

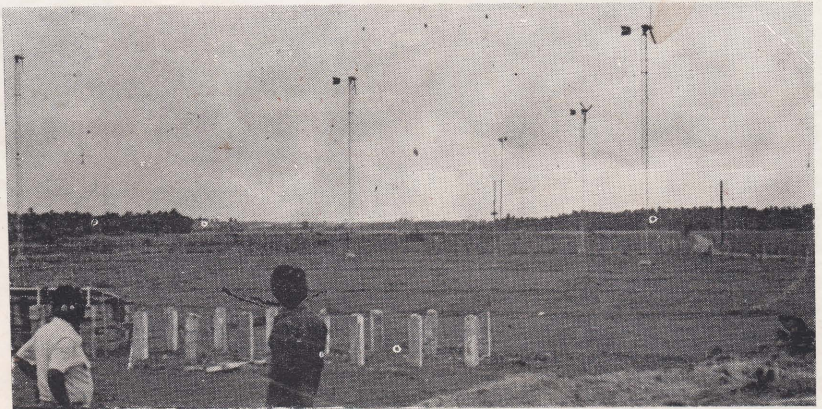
ECONOMIC REVIEW

May
1980

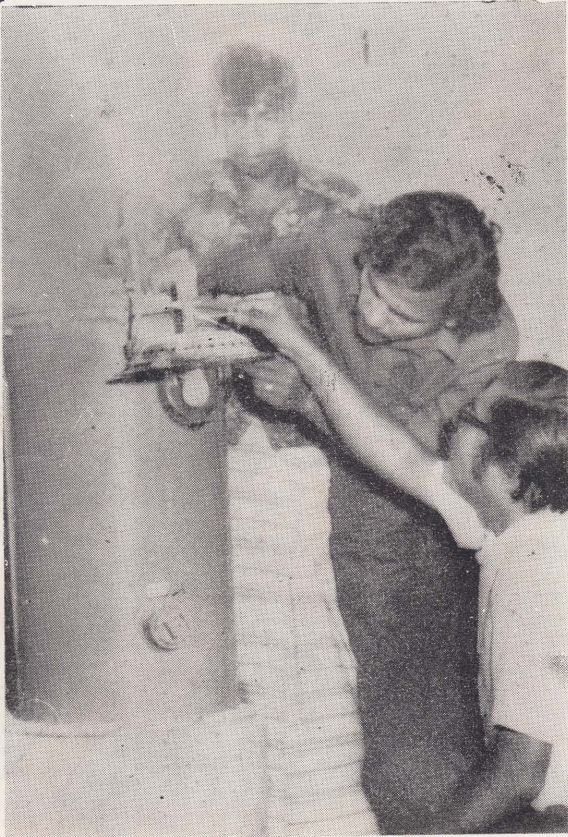


ALTERNATIVE ENERGY SOURCES

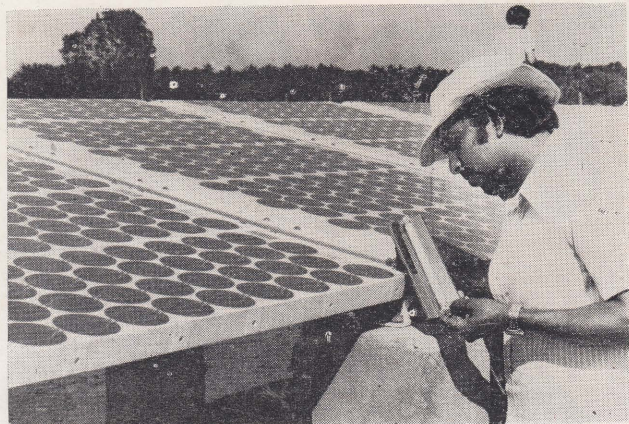
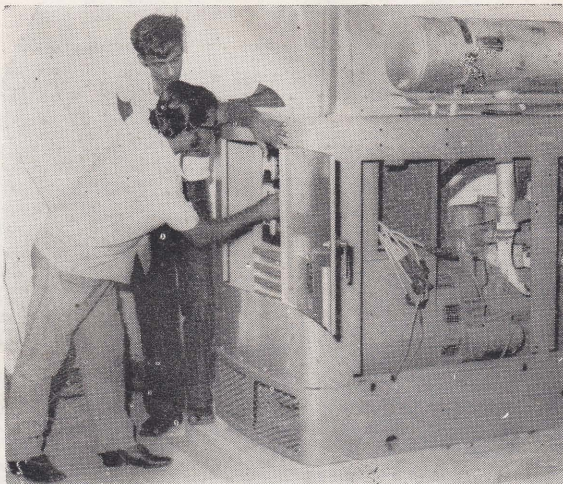
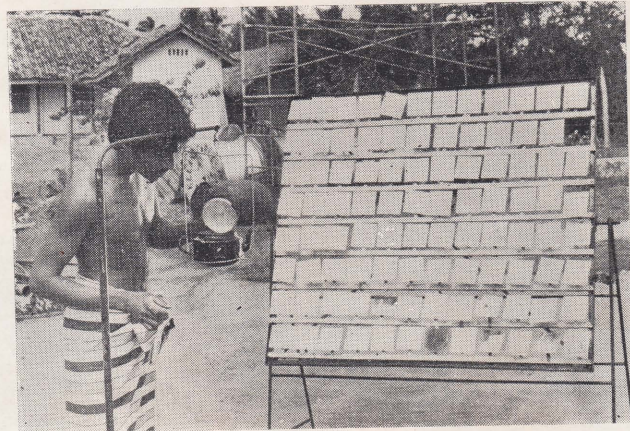
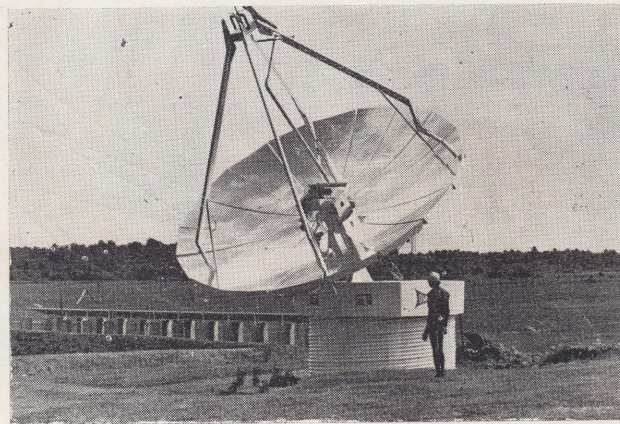
The search for alternative sources of energy has intensified in recent times. The Electricity Board's Alternate Energy Project at Pattiapola in the Hambantota District is carrying out trials for converting solar power; wind power and biomass into energy for domestic cooking and lighting purposes. At right is a set of Windmills at the Pattiapola site. On page three, too, we picture a windmill which serves a large part of the fishing community in the area.



