. In the case of seasonal crops, like paddy, much of the expenditure on cultivation bears a return within a few months and the capital investment on the land is minimal. In the case of crops like paddy even the land preparation is done afresh for each season. The uncertainty of ownership is likely to have very little effect as most resources are mono-period yielding. But perennial crops use several poly-period resources and capital investments are significant. For instance in the case of coconut, fertilization brings a return after 18 months. Similarly, in the case of rubber and tea, continuous fertilization and care of the crop is required not only to ensure the immediate crop but for maintaining yields in subsequent periods. The uncertainty of the ownership of the units could have already reduced the investment on these lands and subsequent production levels.

The realization of these problems has made the Commission consider the suggestion that compensation may have to be adjusted where a noticeable decline of production has occurred on lands vested with the Commisssion. The Agricultural Productivity Law could also be invoked to enforce proper care of agricultural land. However, all these measures are likely to be limited in their effectiveness as policing agricultural operations is a virtually impossible task.

There has also been encroachment on lands presumed to be potential lands for expropriation. This presumption has been based on the wrong understanding that any land over 50 acres is subject to expropriation. The unauthorised felling of trees and damage to property have also occurred in certain areas.

Lands Alienated in Same Operational Units: The second category of lands is where lands vested in the Commission are alienated without a change in the operational size and organization of the farm unit. In other words, the change effected by the land reform would be one of changing the ownership of the land. Increasing the security of tenure and assuring continued cultivation, altering the cost conditions of holding the land and the returns on the land, could influence production on such lands.

One category of lands which may be affected in this manner is paddy land. Where paddy lands formerly cultivated by tenant farmers, are now handed over to tenants on the basis of repaying the assessed value of the land in instalments, the conditions governing the incentives for labour and capital inputs are altered. We illustrate this in relation to the common ande system (share cropping), prevalent on a high proportion of wet zone paddy land.

Under the ande system tenants are given paddy land for cultivation in return for a rental payment of an agreed share of the produce. The landlord's only contribution may be the land or he may also give some inputs like draft animals and seed paddy. Sometimes landlords may contribute other inputs like fertilizer and agro-chemicals either in kind or bear the cost. The share given by the tenant varies generally from $\frac{1}{4}$ to $\frac{1}{2}$ but may sometimes be as low as $\frac{1}{5}$ or as high as $\frac{3}{4}$. The latter rental payment generally involves the landlord bearing some costs of production.

Under this system the tenant who bears all the variable costs of production does not have an incentive to increase his labour inputs and investments in material inputs, unless such investments yield a sufficiently high return to meet the cost of the inputs borne by him. The disincentive nature of share arrangement arises out of the fact that while the landlord does not bear the cost of the additional inputs, a proportion of the additional return has to be given to him.[1]

Under a share arrangement, where the landlord provides the fixed resources and the tenant the variable resources, the tenant farmer will, on the assumption of his attempting to maximise profits, only undertake such investment as would bring him a return exceeding the

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1 Adam Smith in the *Wealth of Nations* observed that the *metayers* (share croppers) in France had no incentive to "lay out in the further improvement of the land, any part of the little stock which they might have saved from their own share of the produce, because the lord who laid out nothing was to get one-half of whatever it produced" (Modern Library Edition, 1937, p. 367). Mill made a similar observation when he said: "the *metayer* has less motive to exertion than the peasant proprietor since only half the fruits of his industry, instead of the whole, are his own". *(J. S. Mill, Principles of Political Economy,* Edinburgh 1843, p. 365). Using marginal analysis, Marshall said: "When the cultivator has to give to his landlord half of the returns to each dose of capital and labour that he applies to the land, it will not be to his interest to apply any doses the total return to which is less than twice enough to reward him". (Alfred Marshall, *Principles of Economics,* Macmillan & Co. 1956, p. 535) More recently, Rainer Schickle, elaborated on this theme in "Effects of Tenure Systems on Agricultural Efficiency", *Journal of Farm Economics* (Feb 1941) pp. 185 - 207 and Earl O. Heady in "Economics of Farm Leasing Systems" *Journal of Farm Economics* (August 1947) pp. 659 - 678. This analysis was recently challenged by Steven N. S. Cheung in "Private Property Rights and Sharecropping" *Journal of Political Economy* (December 1968) pp. 1107 - 1122 and in his book, *The Theory of Share Tenancy,* Univesity of Chicago Press, Chicago 1969. Cheung's analysis is based on the assumption of conditions different to those prevailing in Sri Lanka or indeed in most parts of the world where share cropping exists. The conditions which Cheung assumes are essentially those of perfect competition, where each party to a contract has alternate employment opportunities and perfect mobility to move from one contracting party to another and to alternate employment opportunities. He further stipulates that the landlord could insist on the amount of inputs of the tenant. For criticism of Cheung's analysis, see P. K. Bardhan and T. N. Sriniwasan, "Crop - sharing Tenancy in Agriculture: A Theoretical and Empirical Analysis", *American Economic Review* (March 1971) and Peter Warr *A Subjective Equilibrium Theory of Share Tenancy,* Economic Development Report No. 222 Centre for International Studies, Harvard University (October 1972)

cost of the investment. More precisely, he will undertake an additional investment so long as the return he obtains for it is equal to its cost. However, under the type of share arrangements where the landlord provides only the land and the other fixed resources, and the tenant all the variable resources, the costs of the latter are borne entirely by the tenant while the return he obtains from the additional investment is only a proportion of the increase in production induced by the investment. Thus the objective of profit maximisation is achieved by a share tenant, when the return he obtains as his share is equal to the total cost of the additional investment borne by him. This means that a share tenant will undertake a marginal investment only if the gross return to it are more than the inverse proportion of the tenant's share. Thus, if the share basis is 2/3 for the tenant and 1/3 for the landlord, the tenant will incur a marginal cost only if the total additional return is at least 1½ times the cost incurred.[1]

For a better realization of the disincentive effects, the consideration with respect to return has to be considered in the ex ante situation. Since agricultural enterprises are particularly vulnerable to uncertainties, the expectation of profits will need to be particularly high for a tenant cutivator to undertake an investment involving costs to him. When the inputs considered are in the nature of a new practice or innovation, this condition is exacerbated as the element of uncertainty is greater, if not for any other reason, due to the cultivator's inexperience with the new method. In a context where a tenant farmer is dependent on high interest non-institutional sources of credit, this adds to the costs of investment, thereby necessitating a still higher return.

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1. The derivation of this rule is as follows:—
Profit is maximised when $MC_t = MR_t$
Under share tenancy $MR_t = Y(I-S)$
Where: MC_t is the marginal cost to the tenant of an additional investment
MR_t is the marginal return to the tenant of the additional investment.
Y is the total return of the additional investment
S is the share paid to the landlord
Solving the equation
$MR_t = Y(I - S) MC_t$
When S = ½, $MR_t = 2 MC_t$
When S = ⅔, $MR_t = 1{\cdot}33 MC_t$
When S = ⅓ $MR_t = 1{\cdot}5 MC_t$

While the preceding discussion has been in terms of monetary costs, several improvements in peasant agriculture may not require additional monetary costs, but involve extra efforts of the cultivator in such operations as transplanting, weeding and repair of irrigation canals. However, the logic discussed is relevant as the peasant is likely to weigh the return in terms of produce against the costs in terms of effort and the sacrifice of leisure.

Those obtaining land on the basis of amortization payments are assured of complete security of tenure. They not only derive the returns on current production but also the results of capital improvements yielding returns over a long-run.[1]

The impact of the security of tenure on less obvious forms of capital formation can be particularly significant in Sri Lanka's peasant agricultural context. These include improvements in irrigation channels, better soil conservation and greater care of perennial crops. Raup stresses the importance of these forms of capital accumalation:

> In the early stages of agricultural development this process (i. e. capital formation) is predominantly one of accretionary gains in capital stocks. The investment decisions involved are typically made in small segments, spread over many seasons or gestation periods. The capital formed adds to impressive totals, but the process is characterized by many small, plodding steps.[2]

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1. The effect of a short expection of a secure tenure on investment decisions can be gauged through the present value formulation of investments. A farmer would undertake a capital investment only if the present value of the discounted income flows from it (V) is greater than its cost (C). Where the return in each year is denoted a $R_1, R_2, R_3, R_4 \ldots\ldots R$; and ther ate of discount as r, a farmer will undertake an investment when $C \leq V$ or $V \geq C$

$$\text{where } V = \frac{R_1}{(I+r)} + \frac{R_2}{(I+r)_2} + \frac{R_3 \ldots\ldots}{(I+r)^3} \quad \frac{R_n}{(I+r)^n}$$

The lesser the period of *expected* secure tenure (Rn), an investment having a return over a number of years in the future has a lesser likelihood of its discounted expected income flows exceeding C Since it is the expected period of secure tenure rather than the actual period of tenure, unwritten oral contracts which make no provision for compensation for farmer improvements or guarantee a fixed period of tenure, are inimical to such investment. The higher the return each year, the lesser the period of secure tenure required. The higher the rate of discount the longer the period of expected secure tenurer equired.

2. Philip M. Raup, "The Contribution of Land Reforms to Agricultural Development: An Analytical Framework", *Economic Development and Cultural Change*, Vol. XII, No. 1 October 1963. p. 7.

Raup argues that this type of capital formation is especially affected by the degree of security of tenure:

> By making the use of a productive asset the preclusive right of an individual or a group, a situation is created in which the investor can realize upon his investment: in which the sower can reap where he has sown. This security of expectation is crucial for biological forms of capital, slow maturing enterprises, and undertakings involving numerous incremental additions made at successive intervals over many production cycles.[1]

A secure tenure provides a basis for accretionary capital formation in two ways. First, the secure tenure creates the conditions of adequate incentive for use of labour resources in capital improvements. Second, since investment decisions for capital inputs are directlv related to family consumption, the farmer must be assured of a return in the future adequate to compensate for his present sacrifice. This implies a choice between agricultural operations which yield a higher current return and those which may yield a lower current return but have a potential for higher returns in the long run. In a situation of very great insecurity of tenure, the farmer may exploit resources so as to reduce the future productive capacity. This form of capital consumption is the converse of the accretionary capital formation discussed earlier.

The significance of these considerations are much less in the case of crops like rice where the land and irrigation facilities have to be prepared each season, and the carry over of resources from one season to another is very minimal.

Most of the paddy lands vested in the Commission are likely to be ande lands. This is likely to be so for several reasons. Nearly all ownership extents of paddy lands over 25 acres are in the Wet Zone where the rate of share tenancy is high. Ande tenancy prevails where the landowner has large areas which cannot be self cultivated or even cultivated with wage labour. As such the land reform is likely to alter the conditions surrounding the incentives for cultivation in paddy lands which are transferred from ande cultivation to owner-cultivation. On these lands, the former tenant cultivators – the new owner culti-

1. *Ibid loc. cit.*

vators – will have an incentive to increase their labour inputs and increase inputs like fertilizer, as the total increment in output minus the costs of the inputs acccrues to him.