Below, the solar power abundantly available is being captured in various forms for conversion into energy for domestic use — Bottom picture — P. V. cells; centre — Solar Concentrator, top — Solar Thermal Electric Generator.



Above a biogas powered lamp being tested out at Pattiapola; and below a 100 percent biogas powered 50 H.P. — 375 KVA 3 phase A/C unit in operation at the same place.



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THE ECONOMIC REVIEW is intended to promote knowledge of and interest in the economy and economic development process by a many sided presentation of views & reportage, facts and debate.

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NEXT ISSUE

- Sri Lanka's Economy — a mid-term review
- Welimada's vegetable cultivators diminishing returns
- Railway electrification-social desirability and economic feasibility
- Offshore banking centres: benefits and costs

COVER ARTIST

Nayananda Wijayakulathilaka

Diary of Events

March

- 1 The 10-member Presidential Commission, which handed in its report has recommended the setting up of Development Committees with subordinate law making powers in all districts of Sri Lanka, according to a press announcement.
- 4 The foundation stone for the National Television Complex — Studio Centre in Colombo was laid by the President. The complex which includes two studios in Colombo and two main transmitting stations at Mt. Pidurutalagala and Kokavil is a gift from the Government of Japan.
- 5 The share capital of the People's Bank and the Bank of Ceylon is to be raised in terms of a Cabinet decision. It would begin with a Government contribution this year of Rs. 43.2 million to the People's Bank and with 45.5 million to the Bank of Ceylon. Government would increase the authorised share capital of the two banks to Rs. 1,000 million each while the paid-up share capital would be progressively increased.
- 6 Some of Sri Lanka's external assets have now been placed in the Foreign Currency Banking Units (FCBUs) operated by Colombo based commercial banks, authoritative governmental sources stated according to a press report.
- 7 The price of white printing paper manufactured by the National Paper Corporation has been increased by 80 percent; while the import duty on commercial paper has been raised from 25 — 50 percent, according to the Corporation's Chairman quoted in a press report.
- 8 Over 150,000 acres of prime tea in the Uva, Kegalle, Avissawella, Kandy and Badulla districts were affected by drought, a spokesman for the Janatha Estates Development Board told the press.
- 9 Developed countries could have a zero growth rate in 1980 and this would seriously affect Asian developing nations forcing a widespread revision of their economic priorities, the Economic and Social Commission for Asia and the Pacific (ESCAP) reported in a survey from Bangkok.
- 10 The setting up of a multi-million rupee rice flour milling plant at Mutwal with an initial processing capacity of 500 million tonnes a day has received official approval according to press reports. Meanwhile, the giant 'Prima' flour milling plant in Trincomalee is due to be commissioned by August this year with an initial output of 1800 tonnes of flour a day.
The USA has increased its current aid to Sri Lanka by about Rs. 140 million (US \$ 9.0 million) of which Rs. 100 million (US \$ 6.4 million) will comprise loans and Rs. 40 million (US \$ 2.6 million) grants, according to an agreement signed in Colombo.
Switzerland will give Sri Lanka an outright grant of Swiss Francs 1,650,000 (about Rs. 15.5 million) for animal husbandry and dairy development projects, according to an agreement signed in Colombo.
- 11 Despite deposits in both the National Savings Bank and the commercial banks going up, the proportion of national income now going into

savings is dropping, a study undertaken by the Central Bank has revealed, stated a press report.

The rupee value of the US dollar went over the Rs. 16 mark on the Colombo exchange market reported the evening Observer. This is one of the highest values achieved by the dollar against the Sri Lanka rupee since the November 1977 exchange rate revision.

- 12 Public officers will in future be able to study abroad or be employed for a period of five years on no-pay leave. Three of the five years' no-pay leave can be taken continuously, according to a Cabinet decision.

- 14 The foreign ministers of developing countries ended a meeting in New York with a call for a United Nations conference on global negotiations for international economic cooperation to work out an agreement with the industrial nations within a specific time-frame. The foreign ministers expressed concern over the fact that negotiations with the developed nations were now in a stalemate in several areas such as trade and raw materials.

The President who met all major Unions representing all Estate workers on March 13 and 14 agreed in principal that there should be a collective agreement between Estate Agencies and the Unions and also on several other concessions and facilities for estate workers.

- 18 An Agreement was signed in Colombo between the Government of the USA and the Government of Sri Lanka, whereby the U.S.A. extended a loan on U.S. \$ 18.2 million (Rs. 282.1 million) to Sri Lanka for the purchase of wheat and/or wheat flour.