However, the beneficial impact of this change in tenure is limited in scope, as only 25,000 acres or 2.3 per cent of the asswedumised paddy area is expected to be vested in the Commission. Although the Paddy Lands Act of 1958 and its subsequent amendments attempted to regulate rents and provide incentive-oriented Conditions, in practice, the Act has had little impact.[1] As such, the Land Reform Law is likely to be a corrective of tenancy conditions on only about 5 per cent of tenanted paddy lands.

Had the reform envisaged the provision of incentive conditions on a significant proportion of paddy lands, it should have either conferred ownership on an amortization scheme on all paddy lands not cultivated by the owners or reduced the ceiling on paddy lands to a low level of about 5 acres. Since either of these approaches has not been adopted, the bulk of share-cropped paddy lands will continue to be operated under unsatisfactory tenancy conditions.

Apart from the paddy lands, a proportion of the 90,000 acres of land already alienated in small holdings of 1½ to 2 acres is likely to fall in this category. However, at present these lands are given on temporary leases at 2 per cent of the value of land if developed, or at 1 per cent of the land value if undeveloped.

Estate lands taken over by the State Plantations Corporation and the Udarata Co-operative Estates Development Board(USAWASAMA) and any estates continued to be maintained as large units and operated on the same basis as privately owned estates, are likely to change their productivity only to the extent that the new management is more or less efficient than the previous management. Such transference of ownership without a change in organizational forms is likely to change its productivity owing to differences in the management capacities. A sizeable extent of the tea and rubber lands previously held in estates is likely to fall into this category. A determination as to whether the transfer of ownership and management from the private

1. For a fuller discussion of the Paddy Lands Act, see Nimal Sanderatne "Tenancy on Ceylon's Paddy Lands; The 1958 Reform", *South Asian Review*, January 1972, pp. 117-136. Also University of Wisconsin, Land Tenure Center Reprint No. 84.

sector to the public sector would lead to a change in productivity can be made only after a lapse of a few years and the production statistics of the estates are examined over several years under both forms of ownership.

New Forms of Tenure. The 1972 land reform is likely to result in the development of new forms of tenure and agricultural organization. This is particularly so with respect to the development of co-operative or collective farms. About 33,000 acres have so far been alienated for co-operative farms. Most such lands are developed lands.

Co-operative farms have the advantage of a greater rationalization of labour resources and the economies of scale in certain farming operations. These advantages are likely to be particularly relevant for several new crops requiring standardised practices. But co-operative farms pose several problems as well. A major need is a co-operative spirit generally induced by ideological commitments or economic conditions necessitating continued operation on a group basis. This need requires to be reinforced by skilfull managerial principles which ensure the minimum of conflicts among the partners of the enterprise and ensure the labour input of the individual by adequate incentive conditions. Where a system of ensuring careful management and adequate rewards for labour inputs cannot be provided, a co-operative farming enterprise runs the risks of conflicts among the partners with respect to their inputs and thereby affects the productive capacity of the farm. Considerable amount of education in the advantages of group farming and trained managerial personel are **sine qua non** of making these co-operative farms a success in terms of attaining high productivity levels.

Exploitation of New Agricultural land. One of the major gains in production is likely to arise from the exploitation of agricultural land hitherto unexploited. As the data on Table 3 discloses, as much as 200,000 acres of abandoned and unproductive land and 75,000 acres af jungle land are expected to be vested in the Commission. Although it may not be possible to cultivate all these lands, present indications are that a significant proportion of these could be exploited. The inadequate exploitation of these lands is likely to have been owing to large land owners having little interest in the additional income that could be obtained from the exploitation of

marginal lands. This is specially likely as the wage labour expenditure on cultivating the land may be high in terms of the return and difficulties of management may induce a preference for not cultivating the land. The vesting of the land in the Commission has therefore provided a means of alienating the land to persons or organizations which are likely to cultivate them.

Conclusion

The uncertainty created in the ownership of a sizeable extent of land is likely to result in the neglect of these lands and a reduction in investment on them. This situation will be remedied once the claims on lands declared are settled. Improved tenure conditions on about 25,000 acres of paddy which may at present be under disincentive oriented tenancy conditions, may lead to an increase in production. This may also apply to some other types of lands, but the total extent of land so affected is not likely to be substantial. Many of the lands presently cultivated as estate holdings and vested in the Commission are likely to change only in ownership to a public body but it will not be a basic change in organizational tenurial form. Changes in production are likely to result only if the managerial activities are different. New forms of tenure like co-operatives that are being developed, while having potential for efficient production, are untried in Sri Lanka and their success will depend very much on the motivation for maintaining such collective farms and the managerial skills developed. One of the major gains in production is likely to arise out of the uncultivated land that is alienated by the Commission.

The Adoption of New Technology by Small Farmers: A Synthesis and Analysis of the Evidence on Sri Lanka and Other South Asian Economies.

by

S. N. SAMUEL

There is widespread evidence that technological changes in agriculture, through the use of modern scientific mechanical and biological inputs, have increased and have demonstrated a potential for further increasing agricultural output in Sri Lanka and other developing economies. The primary source of agricultural growth is not in the elimination of productivity slack (that is, more efficient allocation of traditional factors or more investment in traditional inputs), but in modern off-farm purchased inputs such as high yielding seed, fertilizer, pesticides etc. that have the capacity to increase output along new (higher) production functions. But the very process of technology diffusion designed to increase output and stimulate a spiral of growth has the inherent characteristic that it affects income disparity and hence the distribution of income. Since technology diffusion inevitably affects both functional and personal income distribution, it seems advisable to explicitly take cognizance of redistributional objectives at the time policies are formulated to stimulate growth.

One way to harmonize growth and equity is to pay special regard to increasing incomes of smaller (low income) paddy farmers by providing them with modern agricultural technology, which are low cost sources of income streams.

This paper analyses the evidence on small paddy farmer performance in the adoption of new agricultural technology with a view to identifying the factors which may inhibit small farmer receptivity to such technology. These findings will provide information on some institutional modifications needed in Sri Lanka that will make the process of technology diffusion less dualistic and more pervasive.

Factors Influencing Size Neutrality

The degree to which agricultural development programmes can be successfully focussed upon smaller farms will depend on revenue and cost considerations (farmer profitability) at a given level of output. Given revenue (price x quantity), cost considerations will depend on average costs of production for small farmer at a given level of output (farm size x yields). Such average costs of production will in turn depend on the extent of divisibility in inputs. Input divisibility refers to the scale or size neutrality in the inputs significant for increasing paddy productivity. Size neutrality may be said to exist if the overhead costs of technological change are not significantly different between small and large farms at a given level of productivity per acre (technological change).

Since it is the interaction of technology with institutions that determines both output and income distribution, consideration for scale neutrality in technology alone is inadequate for the successful focussing of programmes upon small farmers; attention will also need to be paid to scale or size neutrality in institutions. It appears in fact that the productivity of small farmers can be increased only if scale neutrality in the technical variables is not permitted to be offset by indivisibilities in institutions or vice versa. For instance, indivisibility in physical technology can be offset by institutional-organizational factors as is the case when small farmers gain access to large tractors through custom hiring or cooperative ownership. Conversely, physical divisibility in technology can be offset by indivisibilities in institutions as is the case when small farmers do not apply the highly divisible seed-fertilizer package because of extension or supply biases in favour of large farmers. If a technological or institutional variable that is scale neutral is also significant from the standpoint of productivity, there would then be scope for congruency between growth and equity policy.

Adoption Patterns of Small Farmers

The physical divisibility of the seed-fertilizer technology package notwithstanding, a positive correlation of ·54 was observed between farm size and the area under new seed varieties in a regression equation of inter district paddy yields on 10 variables, thus indicating that

larger farmers adopt sooner.[1] This evidence is consistent with another finding in the same study that there existed a statistically significant positive relationship between farm size and yields at the macro level. Added credance to this positive coefficient is given by the experiences of other regions. In West Bengal and Andhra Pradesh a statistically significant positive relationship between size and adoption at the 5 per cent level was found to exist, although differences in levels of adoption and farm size were greater in bajra than in paddy. A one acre increase in farm size typically led to a 2–3 per cent increase in the probability of adoption in rice growing areas.[2] Survey results from the Pakistan Punjab show that farmers with holdings above 12·5 acres were both "leaders" and "maximum users".[3] In 1970/71, 90·3 per cent of this group planted Mexican wheat covering 92·4 per cent of the wheat area, but only 73·1 per cent of farmers in the below 12·5 acre size devoted 66·1 per cent of wheat acreage to high-yielding varieties. Similar relationships were observed in fertilizer and pesticide use. All these results were highly significant statistically. In the Recife area in Brazil it is reported that sampled small farmers typically prefer to observe some local experience with new practices before they buy them.[4]

This positive relationship between farm size and adoption of the seed-fertilizer package is primarly a manifestation of the uneven flow of technology through the farm size structure, and is indicative of the existence of small farmer response at a later point in time. This phenomenon, observed in Sri Lanka and elsewhere, exists despite the almost perfect divisibility of the physical seed-fertilizer package which permits its application on paddy holdings of any size. Since the positive relationship cannot be attributed to the physical technology per se, it must be attributed to the other interacting primary variable, namely, institutions.

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1. S. N. Samuel, "Redistributing Income Through Technolgical Change in Agriculture; Implications for Sri Lanka's Paddy Subsector". Unpublished Ph. D. Dissertation, Michigan State University, 1973.
2. M. Schluter and J. W. Mellor, "New Seed Varieties and the Small Farm", Cornell International Agricultural Development Reprint 52, Department of Agricultural Economics, Cornell, Ithaca, N. Y. June 1972.
3. M. Naseem, "Small Farms and Agricultural Transformation in Pakistan Punjab" Ph. D. dissertation, University of California, 1972.
4. D. L. Peacock, "The Adoption of New Agricultural Practices in North East Brazil: An Examination of Farmer Decision-Making". Ph. D. dissertation, Michigan State University, 1972.

What institutional variables may contribute to the positive relationship observed between adoption levels and farm size? The following subsection explores this point using the concepts of felt costs and perceived benefits.

Institutions Limiting Scale Neutrality

As stated, the institutional limitations to small farmer adoption of the seed–fertilizer package will be analysed using the concepts of felt costs and perceived returns (benefits). These concepts recognize that subsistence farmer receptivity to new seed–fertilizer technology is determined not just by actual money returns and costs, but by the ratio of subjectively perceived benefits to subjectively felt costs.[1] Institutions affecting the adoption of new technology, if biased against small farmers, increase the real cost of innovation to small farmers by increasing either the money or psychological component in cost (given perceived benefits), and thereby render the seed–fertilizer package less attractive to small farmers, its physical divisibility notwithstanding. Three such institutional factors are :–

(i) the technical information factor,

(ii) the input and credit acquisition factor, and

(iii) the risk factor.

(i) *Information:* It appears from an examination of a cross–section of studies on the relationships between adoption and farm size, that difficulties in gaining access to technical information by small farmers has contributed substantially to the significant positive relationship observed between farm size and seed adoption. It appears that part of the positive relationship is due to adoption lags by small farmers, which in turn is attributable to reduced risk associated with later adoption. Such reductions in risk stem from subsequent information that reaches small farmers from the demonstration effects of early adoptors, formal extension contact, and the development of informal local channels including from landlords. Time (lags) therefore is primarily a proxy variable for information costs.

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1. C. R. Wharton, "Risk Uncertainty and the Subsistence Farmer". *Development Digest*, Vol. VII, Nos 2 AID, Wash. D.C. April, 1969. p. 7

Adoption lags may be regarded as a means of reducing information costs through the internalization of externalities. Later adaptors (small farmers), it is suggested, are those who could not previously afford the cost of acquiring enough technical information to enable them to reduce risks of adoption to acceptable levels. Adoption lags permit the experience of others to confer an external benefit on laggards in the form of reduced risk. This externality, when internalized into the production systems of laggards, assumes the form of a cost subsidy that operates to make adoption an attractive proposition.[1]

Figure 1 illustrates that the pattern of diffusions of technical change follows an elongated "S"-shaped curve OBCD where the path traced out is an intersection of short-run supply and demand curves for the seed - fertilizer package (and other complementary inputs). The "S" shape would result from interaction effects "which is the process through which individuals in a social system who have adopted an innovation influence those who have not yet adopted".[2] As the "S" shape suggests, the adoption level picks up after a lag of t_1 time due to interaction effects (externalities), but tends to flaten out as the optimal level is approached.

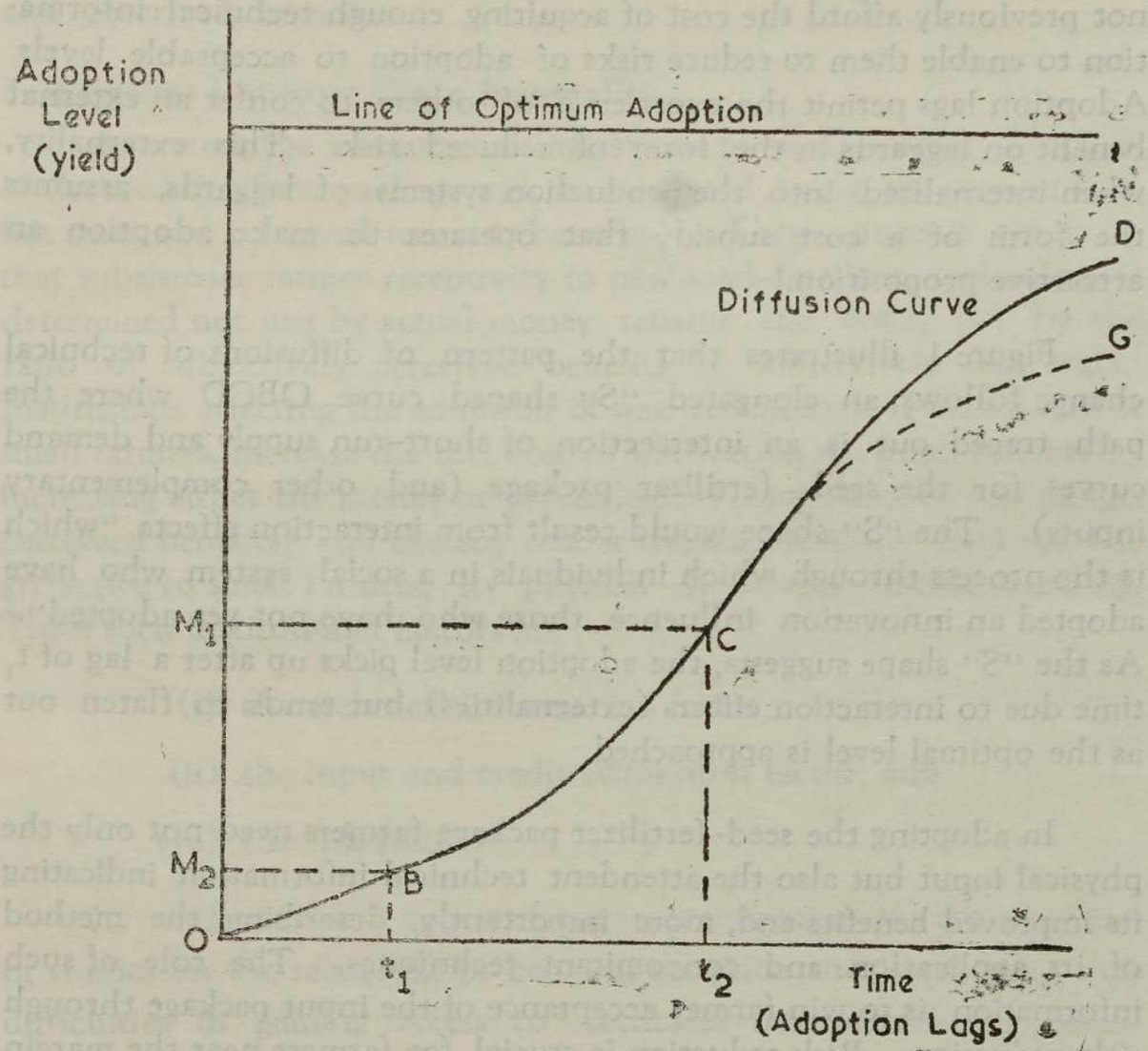
In adopting the seed-fertilizer package farmers need not only the physical input but also the attendent technical information indicating its improved benefits and, more importantly, describing the method of its application and concomitant techniques. The role of such information is to win farmer acceptance of the input package through risk reduction. Risk reduction is crucial for farmers near the margin of subsistence who place a high premium on security because of the high penalty associated with error. There are two categories of risk in new varieties that have to be borne in addition to the risks from weather that are always present. One type beyond the influence of

1. This suggests that the adoption process may be inherently suboptimal. If the added risk assumed by early adoptors remain inadequately compensated by the change in output alone, it is reasonable to presume that fewer farmers adopt early than otherwise would be the case. In a free market situation early adoptors receive rough justice in the form of higher initial prices, while later adoptors receive lower prices due to increase in the quantity supplied This does not apply where an administratively fixed price prevails.

2. Eugene A. Havens and Everett M. Rogers, "Adoption of Hybrid Corn: Profitability and Interaction Effect". *Rural Sociology*, Vol. 26, No. 4 (Dec. 1961) p. 65.

FIGURE 1

Effect of Information on the Diffusion Process



farmer information gathering are those which stem from the proneness of new seed to disease and its increased sensitivity to weather conditions. These risks must be reduced through biological research. The second category of risks are those that cause farmers to adopt later rather than sooner. Much of the latter type of risk can be reduced if farmers had appropriate and adequate knowledge. For instance it is very important for farmers in Sri Lanka to know which of 22 different improved seed varieties are most suited to their particular conditions, so that they can buildup .an investment portfolio. While some varieties like H4 are robust and hardy, the benefit in terms of more assured output is at the expense of lower yields when compared to varieties like BG 11 which are higher yielding but riskier. Farmers also need information of how to deal with pests, recognize and treat disease, effect water control, use correct techniques like row transplanting, inter alia. Hence, since new varieties increase farmer options, information enables the correct (risk-reducing) choices to be made, and significantly influences farmer receptivity to new methods. It needs to be emphasized that the foregoing applies only to those farmers who in the absence of cheap information (i. e. information cost reduction) in the present will bide their time until the results of adoption by others reduce risks (information costs) sufficiently to make them willing to innovate. It does not apply to those who simply will not adopt in the foreseeable future.

Several probable factors seem to inhibit small farmer accesss to technical information, thereby in effect increasing for the farmer the average cost of adoption.

1. Time cost and effort needed to acquire new inputs and learn how to use them are indivisble. Regardless of whether a farm is large or small, approximately the same amount of time and effort would need to be expended in learning how to apply new inputs to the production process. A small farmer may not consider it worth his while to expend time and exert himself mentally to gain the necessary information for himself in view of the limited impact in absolute terms that increased output will have on his prospective income. Time has an opportunity cost at least in terms of leisure foregone.

2. If extension incentives are tied to the productivity of acres rather than persons, there would be extension economies in dealing with larger farmers though whom a greater number of acres could be influenced at almost the same cost (extension effort). Extension contact is one of the more important variables affecting adoption behaviour, the other being contact with informal agricultural leaders, although it is not known whether informal channels are a less preferred substitute for formal channels. If extension efforts are relatively biased against small farmers, as appears to be the case, the cost of acquiring information per unit of results (adoption) will be higher for this size category.

3. It is also likely that farmer receptivity to information is positively correlated with farm size. Progressivity in outlook is related to education levels which depends on income levels which in turn is primarily a function of farm size. For instance, in the Recife area Brazil a statistically significant positive relationship was observed between farm size, education levels and the adoption of new technology.[1] In intutively assessing the profitability or innovation, the fears of social, cultural and religious sanctions can be expected to enter the calculus on the side of felt cost.

4. Control over some multipurpose cooperatives by large farmers and landlords in Sri Lanka and general corruption in cooperative management may contribute to the cost of information and input acquisition by small farmers. Small farmers may be reluctant to patronize cooperatives to seek information from non-peer or elite groups or groups that exploit the system at their expense. For instance, widespread distrust of cooperatives was voiced by farmers in the Elahera Colonization Project in 1967.[2]

Indirect proof that improved channels of information have the capacity for accelerating the adoption process (thereby reducing the positive relationship between adoption and farm size) is found in the influence of the perceptibility of technological benefits on the adoption process. There is evidence that when the benefits of technological change are more easily perceived, the technology is more

1. Peacock, op. cit. p. 171.

2. Schickele, R. and Jogaratnam, T. "Field Surveys - Socio-economic Survey of the Elahera Colonization Scheme" in *Ceylon Papers*, Agricultural Development Council, Inc. N. Y. 1971.

readily accepted provided adequate information at low enough cost is available about methods and techniques. For instance, the basic technology introduced in Comilla, Bangladesh (tubewells and water pumps) promised benefits of such an obvious nature, that even tradition-bound farmers needed to incur very low costs to gain information about its advantages.[1] An identical conclusion was reached in a study on West Pakistan.[2]

(ii) *Input and Credit Acquisition:* When complex bureaucratic procedures are introduced for input and credit provision, disproportionately higher costs (greater difficulties in terms of time and inconvenience) are imposed on smaller farmers. Since small farmers purchase smaller quantities of fertilizer and seed and acquire less credit than larger farmers, but all farmers irrespective of size have to satisfy equally complex bureaucratic requirements, the acquisition cost per pound of fertilizer or production loan is higher for smaller farmers. Also, since small farmers tend to be less literate than large farmers, the filling of forms, generally knowing what procedures to satisfy and how best to meet them, contribute to the higher felt costs on the smaller farmers.