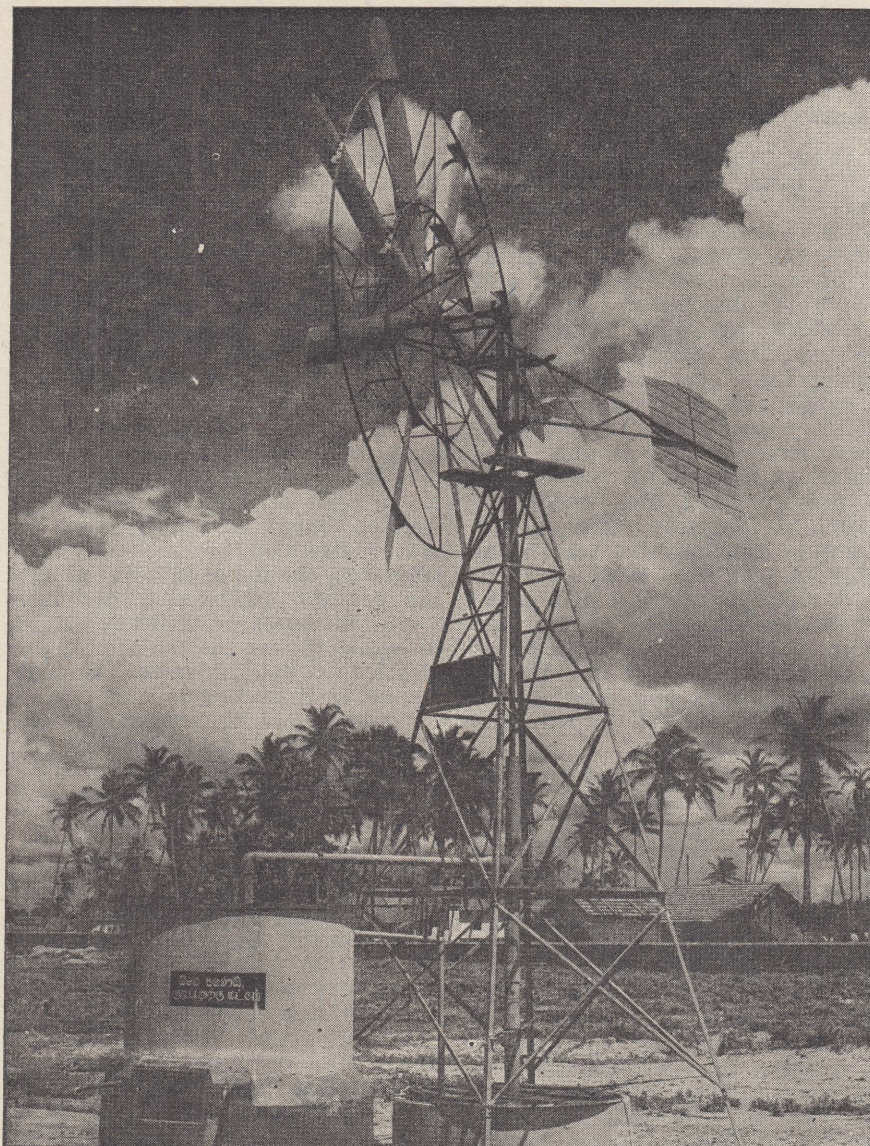
A sum of nearly Rs. 900 million came in last year in the form of remittances from Sri Lankans employed in the Middle East, a Central Bank spokesman revealed.

- 23 The Victoria Multi Purpose Reservoir Project was ceremonially inaugurated by the President in association with the Prime Minister and British Overseas Minister. The project which is estimated to cost Rs. 5,000 million will have an installed hydro power capacity of 210 MW and an annual generation of 780 million KWH and the project is expected to initially provide employment for some 20,000 persons and have an irrigation potential of 112,000 acres.

- 25 Two Indian banks with extensive experience in rural credit are being permitted to open branches in four provincial areas according to authoritative government sources, stated an evening Observer report. It said the Central Bank has authorised the State Bank of India and the Indian Overseas Bank to open branches in Matara, Kandy, Anuradhapura and the Mahaveli areas.

- 26 The Cabinet approved a draft bill to control more effectively activities of private employment agencies.

The Cabinet approved the draft of the Investment Protection Agreement with the Republic of Korea. This is done to attract foreign investors. Similar agreements will be entered into with other countries.



ENERGY II

The recent restriction in power supply has dramatically heightened for us the importance of energy and its vital role in the life of the nation. The rapid rise in energy costs, particularly petroleum prices, has created major dislocations in the economies of the industrially most advanced nations such as US and Japan; while the developing countries most of whom are dependent on oil, have been confronted with serious balance of payments problems and threats in their economic growth.

Sri Lanka, we have realised, is particularly vulnerable in the pre-

sent energy situation with its heavy (85%) dependence on hydro-power (which means in essence that energy in Sri Lanka is drought prone) and on imported petroleum which is subject to periodic price rises.

The following excerpts, from a statement issued by the Ministry of Power and Energy at the height of the recent power shortages in May, indicates to an extent the lopsidedness and increasing seriousness of the energy situation in the country.

"Eighty-five per cent of Sri Lanka's power is hydro electricity generated with the use of water mainly at

the Laxapana Complex and at Ukuwela. Fifteen per cent of the electricity is produced with the use of diesel fuel mainly at Kelanitissa Power Station. Down the years successive Governments had naturally concentrated on the development of Sri Lanka's hydro power resources as opposed to developing thermal power resources. The strategy of large reliance on hydro was adopted because of the relative cheapness of water power."

"The disadvantage of hydro power is that such a system is obviously vulnerable to droughts. If hydro power had not been developed on the other hand (and if the current development of water power under the Mahaveli Scheme had been postponed), the power would have had to be generated more expensively by the use of either coal or oil."

"Over the last two years, in particular, the power demand has increased dramatically at an average annual rate of 14 per cent per year, compared with an average annual rate of 6.5 per cent in the seven years preceding that. This means, virtually that power requirements forecast for the year 1983 had to be met in the year 1980".