(iii) *Risk factor:* Risks in paddy cultivation may be measured by taking the area not harvested as a percentage of the area sown. Risk reduction in cultivation will benefit small farmers more than large farmers because since small farmers are nearer the margin of subsistence they have to pay a higher penalty for error (crop failure), and hence tend to be bigger risk averters. The overall evidence in Sri Lanka tends to support the above position. The Central Bank reports that "there was a steep reduction in the percentage area of crop failure to cultivated area as the size of the area cultivated increased,"[3] Crop failure from lack of water control and pests account for about 80 per cent of the risks in cultivation. Table 1 indicates that floods and drought account for 70 per cent of crop failure, and tend to influence both zones equally. Since the water control factor affects

1. This is an inference fram Robert D. Stevens' "Rural Development Programs for Adoption from Comilla, Bangladesh," Agricultural Economics Report No 215, Michigen State University, East Lansing, Michigan, June, 1972.

2. R. I. Rochin, "Microeconomic Analysis of Smallholder Response to High-Yielding Varieties of Wheat in West Pakistan." Ph D. dissertation, Michigan State University, East Lansing, Michigan, 1972.

3. Central Bank of Ceylon, "Survey on Defaults in the Repayment of New Agricultural Loans," Dept. of Economic Research, Central Bank of Ceylon, Colombo, 1972.

both zones equally, and there are roughly twice as many cultivators in the wet zone, where the farms are less than half as small, floods and drought may be said to adversely affect more small farmers.

TABLE 1

Amount of Crop Failure classified by Cause in Sri Lanka, 1966-67

Cause	Dry Zone				Wet Zone			
	Maha		Yala		Maha		Yala	
	Acres	%	Acres	%	Acres	%	Acres	%
Seed failure ..	2,885	8·8	604	4·7	450	3·2	526	5·3
Pests ..	2,396	7·3	591	4·6	2,666	18·2	689	6·9
Lack of water control ..	23,345	70·8	8,757	68·1	10,407	71·0	6,687	67·5
Other (Institutional, etc.)	4,264	13·1	2,901	22·6	1,147	7 6	2,155	20·3
Total	32,890	100·0	12,853	100·0	14,665	100·0	10,057	100·0

Sources: Department of Census & Statistics, "Statistical Abstract of Ceylon"; 1969, (Colombo, 1970).

Although on an overall basis only 10 per cent of risk from crop failure is attributable to inadequate pest control (Table 1), the data indicate that a reduction in cultivation risks through better pest control will benefit more small farmers. As Table 1 evidences, crop failure attributed to pests is more than twice as high in the wet zone (18 per cent) where the average size of farm is less than 1 acre, than in the dry zone (7 per cent), where the average size of farm is over 2 acres. Information in a recent Central Bank survey is in conformity with the view that small farmers are affected more by the pest control factor.[1] Apart from lack of cash capital resources and technical knowledge, there are other possible reasons for the inadequacy of pesticide use by small farmers. One such reason is the probable inadequacy of credit allotted for this purpose. A more important reason can be

1. Central Bank Survey of Defaults, ibid. p. 32.

traced to externalities associated with pest control efforts. Due to the large number of small holdings within a given area in the wet zone, the efforts of one farmer to control pests is likely to involve higher cost than if all farmers made concurrent efforts. Conversely, a farmer using pesticide on his farm may confer uncompensated (external) benefits on contiguous farms. In either case, the externalities factor causing a divergence between private and "social" benefits/costs must on the assumption of economic rationality, result in an under-application of pesticides. In short, it appears that pest control has "public goods" characteristics.

Summary and Conclusions

Since policies designed to promote agricultural development introduce sources of income streams into the farm economy, explicit cognizance needs to be paid to the needs of small farmers if income disparities are not to be allowed to increase. A cross-section of information supports the hypothesis that a positive correlation exists between the farm size structure and adoption levels. Since the seed fertilizer package is perfectly divisible, the absence of scale neutrality in new technology adoption can be traced mainly to indivisibilities in institutional mechanisms at the local level that are biased against small farmers. The broad categories of institutional variables that reveal attributes of indivisibility (lack of size neutrality) are: (i) technical information or extension; (ii) input and credit acquisition; (iii) risks. Access to technical knowledge is expensive to small farmers because: (1) time costs and effort needed to acquire new inputs and learn how to use them being fixed costs are higher for small farmers; (2) extension incentives are probably tied to the productivity of land rather than of men; (3) larger farmers being richer have greater access to education and are hence more progressive in outlook; (4) control over multipurpose cooperatives by groups with whom the smaller farmers fail to identify may alienate small farmers and make access to information difficult. Indirect proof of the importance of concentrating extension efforts on small farmers is evident in a high small farmer response when the benefits of new technology are readily perceptible.

The following conclusions are tentative in nature and suggest directions in which policy makers may have to look if small farmer productivity is to be increased.

(i) Greatly increased emphasis may need to be placed to increasing the ratio of extension workers to (small) farmers due to the crucial nature of the information factor for technological change. Till such time as the extension ratio can be increased from 1:3000 to say 1:300 overall, existing extension attention may need to be concentrated on assisting smaller farmers like for instance those with holdings below 4 acres.

(ii) Since input subsidies tend to be regressive and hence inimical to an equitable distribution of income, it may be worth confining subsidized fertilizer, seed and credit under the various schemes to small farmers, perhaps those with holdings below 4 acres. In order to discourage the re-sale of subsidized fertilizer to those not eligible to receive it, it may be made known in advance that subsidized fertilizer will be available for a limited number of seasons, perhaps 4. Such limitation would have the further benefit of compensating early adoptors for the greater risks of early adoption.

If the subsidized fertilizer is made available purely on the basis of farm size regardless of this type of crop, it would remove much of the time-consuming procedures needed to ensure crop specificity in fertilizer use.

(iii) Since pest and disease control has public goods characteristics (externalities), it may be advisable to leave pest and disease control under extension or cooperative aegis where the costs would be socialized. But the credit allotment may be maintained as a safeguard for the farmer against extension or multipurpose cooperative deficiencies in program implementation such as a lack of timeliness or adequacy in pesticide application.

CHANGES IN INCOME DISTRIBUTION IN SRI LANKA

by

H. N. S. KARUNATILAKE

Introduction

In the last few years there has been a widespread and growing interest in the problems of income distribution, and this interest has also spread to international organisations and research institutions which are so intimately concerned with the developing world. This has tended to produce an increasing volume of studies on the subject and stimulated interest in field work with a view to gathering more accurate information. Apart from this, practical measures for the redistribution of income have been an important aspect of development policy in a number of Asian countries for quite some time. In some of these countries, steps have been deliberately taken with a view to redistributing incomes, whereas in others, it has been the end result of policies designed to accelerate growth. In the period before 1960, although the Government of Sri Lanka did not look upon income distribution as a major objective of its general economic policy, the welfare subsidies and tax policies it has been committed to for more than a period of 30 years, have in effect, put the country on a course towards progressively greater income equality. Sri Lanka may thus be looked upon as a pioneer among the less developed countries that has taken positive steps to distribute incomes more equitably.

In the late forties and early fifties, successive governments did not increase expenditure on social welfare, particularly the subsidies on food, education and health services with the primary object of redistributing income, nor was the tax structure geared specifically to the same objective. In contrast to this, in the sixties, government emphasised income distribution and deliberate attempts were made to reduce disparities in social incomes. From the nature of the economic measures taken throughout this period, it is evident that in the last decade the redistribution of income and wealth has been a major objective of economic policy.

In Sri Lanka, as in a great many other developing countries, income from property has constituted a very high proportion of total income received, and the government has endeavoured to reduce income inequality by redistributing the ownership of wealth. In the last two years,

policies designed to redistribute wealth have been given a great impetus by government. These incomes from property have accrued to a relatively small segment of the community while the wage earning population and those working on own account constitute the bulk of the population. The data analysed in this paper bear witness to the extent to which these policies have produced results.

Even though economic growth in the last two decades in Sri Lanka has been less spectacular than in most other less developed Asian countries, the effects of growth have seeped down to the lower income segments of the population more rapidly than in other developing countries. The increase in the Gross National Product at constant prices, in the last decade averages slightly less than 4 per cent. Yet, the share of the G.N.P. accruing to the middle and lower income brackets has been proportionately greater than that going to the higher income groups. The inability of the country to achieve a higher rate of growth, in some ways, could be linked to the social welfare policies which were employed by the government over a period of more than twenty five years. These policies have tended to divert a progressively increasing proportion of the financial resources at the disposal of government to consumption with resulting lower outlays on investment. The lower level of investment, has in turn, had adverse effects on the average level of incomes and the scope for embarking on sectoral programmes of development, especially is areas where very low income levels prevail.

Income distribution is of great importance today because it is now considered an essential part of development strategy which could influence ultimately the magnitude and the composition of the Gross National Product, because manpower resources can be best harnessed for the development effort if the community consists of well nourished and healthy individuals who enjoy a satisfactory standard of living. In the developing countries, it is a major instrument for eliminating mass poverty and sub standard living conditions. There are two aspects to the distribution problem, the distribution of existing resources more equally among the population and the distribution of the increment of the total product in favour of those in the lowest income brackets. Where economic growth has been less rapid the emphasis may have to be on restructuring existing levels of income without redistributing the addition to the Gross National Product each year in a more equitable manner. Economic planners in Sri Lanka have been

of the view that the increase in the Gross National Product alone is not a sufficient indicator of economic progress. Because even with a relatively high annual growth rate the Gross National Product could be unequally distributed resulting in serious income disparities. In view of this, there has been a great deal of emphasis on redistributing existing income and wealth in Sri Lanka because the addition to income, due to the relatively low rate of economic growth has been inadequate to make an appreciable impact on the incomes of those in the lowest income brackets.

The objective of reducing inequality in social incomes has been specifically incorporated in the Five Year Development Plan which became operative in 1972 and has now become an integral part of development strategy. The large number of measures which the government has put into operation in the last four year period is directly aimed at achieving this objective. Apart from the statistical picture which will give some indication quantitatively of the results of government policies, the visual impression is equally important. Those who have travelled extensively in Sri Lanka at different times in the last two decades would have noticed the considerable improvement in the economic conditions of the poorer people especially those who live in the rural sector. Higher prices for agricultural products and better social amenities have made visible improvements in the living standards of the rural community. This is important because until the mid fifties, the rural sector was the most neglected part of the economy. At this time, this sector was even more backward than the estate sector because the systematic policies of the plantation companies for the development and the maintenance of levels of production in the estate sector were not introduced by government for the benefit of the rural economy. In this context, the economic measures taken by government more recently have had a very clear bias towards the rapid rejuvenation of the rural economy. As a result one could even speak in a wide context of the terms of trade having moved distinctly in favour of the farming community. The latter has had implications not only for higher standards of living in this sector but has also affected rural urban migration in a significant way.

In Sri Lanka, a considerable amount of data on personal incomes and expenditure has been available over a period of time and new data continues to be available from more recent surveys. No single

survey has been undertaken exclusively for the purpose of studying changes in personal incomes and the size distribution of income. But most surveys, particularly those concerned with family expenditure and general socio-economic conditions, have sought detailed information on personal income and related demographic and employment aspects both on an islandwide and sectoral basis. The superior quality of this data could be attributed to the experience that institutions like the Central Bank and the Department of Census & Statistics have gained in sample survey work, the availability of trained investigators and the very high rate of response of the population to interrogation.