"Hydro power development was the most economic power development alternative in this country whilst the installations of thermal power facilities is very expensive. (In 1961-62 the Kelanitissa thermal Power Station was constructed at a cost of around Rs. 50 million. At today's prices a similar facility would cost around Rs. 540 million (i.e. over ten times the previous cost). The decision not to over-invest on thermal back-up capacity, which would have most of the time have remained idle is a valid one on cost criteria. However, in April 1978, when it became clear that the power demand projections were increasing steeply, the CEB recommended to the then Ministry of Irrigation, Power and Highways that Gas Turbines should be installed."

"The awareness of the increasingly serious power and energy situation in the country led the Government to appoint a Special Committee on Energy headed by the Secretary to the Ministry of Power and Energy. That Committee submitted two reports to the Government and in its first report reiterated the increasingly serious energy situation. In recognition of these recommendations the Government has authorised the investigation by the Ceylon Electricity Board itself of developing the balance hydro resources outside the accelerated Mahaveli Scheme and the systematic develop-

ment of what is loosely known as the Mini Hydro Potential."

"Development of hydro electricity, however, is so tremendously expensive that the resources for development of the potential outside the Mahaveli Basin has itself to be financed from sources outside Sri Lanka, since the Government alone cannot carry out the burden of such vast development programs".

The situation demands effective energy management and planning policies on a short term and long term basis. With a view to exploring and highlighting the true situation in this country a national seminar on "Energy in Sri Lanka" was held in Colombo in January this year (i) to highlight the nature of the energy crisis, its relevance for Sri Lanka, and the crucial need for energy planning at the national level; (ii) to draw out and emphasize the many relationships among different forms of energy (including substitution possibilities) by discussing all of these topics within a single comprehensive forum; (iii) to achieve a measure of self-reliance by consolidating the knowledge of Sri Lanka energy experts and by identifying national energy issues before obtaining foreign expertise to fill in the gaps; and (iv) to facilitate the exchange of ideas and awareness on energy matters among the principal policymakers, the scientific - professional community, and the concerned public. The Seminar accepted that a national energy plan (such a plan is now in existence) could clarify the long range role of the three major forms of energy or sub-sectors within the energy sector in Sri Lanka, namely; electricity, oil and traditional fuels (wood).

The following papers, selected from this seminar, (scaled down from the originals due to editorial considerations) are intended to highlight some of the important aspects of the overall energy situation, trends in the future, and possible solutions.

This Special Report is titled "ENERGY II" as this is one of the few occasions when the importance of the subject was such that the "Review" has had to deal in-depth with a topic for a second time. The first occasion when we dealt with ENERGY was in the 'Economic Review' of August 1977 when many of the basic issues connected with the local and global energy situation were discussed.

Social Factors and Production Modes in Energy Use

Susantha Goonatillake

As Sri Lanka's colonial economy evolved into plantation production in the 19th century, the energy use pattern changed significantly. Thus energy was associated with plantation production (oil for drying and running the machinery), transport of produce (by steam train and ship and later lorry) and maintaining the farm machinery in the workshops of Colombo (steam and oil power). The technological infrastructure built around the plantations intensified the energy use pattern from the traditional system. In the early phase of the plantation economy, the traditional energy sources were partially used, for example in transport of plantation produce by bullock carts, solar drying of tea, firewood drying of tea and desiccated coconut. Use of aerial tramways and wire chutes worked by gravity fell into an intermediate category.

The plantation economy brought a new social stratification. Gradually those associated with plantations adopted the technology and energy use pattern in common with some of the Europeans. The energy uses included gas and coal for cooking, rather than firewood. New domestic technology and energy use patterns resulted partly from income differences between those using the new energy sources and the majority of the population, as well as of cultural differences between the two. The growth of Colombo as an urban center helped develop transport lines based on steam trains. Although the initial transport connection was from Kandy and helped transport plantation goods, other lines were added to transport workers, vendors and customers — personnel the new urban economy demanded.

From the 1930's onwards, and especially since independence, changes in the country have increasingly integrated the colonial economy with the rest of the country. These changes included the settlement of population in new areas and the spread of commercial transactions into the rest of the country. New industries have been established apart from the colonial plantation or the traditional handicraft based ones. Dams, irrigation canals and roads have been built, or in the case of canals

and dams also partially restored. These have resulted in spilling over of the concentrated technological enclaves into the rest of the country, with attendant changes in energy use patterns. The new industries, as well as the physical infrastructure development, have helped map further some of the energy use patterns from the developed countries.

In domestic energy use the more affluent urban and rural people use electricity in place of oil as a light source, oil and to a smaller extent electricity have replaced firewood in cooking. In transport, the upper income groups use personal motor cars, the majority use buses or trains for short distances. Lower income groups use bicycles or bullock carts, although the latter is tending to fade out.

Energy use in present day Sri Lanka reflects the history of the modes of production in the country; in the case of personal and domestic energy use, the use reflects the social stratification system. The most significant uses of energy are in the dominant modes of production including the plantation sector, the industries built during the import substitution phase of post-independence growth and the new industries that developed in the post-liberalisation phase. The dynamics of the post-liberalisation phase are not yet clear. Currently, there is a shake out occurring. Some of the older industries are tending to lose their competitive edge vis-a-vis imports; certain other industries are opening up.

Firewood and other fuels associated with the traditional modes of production and the domestic use of the lower income group provide 60% of the total energy consumed in the country. Petroleum products and hydro electricity associated with the more recent modes of production and domestically with the higher income groups provide respectively 28% and 12% (Perera and Sepalage, 1979).

Commercial energy associated with the new modes of production and the domestic demands of higher income groups (who are associated with servicing the higher modes of production) gives a breakdown as follows:

Domestic Section	20%
Industries Sector	33%
Transport Sector	40%
Other	7%

(Source: Perera and Sepalage 1979)

The relative breakdown of commercial energy according to electricity, oil and coal (for the year 1975) is given below. It is noted that oil products provide almost 70% of commercial energy—

Hydro-Electricity	Oil Products	Coal
30.0	69.0	0.6

(Source: Perera and Sepalage, 1979)

Over the last two years or so, there has been a large increase of private motor vehicles at a time when petroleum prices were also increasing and countries with large motor car populations were actively attempting a shift to the use of public transport or low fuel consumption cars. Import of 35,000 motor cars over the last three years — roughly 20,000 a year — is more than twice the figure for the entire 15 year period prior to this. During the last two-year period, oil prices have more than doubled from a figure of \$12 a barrel in 1978 to over \$24 a barrel. Actual spot market prices today are nearer \$40. The gross oil bill has also consequently increased from being Rs. 80 million of the import bill before the oil price hike to nearly Rs. 3300 million for 1979 and nearly Rs. 7000 million estimated for 1980. Motor cars consume 12% of the oil consumed today and so contribute somewhat significantly to the total import bill. But although the number of cars increased, the amount of oil consumed by private motor cars has remained stable over the last decade or so. A higher car population is being used somewhat less, say 25 miles or 1½ hours per day average instead of an earlier 36 miles and 2 hours (Diandas). We are buying more cars but using them less. Car imports for 1978 (about 15,000) cost nearly Rs. 300 million rupees whilst the petrol component of the fuel bill in the same year was Rs. 450 million (Diandas 1980), giving an annual expenditure of Rs. 750 million. (Note that the railway electrification scheme costs approximately Rs. 400 million and the 60 MW gas turbine Rs. 300 million).

The local demand for cars is dependent on the number and income of the higher income groups in Sri Lanka, which in turn reflects the total GNP and the income distribution in the country.

The economic viability of a personal car is not only dependent on the capital cost but also operating. The income distribution in Sri Lanka appears to be changing towards a rise of upper income earnings. There is also evidence that the GNP itself is increasing. This perhaps indicates that the higher income groups are sharing more wealth among an increasingly smaller group. With rising petrol prices and the play of these contradictory pressures it seems likely that those who could afford personal motor cars would decrease. With the rise of petrol to Rs. 30/- a gallon, some middle group car owners dropped out of regular car use and resorted to public transport. With the next increase, the number dropping out has to increase. A considerable part of the population have addicted themselves to an expensive capital outlay and a game of unplanned obsolescence of motor cars they cannot afford to operate.

How did this irrational situation develop where we are locked into a socially undesirable use pattern? The answer lies in the actual working out of the relationships between the different modes of production (especially how and who the determinants of their economic activities are) and the relationships between the different economic and social levels of population involved in a given mode or production. The decision to liberalise imports of motor cars was presumably taken under the broad ideology of the open door policy for Sri Lanka. This also fit into the aspirations of the upper income groups who had been denied access to motor cars for some time, as a result of the enlarging of the middle class during largely the import substitution phase.

However, with the increases in oil prices there have been spasmodic efforts "to do something" with various policy decisions such as limiting imports to only low capacity cars, its apparent ineffectiveness judging from the large size cars on the roads today, the Sunday travel ban, etc. At the same time the import flow continues, oil prices continue to rise and public transport remains at a low level.

The rural sector is being penetrated by new commercial forces that are transforming the rural economy based on older traditional methods of production. Consequently new social strata are emerging who, being attached to the

new modes of production, preempt the access to resources. Therefore the next energy use aspects that I would like to highlight is the manner in which the rural sector uses energy, specifically how electrification schemes are selected. There is a new thousand-village rural electrification scheme that is to come into use in the future. Under this plan, houses and villages to be electrified are chosen through some rational criteria, the villages having been selected by a team of consultants. The general trend in actual selection for rural electrification over the last ten years or so has been done by priorities allocated by the local elected representatives. The result has been that electricity has been supplied essentially to the local elected member's sources of electoral support, namely those villages which supported the person or the social strata that helped mobilise the voters. The latter social group often were members of the rural elite and high income groups. Consequently electricity is usually provided for only a few families for whom often an expensive and uneconomic electricity supply line is provided. This pattern of domestic, small scale electrification is often at the expense of rural industries and clusters of rural poor. Supplying electricity to these groups would be more advantageous economically than supplying it to lone individuals with political influence.

Apart from this general selection policy, forces operating over nearly two decades have increased the importance of rural electrification generally in the eyes of the politicians. The importance of the rural voters and the importance of those who mobilise them have resulted in an increased demand for rural electrification, although on narrow economic terms, there is actually an uneconomical rate of return; rural electricity reaches only a narrow segment of the electrified villages.

In this note I have attempted to summarise briefly the energy demand and energy use patterns as they associate themselves with different modes of production and income stratification systems. I have also examined some of the social forces that determine two contemporary energy use situations; namely, the increased influx of motor cars and the social mechanics of rural electrification.

INTEGRATED ENERGY PLANNING - FUTURE SITUATION AND POLICY ALTERNATIVES FOR SRI LANKA

K. K. Y. Perera

The principal sources of commercial energy utilized in Sri Lanka's economy are electricity, oil and relatively small quantities of coal. In the domestic sector, in household industries and in certain small scale industries, traditional fuels like firewood and vegetable wastes are used. The consumption of energy in the main supply sources for the period 1950 to 1975 is given in the following tables 3:

TABLE I

Energy Consumption in Sri Lanka 1950-75 (in primary units)

Year	Electricity (hydro electric) (G Wh.)	Oil products ('000 tonnes)	Coal & Coal products ('000 tonnes)
1950	46.0	206.0	293.0
1960	257.7	535.0	256.3
1965	309.7	620.1	136.7
1970	624.9	893.0	25.0
1971	703.6	852.0	15.5
1972	732.2	924.0	12.0
1973	627.8	963.4	10.0
1974	880.7	764.6	10.0
1975	965.8	731.2	10.0

TABLE 2

Energy Consumption in Sri Lanka 1950-1975 in common units of measurement (Gwh. e.r.)