In a developing economy where the predominant part of the population does not belong to the income tax paying category and live in the rural sector, there is always a tendency in these surveys for income to be under-stated. This is largely because in a system where the number of tax payers constitute a very small proportion of the population, those who have not been paying taxes are reluctant to divulge their full incomes through fear, least they come within the tax framework. In view of this, the bias in these surveys may be towards greater understatement of income. Moreover, there is also the fear that in an economy such as that of Sri Lanka, where subsistence activities are fairly large, income accruing in real terms to the families are also often not accurately recorded. Particularly in the rural sector, real income in the form of food grown by the farmer and consumed in the household, fuel and free transport which are items of day to day significance may not be fully recorded in the statements of income[1] For purposes of international comparability this may not present a problem, because most surveys in the developing countries presumably have the same shortcomings and the element of understatement would be a common feature in many countries. While these may be looked upon as common limitations of data relating to income, the experience with social surveys in this country points to the fact that careful planning, close supervision of field work and the intensive training of field investigators could contribute to some extent to overcome these deficiencies.

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1 Households mainly engaged in agriculture, usually do not keep accounts of their activities and replies to questions from memory are likely to have a heavy bias towards underestimation.

While in many surveys on income and expenditure, data has been collected primarily on a household basis, in the three consumer finance surveys, data has been obtained for each household, consisting of spending units, and for the individual income recipients. On account of this, the inequalities in the size distribution of incomes for spending units as well as for individuals have been brought to light. If the income of the spending unit alone was taken into consideration, the pooling of incomes would tend to give an automatic upward bias because the household may consist of both high and low income earners, as it is the case in the estate sector, particularly where there are several income earners in each household belonging to different age groups and where their earnings also vary accordingly. When the incomes of individuals are taken into consideration, the average incomes would not show an upward bias because all incomes would receive an equal weighting in the process of working out the average.

In this paper, separate inequality ratios have been prepared for the three sectors urban, rural and estate because it is one method of identifying the sources of inequalities. It would help to show how the particular economic and social characteristics of each sector have influenced the size distribution of income and what are the major structural, economic and social differences that bear on this problem. The Sri Lanka data shows that these inequalities are greater in the estate sector than in the other two sectors and that the income disparities which have prevailed in the estate sector in the fifties have not been reduced to the same extent as in the urban and rural sectors.

The indicators[1] that have been used in the analysis of the size distribution of income here, of course, have certain common short comings. Although the concentration ratio shows the degree to which

1. Among the measures of inequality are the Gini concentration ratio, the Kuznets ratio, the standard deviation of logarithms and the coefficient of variation. Of these, the most commonly used is the Gini concentration ratio which is the area between the Lorenz Curve and the diagonal showing perfect income equality. One shortcoming of the Gini ratio is that it is not sensitive to small percentage changes in income which may be reflected as a significant change in the income shares of the lower income groups. As the Gini ratio lies between O and 1, the presence of innumerable points in between would tend to dampen the actual effects of shifts towards equality. In the latter context, the standard deviation of logarithms of income is superior because it is sensitive to small percentage changes in income and very high incomes have very little influence on it.

inequalities have decreased what it does not indicate is that the lower average income levels conceal the spread between the lowest and the middle level or even the higher income levels, and there is no indication of the large number of people who are virtually living well below the poverty line. In this sense, the concentration ratios have much less significance if the average income levels in the country are very low. In Sri Lanka, in the years 1953, 1963, and 1973, per capita incomes have been Rs. 573, Rs. 648 and Rs. 784 respectively, which shows that although inequalities have decreased, the increase in per capita income over the two decades has been small. Furthermore, per capita income does not reflect the actual incomes of those who are below the poverty line and whose incomes are lower than the per capita income. The large proportion of people living below the poverty line is to some extent due not only to the low level of average income but also to the unequal distribution of both income and wealth. In Sri Lanka's case, those who have secured permanent employment generally fall above the poverty line because most of the trades and services have been subject to minimum wages. Those who are employed but live below the poverty line are primarily in vocations which are not regulated by minimum wages or those who are casual workers. Since Sri Lanka has an unemployment rate of 17·4 per cent,[1] the unemployed along with those who fall into the lowest income brackets would be living well below the poverty line.

1. This figure is from the Labour Force Participation Rate Survey of 1973.

TABLE No. 1

Income Distribution by Spending Units 1963, 1969/70 and 1973

Group of Income	1969/70				1963				1973			
	Spending Units		Income		Spending Units		Income		Spending Units		Income	
	%	Cumulative %	%	Cumulative %	%	Cumulative %	%	Cumulative %	%	Cumulative %	%	Cumulative %
50 – 199	45·6	45·6	21·5	21·5	71·0	71·0	38·3	38·3	33·45	33·54	15·20	15·20
200 – 399	35·2	80·8	34·0	55·5	19 7	90·7	26·9	65 2	45·96	79·50	41·38	56·58
400 – 599	11·2	92·0	18·6	74·6	5·6	96·3	13·4	78 6	12·89	92·39	19·67	76·25
600 – 799	4·4	96·4	10·8	84·9	1·5	97·8	5·5	84·1	3·94	96·33	8·59	84·84
800 – 999	1·8	98·2	5·6	90·5	0·9	98·7	3 9	88·0	1·66	97·99	4·67	89·51
Over 1000	1·8	100 0	9·5	100·0	1·3	100·0	12·0	100·0	2·01	100·00	10·49	100·00

Source: Reports of the Survey of Ceylon's Consumer Finances 1963, and 1973 and a Socio-Economic Survey of Ceylon 1969/70.

Income Data in the Consumer Finance Surveys

Table No. 1 shows that in 1963 that 65.2 per cent of the spending units received an income of less than Rs. 400 whereas in 1973 the percentage had fallen to 56.58. Similarly, the spending units receiving less than Rs. 600 had declined from 78.6 to 76.25 in the same period. In the case of spending units in receipt of over Rs. 1000 the percentage has fallen from 12 to 10.49 in the last ten years.

TABLE No. 2

Percentage of Income Receivers and Total Income Received

Average Income (for one month) Rs.	1953 *(a)*		1963 *(a)*		1969/70 *(b)*		1973 *(a)*	
	Income Receivers	Total Income	Income Receivers	Total Income	Income Receivers	Total Income	Income Receivers	Total Income
100 and below	70·25	33·16	59·16	23·71	56·2	23·5	26·28	7·49
101 – 200	20·84	26·22	24·97	26·89	23·9	25·1	29·39	19·35
201 – 400	6·79	17·04	11·54	23·65	15·3	30·8	32·98	40·66
401 – 600	0·76	3·34	2·55	9·19	2·9	10·0	7·62	16·02
601 – 800	0·65	4·05	0·66	3·41	0·9	4·4	1·90	5·72
801 – 1000	0·18	1·39	0·36	2·42	0·4	2·3	0·74	2·88
over 1000	0·53	15·80	0·76	10·73	0·4	3·9	1·09	7·88

Source: Consumer Finance Survey 1973 and Socio Economic Survey of Ceylon 1969/70.

(a) Consumer Finance Surveys

(b) Socio Economic Survey 1969/70.

Since 1953, Sri Lanka has carried out a series of surveys on income and expenditure. In this study, the data analysed is primarily the information on personal income that has been available from the Consumer Finance Surveys undertaken by the Economic Research Department of the Central Bank at regular intervals of ten years. The first survey in this series was carried out in 1953, the second in 1963

and the third in the first quarter of 1973.[1] The data from these surveys is comparable because the coverage methodology, the scheme of applying questionnaires to the population, and the supervision exercised have been essentially of the same order. These surveys have given considerable emphasis to the collection of data on income received both in money and in kind. In Sri Lanka, income in kind is a significant component of total income particularly in the rural and estate sectors. Since the surveys were timed to coincide with the major paddy crop, viz., the Maha crop, when activity in the rural economy is at a peak, they tended to cover both seasonal incomes and income of a more stable nature. Apart from these surveys, data on income and expenditure have also been available from the Socio Economic Survey 1969/70 undertaken by the Department of Census and Statistics. However, for the purposes of this study, the data from the Socio Economic Survey would be referred to but would not be directly used in making assessments on the extent to which income inequality has changed. One reason for this is that the Socio Economic Survey does not fully include real income, and to some extent, this precludes a comparison with data from the Consumer Finance Surveys. In the Socio Economic

1. Over the years, progressively, the survey methodology has been improved and perfected by the Economic Research Department of the Central Bank of Ceylon. The Consumer Finance Survey of 1973 was designed and executed with a greater degree of accuracy than the two previous surveys. In the 1963 survey, one of the difficulties was the inadequacy of the sampling frame used for the election of the sample. On that occasion, the sampling frame was the list of households maintained by the Food Commissioner for the purpose of issuing rice ration books. On a very reasonable estimate this list provided only 95 per cent of the coverage of the whole population of the island. A good number of persons do not possess ration books and some have for various reasons not put themselves on the householders list. For the 1973 survey, the sampling frame used was the 1971 Census of Population of the Department of Census and Statistics. This provided an a most 100 per cent coverage of the population of the island. The method of selection of the sample was also an improvement on the 1963 survey. The method adopted was what is known as the 'Lahiri' method of selection. The concepts and definitions used in the surveys of 1963 and 1973 were essentially the same. Improvements were also made in the stratification In the 1963 survey the stratification was somewhat cumbersome while in the 1973 survey, this was simplified and there were only 12 strata, i.e. 3 sectors in each of the four zones. The organisation of the field work was also different in the 1973 survey, where 500 school teachers were selected as investigators who worked under the direct supervision of trained officers from the Central Bank. In the 1963 survey, however, the investigators were inspectors of cooperative societies who were supervised by the District Statistical Officers of the Dept. of Census and Statistics. In this respect, the amount of control exercised over the work in 1963 was not as good as in 1973. With this greater measure of supervision it is felt that the quality of the 1973 data is much better than that collected in 1963.

Survey income in kind is included only in the data on household income. Income from garden produce or from property shared in common is included as income of the chief of the household. Since the format of the three Consumer Finance Surveys have been similar and the information gathered comparable, the data from these surveys will also be used to examine the changes in the pattern of inequality in each of the three major sectors of the economy – the urban, rural and estate sectors.

In the surveys for 1963 and 1973, the sample was stratified on a three sector basis while in the 1953 survey, the economy was divided into two sectors, the estate and non-estate sectors; the urban sector was combined with the rural sector to constitute the non-estate sector. In the surveys, data were collected both in respect of income receivers and spending units. An income receiver has been defined as a recipient of money income or income in kind during the six months immediately preceding the survey. The spending unit is a much wider concept and could include more than one income receiver. The spending unit consists of one or more persons who are members of the same household and share major items of expenditure. This is important in the estate sector where members of a family, both parents as well as children over 14 years of age would be employed, and would jointly constitute a spending unit; while the number of income receivers would be equal to the number of employed persons in the family. However, the household can have more than one spending unit if more than one family is found in the household. Each family unit is treated as a spending unit.