Year	Electricity (Hydroelectric) (Gwh.e.r.)	Consumption of Oil Producers (Gwh.e.r.)	Coal & Its Products (Gwh.e.r.)	Total Commercial Energy Consumption (Gwh.e.r.)
1950	46.0	618.0	549.4	1213.4
1960	257.7	1605.0	480.6	2343.3
1965	309.7	1860.3	256.3	2426.3
1970	624.9	2679.0	46.9	3350.8
1971	703.6	2556.0	29.1	3288.7
1972	732.2	2772.0	22.5	3526.7
1973	627.8	2890.2	18.8	3536.8
1974	880.7	2293.8	18.8	3193.3
1975	965.8	2193.6	18.8	3178.2

This table is built up from Table 1.

Conversion factors are (a) '000 tonnes of oil products = 3 Gwh.e.r.

(b) '000 tonnes of coal products = 1.875 Gwh.e.r.

The relative share of different fuels in the total commercial energy consumption in percentage is given in Table 3.

If the energy consumed in different forms is brought down to a common unit it is found that in the

TABLE 3
Percentage Share of

Year	Electricity (Hydel)	Oil Products	Coal
1950	3.8	50.9	45.3
1960	11.0	68.5	20.5
1965	12.8	76.6	10.6
1970	18.6	80.0	1.4
1975	30.4	69.0	0.6

year 1977, the total energy requirements of 10 TWH were met by pet-

Total Demand on Energy Generation upto 1990

	Generation Demand	Consumption Total
1985	2796.1	2431.4
1986	3100.5	2696.1
1987	3437.7	2989.3
1988	3812.0	3314.8
1989	3679.5	4231.4
1990	4092.9	4706.8

TABLE - 4

Electrical Energy Consumption and Requirements in Gwh Expected for the period 1979-1984

Class of Consumption	1979	1980	1981	1982	1983	1984
Domestic	116	124	133	142	153	153
Industrial	715	812	209	1018	1143	1284
Other	490	539	596	677	757	839
Total consumer demand	1321	1475	1638	1837	2053	2286
Total demand on Generation Gwh	1508	1685	1866	2089	2319	2592
Total demand on Generation MW	307	338	367	411	456	510

roleum products 28%, hydro electricity 12%, and firewood and other fuels 60%.

In arriving at the above forecasts, the requirements of large industries schedule up to 1980 have been taken into consideration individually. For the existing industries, a 25% increase in consumption over 1976 consumption has been applied to account for working at increased capacity. Consumption of the new large industries scheduled for after 1980 has been assumed to increase at the rate of 15% from 1981 to 1984. The rates of growth adopted for the other significant consumption sections over the period 1979-1984 are: domestic sector 7.07%; small and medium industries sector 7.57%; commercial sector 8.0%; and bulk supply sector; 6.0%.

For the longer term demand prediction, regression analysis using GDP growth rate of the different sectors of the economy had to be used. Based on this the total demand on energy generation until 1990 are predicted and given at top right. The GDP growth rates assumed are, manufacturing and mining 8.1%, agriculture 1.9%, transport and other sectors 5.5%. A population growth rate of 2.0% per annum also has been assumed.

Consumption of Energy- Projected

Table 4 above shows the electrical energy consumption pattern expected over the period 1979 to 1984.

Predicted Consumption of Oil Products

The predicted estimate of consumption of oil products given is as follows.

importance to Sri Lanka is its hydro power potential. There are 103 rivers and streams mainly originating from the central hill country, each having varying drain-

TABLE 5

Product	Estimate of Consumption of Oil Products		
	Actual consumption in 1976 in '000 tonnes	Predicted rise in growth of consumption per annum	Predicted Consumption in 1982
Gasolene	101.4	4%	128.3
Kerosene	206.7	7%	310.0
Auto-diesel	257.6	10.2%	461.4
Heavy diesel	33.0	—	50.0
Furnace Oil	126.2	6%	219.0
Total:	724.2	8.2%	1168.7

A more recent prediction, taking into account the effects of price elasticity, is given below.

square kilometres. The total annual rainfall over the entire island is estimated to be 107 million acre

TABLE 6

Projected Oil Products Requirements in Sri Lanka in '000 Tonnes (1979-1990)				
Year	Industrial Heavy		Transport, Petrol & Auto Diesel	Total
	Domestic Kerosene	Diesel and Furnace oil		
1978	234.2	240.225	422.599	897.024
1979	212.4	207.209	329.579	749.188
1980	188.6	215.354	339.084	743.038
1981	194.0	224.234	348.904	767.138
1982	199.8	235.774	358.993	792.567
1983	205.9	244.106	369.391	819.397
1984	211.9	255.380	380.077	847.357
1985	218.1	267.756	391.055	876.911
1986	224.8	281.198	402.318	908.316
1987	231.4	295.689	413.064	940.953
1988	238.2	311.638	425.684	975.522
1989	245.5	328.846	437.767	1012.113
1990	252.3	347.556	450.105	1049.961

FUTURE DEMAND FOR FIREWOOD

It is difficult to give yearly estimates for the consumption of firewood, because the figures have been arrived at indirectly. It is however estimated that the annual demand for firewood would have increased from 3.4 million tons in 1970 to about 4.5 million tons in 1978. The pattern of use of firewood in the future cannot be predicted but can be influenced by such steps as restrictions on felling of trees and clearing of jungle areas. In particular, the introduction of more efficient firewood cookers can reduce the per capita consumption of firewood from 1/3 to 1/2 of the present usage.

ENERGY RESOURCES

Hydro Electric Energy

The most predominant commercial energy resource of substantial

age areas varying from 10 to 10,000 per foot. A total of 329 MW of hydro power with an annual energy capability of approx. 1500 Gwh. has been presently developed. The technically attainable and the economically feasible hydro power potential as reported in the UNDP/FAO 'Mahaweli Ganga Hydro-Power Survey' 1968 when updated considering the recent developments indicate 2000 as the total power potential and 6600 Gwh the total energy capability from medium and large hydro power plants.