The Consumer Finance Survey of 1953 showed that most of the income receivers were in the lower income deciles. The share of the top 10 per cent of the income receivers was as much as 42·49 per cent of total income, while the bottom 10 per cent received only 1·51 per cent. The average monthly income for income receivers as a whole in 1953 was Rs. 107·40. In the estate sector, the average was Rs. 58·40. In the non-estate sector it was Rs. 107·80 and was higher than the

average for the Island. The lower incomes in the estate sector were largely due to the bulk of income receivers being unskilled labourers whereas in the non – estate sector which is the urban and rural sectors combined, the people were engaged in a wide variety of occupations which included workers who were well paid and a large number of self – employed persons with relatively high incomes. The 1953 survey showed that the average income of men was higher than that of women. This difference, however, was less evident in the estate sector where occupational categories were few, where men and women generally did more unskilled work than in the rest of the country and where better paid occupations were largely monopolised by men. The 1953 survey showed that incomes were mainly obtained from work. Of the whole sample, 74·7 per cent received incomes from work. In the estate sector the proportion was much higher being 97·6 per cent, while it was 75·7 per cent in the non – estate sector.

The 1963 survey showed that about 79·65 per cent of the income receivers earned less than Rs. 400 and 52·56 per cent received less than Rs. 200 a month, while 27·20 per cent received less than Rs. 200 per month. Income in excess of Rs. 400 was earned by 14.29 per cent of the total population. This shows that the bulk of the income receivers were in the income group less than Rs. 400. The average income of an income receiver in 1963 was Rs. 267.39 for two months as compared with Rs. 214.80 in 1953. This 25 per cent increase in the average income in the ten year period between the two surveys represent an yearly increase of nearly 2 per cent. When the increase of ten per cent in prices as indicated by the Colombo Consumers' Price Index between 1953 and 1963 is taken into consideration the rise in real income is 13 per cent during this period. In 1953 the average income of the rural and urban sector combined (the non estate sector) was Rs. 121·80 whereas in 1963 the average income of the urban sector was Rs. 255·09 and the rural sector Rs. 127. This shows that money income has shown a moderate increase in the ten year period.

TABLE No. 3

Percentage of Total Income Received by each Tenth of Income Receivers and Spending Units (All Island)

Deciles	By each tenth of Income Receivers			By each tenth of Spending Units		
	1953	1963	1973	1953	1963	1973
Highest 10 ..	42·49	39·24	29 98	40·60	36·77	28·03
Second ..	14·16	16·01	15 91	13·20	15·54	14·92
Third ..	10·39	11·46	12·65	10 10	11·22	11 65
Fourth ..	7·94	8·98	10·56	8·30	9 00	9·91
Fifth ..	6·31	6·82	8 75	6·90	7·54	8·75
Sixth ..	5·71	5 55	7·10	6 40	6·27	7 45
Seventh ..	4 37	4·51	5 70	5·20	5·21	6·52
Eighth ..	3·56	3·56	4·38	4·10	4·00	5 60
Nioth ..	3·56	2·70	3·17	3·30	2·95	4·38
Lowest .	1·51	1·17	1·80	1·90	1·50	2·79

Source: Reports of the Survey of Ceylon's Consumer Finances 1953, 1963 and 1973. The Report for 1973 has not yet been published.

Like in the previous surveys, the main object of the Consumer Finance Survey of 1973[1] was to collect data on household income and expenditure. Along with this, related demographic and employment data were also collected. The average monthly income per income receiver in 1973 was Rs. 228 compared to the average of Rs. 134 in 1963. When deflated by the Colombo Consumers' Price Index, the average monthly income in 1973 would be Rs. 150 at 1963 constant prices. This means that the average real income as revealed in the last two consumer finance surveys has increased by 1.2 per cent per year. The survey also shows that average real income in the urban sector has declined at the rate of 1.8 per cent annually, while the rural and estate sectors taken separately have gained at the rate of 2 per cent. As in the 1953 and 1963 surveys, the 1973 survey shows that most of the incomes arise from work and property income was less important.

1. The sample drawn for the Survey consisted of 5088 households with 28,587 individuals among whom there were 7,326 income receivers. The Survey collected income data for the two months immediately prior to the Survey in addition to income data in money and kind for a period of six months.

In Table No. 3, the size distribution of income between 1953, 1963 and 1973 respectively, have been presented in terms of the decile shares received by income receivers and spending units respectively. With regard to the income receivers, between 1953 and 1973, the share of income of the highest 10 per cent has fallen from 42.49 per cent in 1953, to 39.24 per cent in 1963 and to 29.98 per cent in 1973. The share of income enjoyed by this decile in 1973 is approximately 70 per cent of the share that this group received in 1953. Although the decline between 1953 and 1963 is not very significant, the decrease between 1963 and 1973 is indeed spectacular. If the income shares are looked at from the point of view of spending units, the decrease in the shares over the 20 year period is very much the same except in some of the lowest deciles. For spending units, the share of the highest 10th was 40·7 per cent in 1953, 36·77 per cent in 1963 and 28·03 per cent in 1973. In the second highest decile, in 1953. 14·16 per cent of total income accrued to this group, in 1963 the share increased to 16·01 per cent and decreased in 1973 to 15·91 per cent. There was a similar decrease in the income share of spending units in the second decile. In the third highest decile the trend in the first two deciles for the income shares to decrease has been reversed. The share of the third decile for 1953 was 10·39 per cent, 11·46 per cent in 1963 and 12·65 per cent in 1973. The same trend is evident in the share of income of the income receivers in the corresponding deciles.

From the fourth decile downwards, between 1963 and 1973, there has been a progressive increase in the income shares of income receivers. Although the difference between 1953 and 1963 is less noteworthy, the increase between 1963 and 1973 is significant. In the fourth decile, the income share of income receivers between 1963 and 1973 increased by more than 1 per cent from 7·94 per cent to 8·98 per cent whereas between 1963 and 1973, the increase was over 1·5 per cent from 8·98 per cent to 10·56 per cent. For income receivers in the fifth decile, between 1953 and 1963, although the increase in the share of income was only marginal, between 1963 and 1973 the increase from 6·82 per cent to 8·75 per cent has been appreciable. In the sixth decile, although the income share between 1953 and 1963 actually decreased, the shift from 5·55 per cent to 7·10 per cent between 1963 and 1973 has more than compensated the earlier change. The trend in the seventh and eighth deciles is very similar, while there

is no difference in the income shares between 1953 and 1963, between 1963 and 1973 however, the income share has increased from 3·56 per cent to 4·38 per cent. In the ninth decile, the share has decreased significantly from 3·56 per cent in 1953 to 2·70 per cent in 1963 but in 1973 the share has increased to 3·17 per cent. For spending units in the tenth decile the share of income has increased substantially from 1·50 per cent in 1963 to 2·79 per cent in 1973 despite the trend towards greater equality in the higher deciles. This shows that there is yet a substantial concentration of low income earners in the country. This disparity is larger in the case of spending units than for income receivers. In so far as spending units are concerned there is a tendency for the shares of the lowest deciles to increase partly on account of their being more than one income receiver in each spending unit and partly because of the sharp increase in unemployment in the last few years. There may be more unemployed and underemployed persons in each spending unit in 1973 than in 1963.

The changes in inequality are depicted in Diagram 1, which shows the Lorenz Curves for income receivers between 1953, 1963 and 1973. The cumulative percentage of income received is plotted on the vertical axis. The three curves, for each of the years under reference clearly show the reduction in inequality in the last decade. Although between 1953 and 1963, there was a shift towards greater equality, it was only partial because the income shares of the higher deciles except the tenth increased while those of the two lowest deciles decreased. The picture has changed remarkably in the last decade. The curve for 1973 is much nearer the line of equal distribution and the percentage shares of the middle deciles have tended to increase proportionately more than the highest and the lowest deciles. The Gini concentration ratio which gives a fair measure of the inequality of income distribution relates to the area under the line of equal distribution and the Lorenz Curve. The concentration ratio is between 0 and 1 and the size distribution of income for 1973 shows that the concentration ratio for spending units has decreased (Table 4) appreciably to 0·35 in 1973 from 0·45 in 1963 and 0·46 in 1953. The corresponding ratios for income receivers are 0·41, 0·49 and 0·50 respectively. In fact, this is the first occasion where the Lorenz Curve has moved clearly away at every point from the curve showing income distribution 10 years earlier.

DIAGRAM 1

INCOME RECEIVERS

LORENZ CURVE SHOWING DISSTRIBUTION OF INCOME 1953, 1963 AND 1973

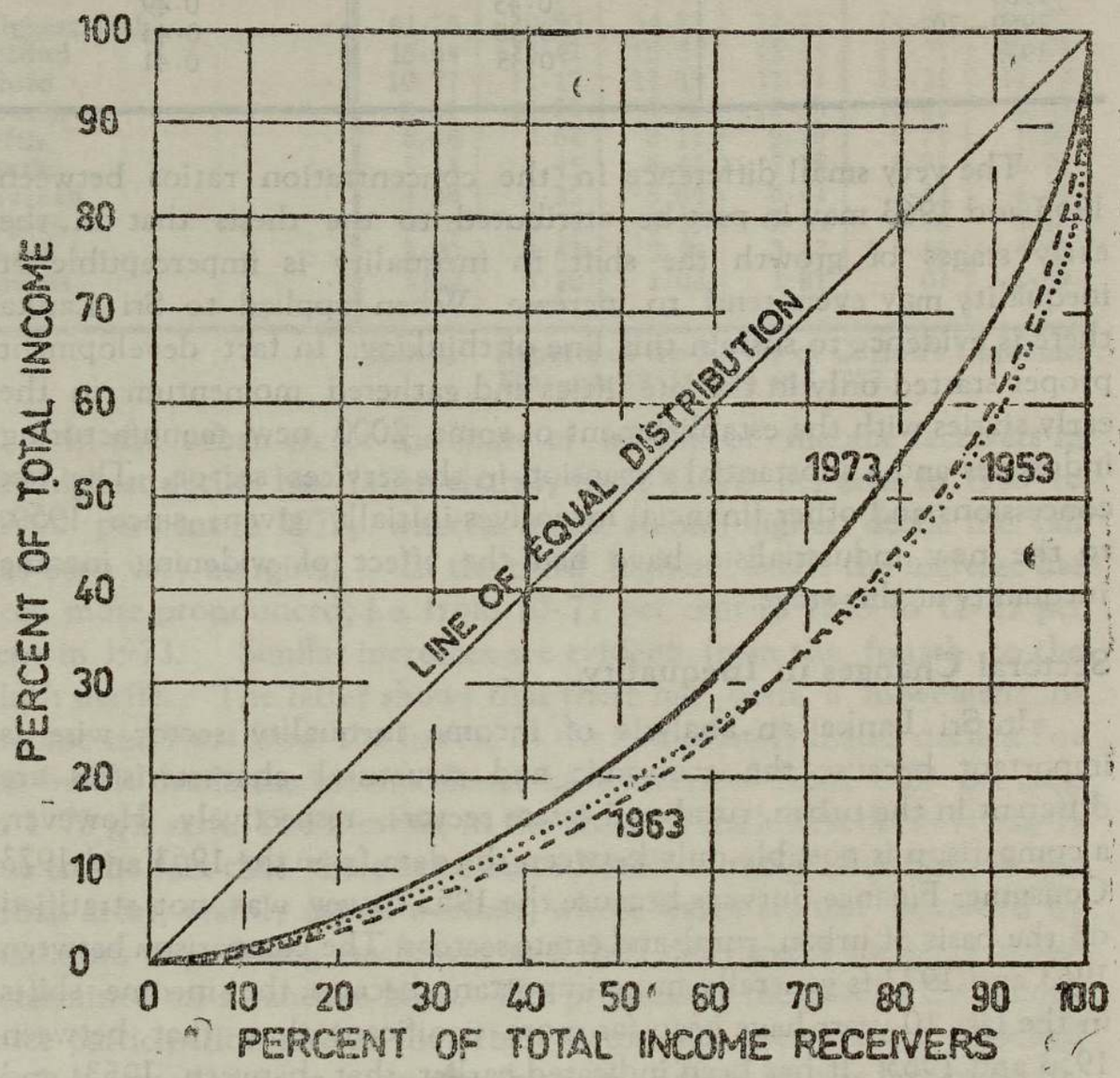


TABLE No. 4

Concentration Ratios

Year	Income receivers spending units (All Island)	Income receivers (All Island)
1953	0·46	0·50
1963	0·45	0·49
1969—70	0·38	0·43
1973	0·35	0·41