Coal, Oil and Natural Gas

There are no known coal, oil, natural gas or similar resources in Sri Lanka. Approximately 3 million tons of peat have been discovered in the neighbourhood of Colombo city. The extractable quantity of peat in this area has been estimated to be equivalent to 2 mil-

lion tons of peat with a calorific value of 2600 Kcal/kg. Other peat deposits may exist but have not been identified and evaluated.

Nuclear Resources: Monazite sands found in certain parts of Sri Lanka contain uranium and thorium ore in the form of oxides to the extent of about 10 per cent thorium oxide and 0.1 per cent uranium oxide.

Firewood: Firewood and agricultural wastes constitute a major energy resource for Sri Lanka. The area under forest in Sri Lanka is roughly 60,000 hectares under proclaimed forests and a similar area of proposed reservations and about 1.8 million hectares under other crown forests. A major portion of firewood is supplied by the rubber plantations which becomes available due to re-plantation of rubber cultivations considered under a Government subsidy scheme. Substantial amounts of firewood are also supplied in the form of wood wastes from saw mills, paddy husks and from wastes available from coconut plantations and tea plantations.

ANIMAL AND VEGETABLE WASTES

Animal wastes, primarily cow-dung is available in the major cattle breeding areas in the Northern and Southern parts of the country. Cow-dung is not burnt as an energy source in Sri Lanka. However, it could be very economically used to produce biogas as an energy source for certain limited applications, and composted manure through anaerobic fermentation. Large volumes of biogas could be produced by using animal wastes supplemented with other vegetable wastes available in substantial quantities throughout the country.

Solar Energy and other Renewable Resources: The near equatorial position of Sri Lanka and the very topographic nature of the island guarantees the availability of high solar insulations and reliable wind regimes throughout the year.

There is also energy available to be exploited in the ocean waves and in the thermal gradient of the warm tropical sea surrounding the island. There are no known areas for geothermal energy of any significance and the tidal energy is quite diluted.

Policy Alternatives for Sri Lanka

It would be seen from the above that the commercial forms of energy resources available in Sri

Lanka, which can readily be made use of, are quite limited. Hydro-electric energy resources form the major commercial form of energy that could be developed in the foreseeable future. The hydro electric resources themselves are limited; even if all potential hydro electric schemes are developed, they would be adequate only to meet the naturally rising electrical demand up to about 1994 or so. Development of hydro-electric energy is also a very expensive process; the per kilowatt cost of installation of hydro-electric plant along with associated dams, tunnel etc., is in the region of Rs. 20,000/-. A substantial portion of the funds is required in foreign exchange and has to be paid back to the donors with interest. Hence hydro electric energy, although indigenous, bears a significant foreign exchange component.

The use of firewood for non-commercial energy is seen from the above to be quite widespread. In fact it would be seen that presently about 60% of all energy consumption in Sri Lanka is met out of firewood. Although felling of trees is necessary for the production of firewood, if undertaken on a properly planned programme along with reafforestation, use of firewood is not something to be highly discouraged. In fact the introduction of a suitable firewood cooker which can be used in practically all homes can cut down the use of firewood to less than 35% to 50% of the present consumption. With a proper strategy combining reafforestation and economic use of firewood, the majority of the cooking needs could be met using this form of energy for the next 10 years or so. It must be remarked that firewood is a replenishable form of energy, the energy really derived from the sun.

Oil and coal are imported energies and unless the on-going exploration programmes show significant quantities of these, the use of oil and coal will have to be discouraged in selective spheres. It is likely that oil will become more and more expensive and differentially more expensive in relation to coal. Hence for certain applications such as for large thermal power stations which may be required in the nineteen nineties, coal will show better prospects.

The other renewable sources of energy such as from wind, solar, bio-gas, etc., can be used increas-

ingly in the coming 10 years for limited applications. Although this may not create a significant dent in the extent of commercial energies used, the use of these energies should be encouraged with a view to arresting the need for expensive use of commercial energy where possible.

Summary

The following summarises some thoughts for policy considerations.

(1) Economic use of energy should be encouraged

For example, fluorescent lighting uses 25% to 30% of the electrical energy needed for comparable lighting using incandescent bulbs.

(2) Waste should be reduced

Operationally, switching off of street lights at the correct time, idle motors in factories etc., are examples. In design, proper natural lighting, sound, ventilation for houses, factories, commercial establishments etc. are required.

(3) Energy appropriate to each demand.

Although there will be exceptions, the following are generally suggested:

(a) Electrical Energy

The use of electricity should be encouraged in general for motive power and for transport purposes in urban locations. Electrification of factories such as in tea, coconut and rubber, should be encouraged to reduce the consumption of diesel oil. These can go on progressively particularly because of the fact that after 1983, adequate supplies of hydro-electric energy are likely to be available until at least 1989 due to the commissioning of Kotmale, Victoria, Randenigala, Samanalawewa and other hydro-power projects. However, the electrification of railways should be undertaken with appropriate planning and caution; thus if the initial work in relation to this commences during 1980 it would be about 1983-84 by the time Sri Lanka can have its first electric train running. This would also match

with the availability of adequate hydro-electric supplies.

The use of electricity for the purpose of heating and particularly for domestic cooking should be discouraged. This is because of the high capital cost required for electrical generating plant, transmission, distribution, etc. To support a single one kilowatt hot plate using hydro-electric plants, it may require as much as Rs. 20,000/- of investment in the above, particularly because most people use electric hot plates during the peak time of about 7 o'clock in the evening. Also during the period from 1980 till about 1984, the hydro-electric energy available in general would not be adequate to meet the demand for electricity consumption. This means that electricity using imported oils will have to be utilised for supplying additional loads coming in. Thus to support the generation required for a hot plate, fuel oil will have to be burnt at a power station at approximately one third efficiency. It would be more logical to use the fuel oil directly in an oil burning cooker.

(b) Firewood

For a majority of cooking needs, more efficient domestic cookers should be popularized. Suitable reforestation programmes are needed. (The alternative of electrical energy for cooking needs should be discouraged).