The very small difference in the concentration ratios between 1953 and 1963 may in part be attributed to the thesis that in the early stages of growth the shift in inequality is imperceptible or inequality may even tend to increase. When applied to Sri Lanka there is evidence to sustain this line of thinking. In fact development proper started only in the late fifties and gathered momentum in the early sixties with the establishment of some 2000 new manufacturing industries and a substantial expansion in the services sector. The tax concessions and other financial incentives initially given, since 1959, to the new industrialists have had the effect of widening income inequality at this stage.

Sectoral Changes in Inequality

In Sri Lanka an analysis of income inequality sector wise is important because the economic and structural characteristics are different in the urban, rural and estate sectors, respectively. However, a comparison is possible only between the data from the 1963 and 1973 Consumer Finance Surveys because the 1953 survey was not stratified on the basis of urban, rural and estate sectors. The comparison between 1963 and 1973 is generally more important because the income shifts in the last 10 years have been far more significant than that between 1953 and 1963. It has been indicated earlier, that between 1953 and 1963, there was only a marginal decrease in income inequality.

In the urban sector, where some 2·3 mllion or about 18 per cent of the population lived in 1972 and where those who earned the highest income live, the overall changes in the trends in income inequality are broadly comparable to those for the island as a whole.

TABLE No. 5

Percentage of Total Income Received by each Tenth of Income Receivers

Deciles	By Each Tenth of Income Receivers					
	Urban		Rural		Esrate	
	1963	1973	1963	1973	1963	1973
Highest 10th ..	42·78	29·90	34·23	27·27	24·87	31·70
Second ..	15·64	15·42	16·51	15·44	13·31	13·51
Third ..	10·77	12·17	12 35	12·72	11·21	11·12
Fourth ..	8·31	10·25	9·96	10·68	10·42	9·53
Fifth ..	6.64	8·68	8·11	9·16	8·71	7·99
Sixth ..	5·13	7·45	6·45	7·79	8·71	6·91
Seventh ..	4·28	6·25	5 04	6·42	7·33	6·16
Eighth ..	3·16	4·75	3·73	5·18	6·86	5·58
Ninth ..	2·00	3·42	2·54	3·53	5·56	4·61
Lowest ..	1·29	1·70	1·08	1·81	3·02	2·89

Sou ce: Reports of the Survey of Ceylon's Consumer Finances 1953, 1963 and 1973.

In the urban sector the share of income of income receivers in the highest decile has fallen sharply from 42·78 per cent in 1963 to 29·90 per cent in 1973, whereas in the second highest decile the fall has been very marginal. In the third highest decile the increase has been more pronounced, i.e. from 10·77 per cent in 1963 to 12·17 per cent in 1973. Similar increases are evident from the fourth to the ninth decile. The latter shows that there has been a movement of income receivers from the lowest to the immediately higher deciles. For the lowest decile the income shares have increased from 1·29 per cent to 1·70 per cent. The increase in the share of the lowest decile is largely due to the fact that there are a considerable number of persons in the urban areas, mainly casual workers, whose wages are not governed by minimum wage fixing machinery and their daily wages are more or less determined on a random basis. The progressive increase in the labour force participation rate in the urban sector and pressure for unskilled work has tended to increase the share of income of the lowest decile, The concentration ratio for the urban sector, where the highest inequalities are found, has fallen from 0·49 in 1963 to 0·40 in 1973. This is depicted in the accompanying Diagram 2. The concentration ratio for the urban sector in 1963 was the same as that for the island as a whole. But in 1973 the concentration ratio for the island was 0·41 as against 0·40 for the urban sector.

DIAGRAM 2

INCOME RECEIVERS

LORENZ CURVE SHOWING DISTRIBUTION OF INCOME FOR 2 MONTHS BY URBAN SECTOR 1963 AND 1973

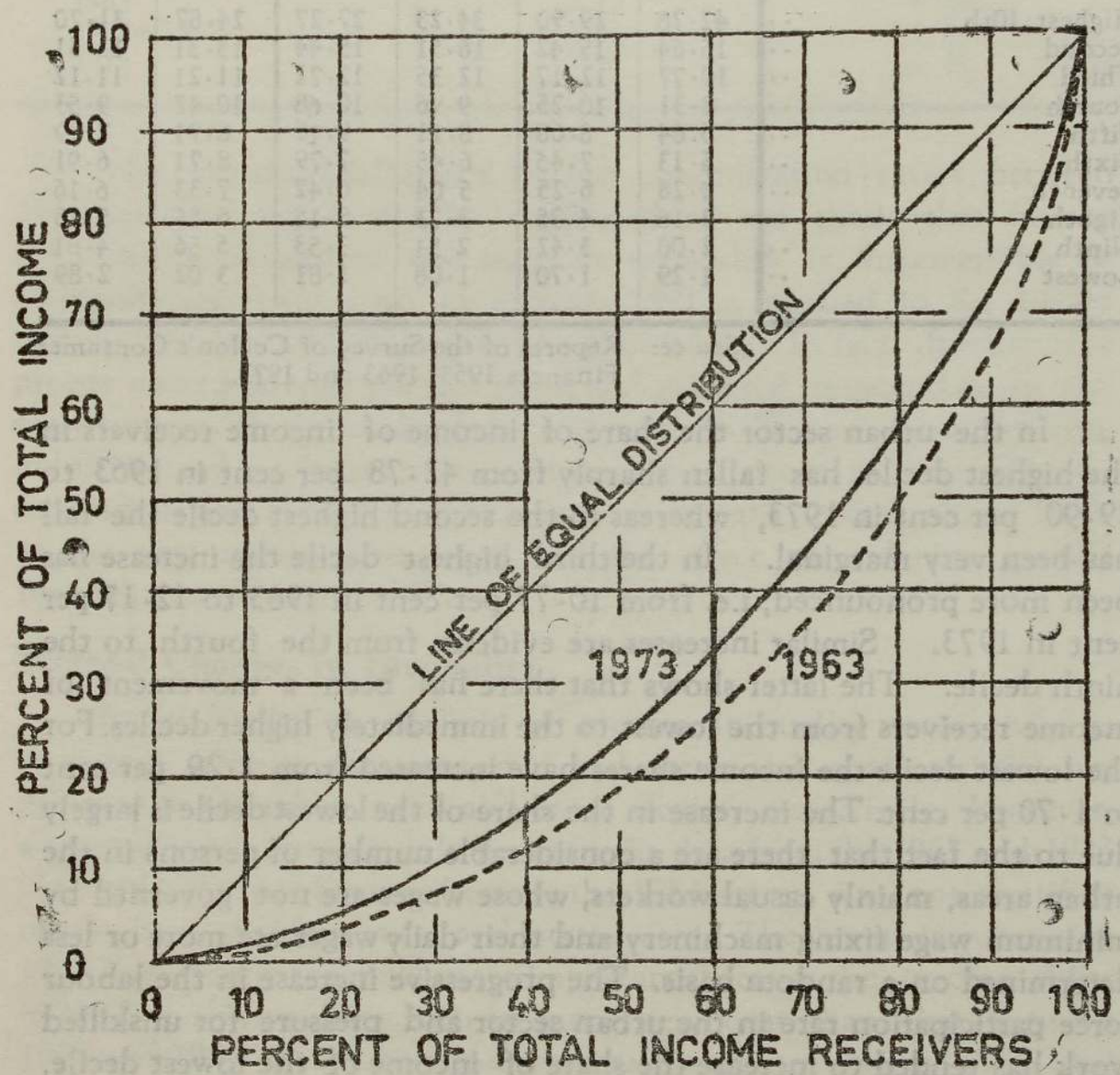


TABLE No. 6

Concentration Ratios by Sectors (Income Receiver)

Year	Urban	Rural	Estate	All Island
1953	—	—	—	0·50
1963	0·49	0·44	0·27	0 49
1973	0·40	0·37	0·37	0·41

Source: Ceylon's Consumer Finance Surveys 1963 and 1973, Central Bank of Ceylon.

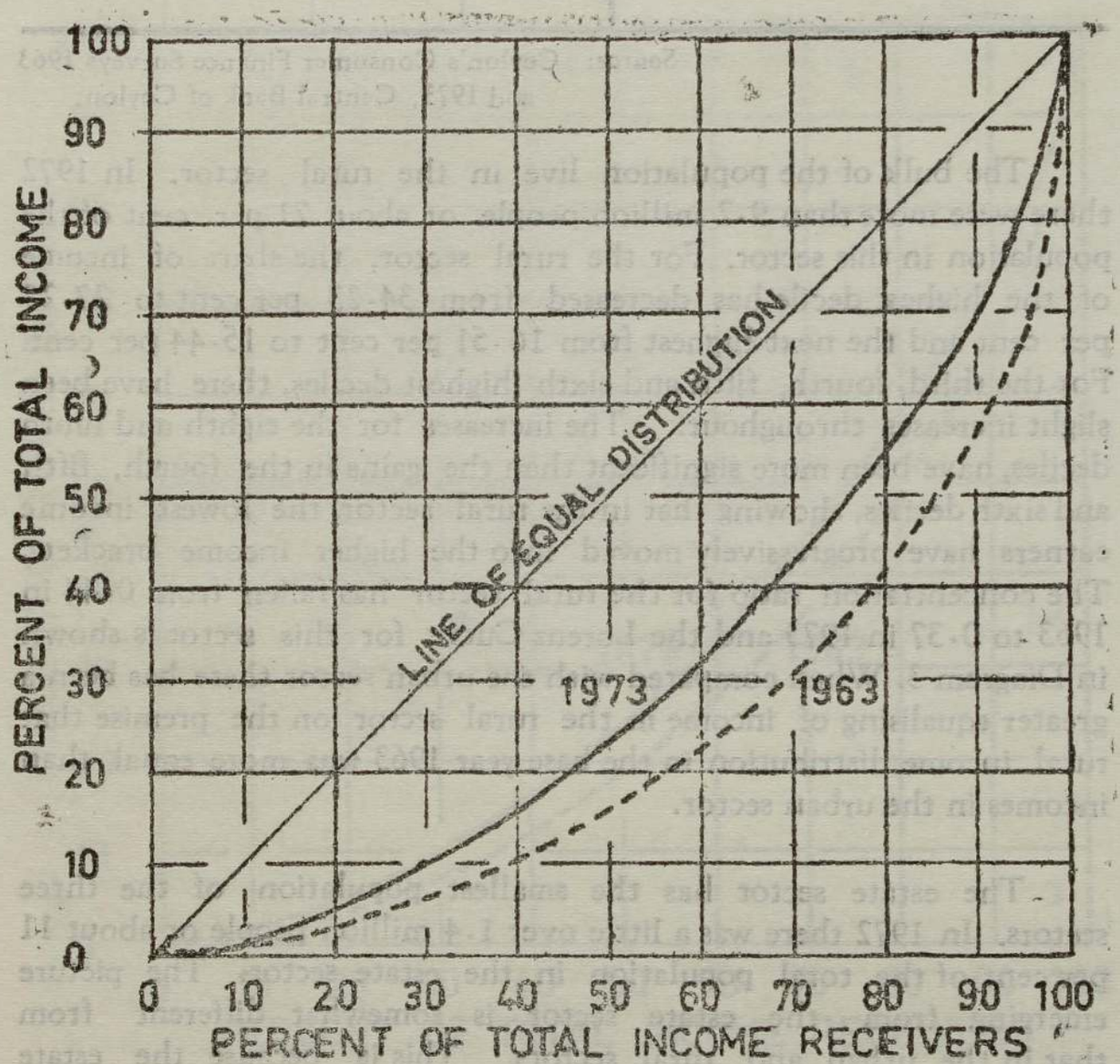
The bulk of the population live in the rural sector. In 1972 there were more than 9·2 million people or about 71 per cent of the population in this sector. For the rural sector, the share of income of the highest decile has decreased from 34·23 per cent to 27·27 per cent and the next highest from 16·51 per cent to 15·44 per cent. For the third, fourth, fifth and sixth highest deciles, there have been slight increases throughout. The increases for the eighth and ninth deciles, have been more significant than the gains in the fourth, fifth and sixth deciles, showing that in the rural sector, the lowest income earners have progressively moved into the higher income brackets. The concentration ratio for the rural sector has fallen from 0·44 in 1963 to 0·37 in 1973 and the Lorenz Curve for this sector is shown in Diagram 3. When compared with the urban sector there has been a greater equalising of income in the rural sector on the premise that rural income distribution in the base year 1963 was more equal than incomes in the urban sector.

The estate sector has the smallest population of the three sectors. In 1972 there was a little over 1·4 million people or about 11 per cent of the total population in the estate sector. The picture emerging from the estate sector is somewhat different from that in the urban and rural sectors. This is because the estate sector has a relatively few large income earners while the wages of the workers on the estates are among the lowest in the country. In the estate sector, the share of income in the highest decile increased sharply from 24·87 per cent in 1963 to 31·70 per cent in 1973, while in the second highest decile there was a very slight increase. This is in contrast to the trend in highest deciles for the urban and rural sectors

DIAGRAM 3

INCOME RECEIVERS

LORENZ CURE SHOWING DISTRIBUTION OF INCOME FOR 2 MONTHS BY RURAL SECTOR 1963 AND 1973



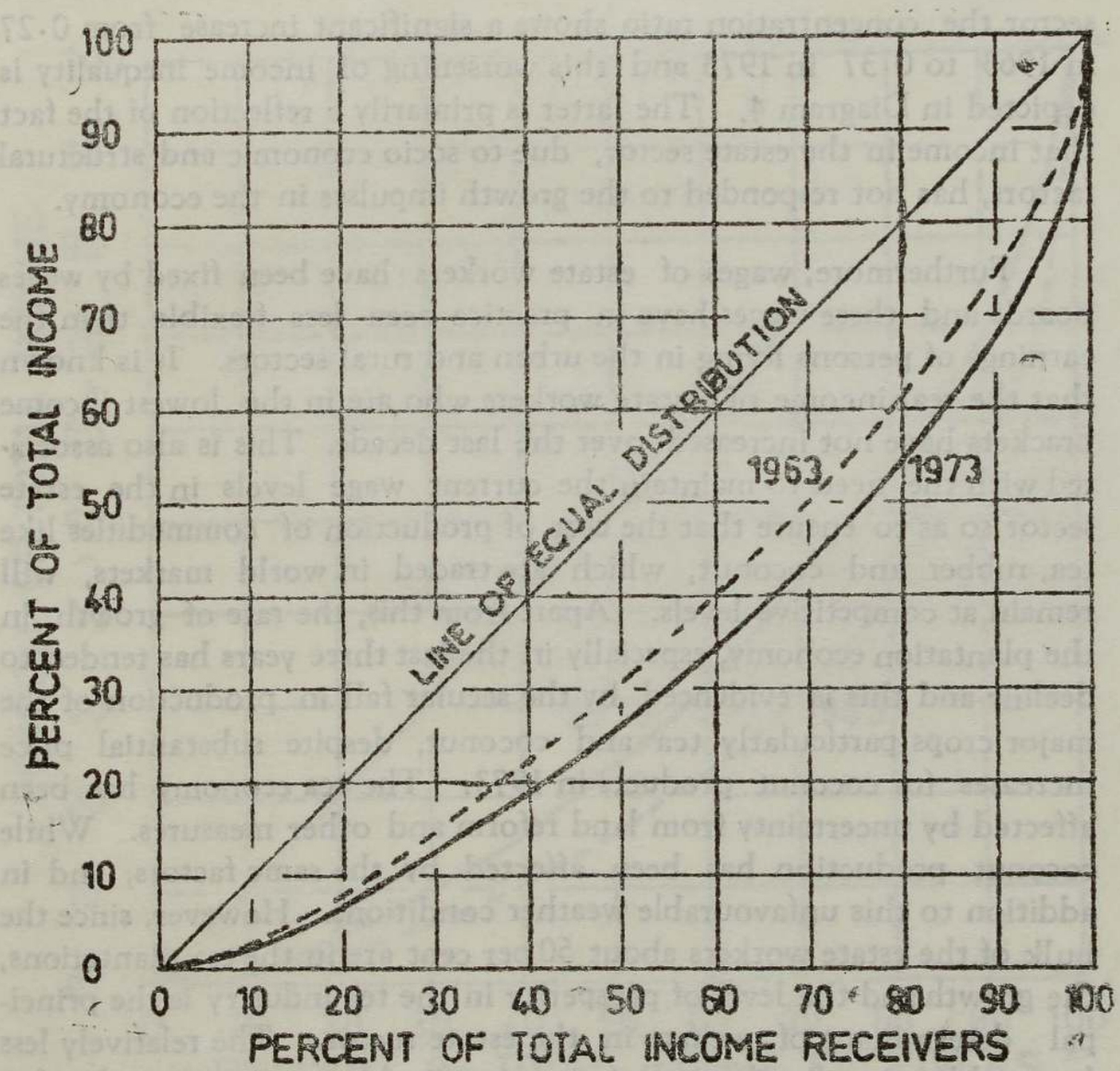
where the income shares decreased substantially in the decade under reference. For the second highest decile the trend in the estate sector has been for the share of income to increase marginally whereas in the urban and rural sectors there have been decreases. From the third decile downwards to the very lowest decile, the share of income accuring to these groups have decreased substantially. This is in contrast to the trend of income shares in the urban and rural sectors, where from the fourth decile downwards, there has been an increase in the shares of each decile between 1963 and 1973. For the estate sector the concentration ratio shows a significant increase from 0·27 in 1963 to 0·37 in 1973 and this worsening of income inequality is depicted in Diagram 4. The latter is primarily a reflection of the fact that income in the estate sector, due to socio economic and structural factors, has not responded to the growth impulses in the economy.

Furthermore, wages of estate workers have been fixed by wages boards and these wages have in practice been less flexible than the earnings of persons living in the urban and rural sectors. It is known that the real income of estate workers who are in the lowest income brackets have not increased over the last decade. This is also associated with the need to maintain the current wage levels in the estate sector so as to ensure that the cost of production of commodities like tea, rubber and coconut, which are traded in world markets, will remain at competitive levels. Apart from this, the rate of growth in the plantation economy, especially in the last three years has tended to decline and this is evidenced by the secular fall in production of the major crops particularly tea and coconut, despite substantial price increases for coconut products in 1973. The tea economy has been affected by uncertainty from land reform and other measures. While coconut production has been affected by the samc factors, and in addition to this unfavourable weather conditions. However, since the bulk of the estate workers about 50 per cent are in the tea plantations, the growth and the level of prosperity in the tea industry is the principal determinant of welfare in the estate sector. The relatively less favourable size distribution of income in this sector is partly due to the difficulties which the tea industry has had to face in recent years. The plight of the industry has been aggravated by the prices of tea remaining depressed for more than a decade and being more or less static in the commodity boom that began lest year. Along with bananas, tea is the only commodity traded in world markets whose

DIAGRAM 4

INCOME RECSIVERS

LORENZ CURVE SHOWING DISTRIBUTION OF INCOME FOR 2 MONTHS BY ESTATE SECTOR 1963 AND 1973



prices did not move up in sympathy. In addition to these factors the increase in the concentration ratios in in the estate sector between 1963 and 1973 in also due to the methodological reason that in the 1963 Consumer Finance Survey management level or higher paid staff were hardly represented in the sample, whereas in 1973 adequate representation was given to them.

Despite what has been said above the size distribution of income in the rural and the estate sectors is to some extent correlated with the trends in overall inequalities in the size distribution of income in the country as a whole. The principal difference being that the shifts in income from the top to the middle group and from bottom to the middle group have not taken place to the same degree in the estate sector as in the rural sector. But taking the country as a whole, since the bulk of the population live in the rural sector, in analysing the size distribution of income, the greatest weightage has to be given to the rural sector. Thus, the reduction in inequality in the rural sector may be taken as the true index of changes in income inequality in the economy. Although the estate sector is significant from the point of view of exports, because more than 90 per cent of the agricultural export commodities are produced there, yet, the number of persons involved in that sector as a whole is not more than 1 million. As against this, more than 7 or 8 million people live in the rural sector and in this context, the relative proportion of population is the material consideration in making an intersectoral comparison. The data also shows that in a relative sense urban inequality tends to be generally less significant in Sri Lanka than in most other Asian countries where the former has been generally greater than rural inequality.

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