(c) Oil and Oil products

For industrial heating and for general transport needs, use of oil will have to be continued. Limitations on private travel by pricing or other methods will be required. (Coal may be reintroduced for specific applications.) Oil exploration should be continued.

(d) L.P. Gas

For limited urban domestic cooking, industrial and commercial uses.

MAJOR HYDRO POWER DEVELOPMENT

P. N. Fernando

Major hydro power development sites are located on the Mahaweli Ganga and its tributaries, Kelani Ganga, Walawe Ganga, Kalu Ganga, Gin Ganga and the Nilwala Ganga.

The Mahaweli Ganga and its tributaries provide some of the

best sites such as Kotmale (225 MW, 376 GWH) Victoria (210 + 210) MW, 686 GWH). Randenigala (122 MW, 686 GWH) and Rantambe (49 MW, 158 GWH) which are due for commissioning under the Accelerated Mahaweli. The most promising remaining sites are located on the Kotmale Oya, Amban Ganga

(e) Mini-hydro

The use of Mini-hydro power plants should be considered in its proper place and perspective. A recent assessment has indicated that the total mini-hydro potential available in the country is in the region of only 75 Megawatts. To obtain this, 75 MW several hundreds of small sites will have to be developed. It would thus never replace the requirement for major hydro, whose potential is estimated to be in the region of 2,000 MW. However, where found economical and suitable for the particular location and environment, mini-hydro power

sions to be taken later based on further research and development study.

(j) Nuclear power: to be reviewed in about 2 years for possible uses in the 1990's.

It is clear that during the next ten years or so, firewood, electrical energy and oil products would continue to dominate the energy usage field in Sri Lanka. Proper pricing, education and propaganda, physical constraints and other technical controls will have to be used to modify energy usage in keeping with the ideas expressed above. To specify optimum targets for the different types of energies is difficult. A tentatively suggested set-of targets for the major energies are given below.

Year	Firewood Gwh. electrical equivalent (%)	Oil Products Gwh. electrical equivalent (%)	Electricity Gwh. (%)	Total Gwh. elect. equivalent (%)
1977	6000 (60%)	(23%) 3150	(30%) 4093	(100%) 13613
1990	6370 47%	(28%) 2800	(12%) 1200	(100%) 10000

plants may be developed.

(f) Solar - photo and volta applications

Small houses with very small electric lighting requirements may find this useful in coming years. Five fluorescent lamps each of 6 W capacity may require a total capital of only Rs. 5000/- to cover the cost of solar cells, batteries, invertors, wiring, etc.

(g) Limited use of wind power: for water pumping in irrigation, etc.

(h) Bio-gas: Limited use for heating and lighting needs depending on location.

(i) Fuel alcohol and ocean thermal energy: Deci-

These figures do not include solar-electric, bio-gas, wind and other forms of energy expected to play a minor role.

The above is consistent with the hydro energy resources which should be rapidly developed, and the desirability to shift certain types of energy consumption, from oil to electricity. It is also consistent with the power potential of the accelerated Mahaweli development and other hydro-power programmes now under way. It also takes into account the fact that the per capita firewood consumption for domestic cooking needs can be reduced to less than half. However, it is only a very tentative proposal, which must be further studied and modified. Further, it would need periodical modification and updating depending on local and international developments.

and the Uma Oya.

With the completion of the Canyon power plant the Kehelgamu-Maskeli Oya development on the Kelani gets completed. However, some development is possible downstream of Polpitiya.

The well known Samanala-wewa project located on the Walawe Ganga is one of the best projects with a possible power output of 180 MW, firm energy of 400 GWH and considerable secondary energy. This project is best implemented soon after the Accelerated Mahaweli power projects.

Another very attractive power project is the Kukule on the Kalu Ganga with around 100 MW of power and 445 GWH firm energy. This has to be given priority for commissioning in the early 1990s.

Annex (1), gives a summary of the major hydro potential (882 MW, 3073 GWH) which could be developed in the future after the Accelerated Mahaweli power projects. The power and energy capabilities indicated are tentative and are based on existing preliminary investigations. The power capabilities in particular could be increased when feasible to provide peaking capability for the system because hydro plants are eminently suitable for peaking purposes. The major hydro electricity potential in Sri Lanka, including those already developed (329 MW, 1500 GWH) and those being developed (676 MW, 1838 GWH) then, amounts to around 1900 MW, 6400 GWH.

PROSPECTS FOR MINI HYDRO POWER DEVELOPMENT

Mini-hydro projects fall into two usual categories. Namely, the run of the river plants at water fall sites and storage plants at dam sites. In a recent study the promising water fall sites and the location of possible small scale storage schemes in the Wet Zone were identified. The relatively large existing Dry Zone reservoirs and proposed irrigation reservoirs where mini-hydro potential could be developed were also located. In this study around 70 water fall sites, 20 mini dams in the Wet Zone, 30 existing irrigation reservoirs and 30 proposed reservoirs in the Dry Zone were identified. The total potential from these sites is of the order of 95 MW at 395 GWH on a rather optimistic basis.

Considering the very large amount of work involved in these numerous projects, it would take

a considerable length of time for their realisation. Therefore, from the point of view of impact on the national energy problem their contribution would be extremely small. However, it is recommended that the more beneficial mini-hydro projects should be implemented and, wherever it is economically and technically possible, the

power developed should be injected to the national grid. An application diagram for choosing suitable turbines for mini-hydro projects is shown in Figure (2). The tube and bulb turbines in particular are now available in attractive packages which could be installed with a limited amount of civil engineering work.

Annex (1) ESTIMATED POWER AND ENERGY FROM THE FUTURE MAJOR HYDRO DEVELOPMENT SITES
(The estimates are subject to revision after detailed studies)

Cascade and Power Plants	Installed Power (MW)	Annual Energy (GWH)
1. Mahaweli Ganga (Main River) Cascade		
Rozella	2.6	7.4
Trafalgar	9.5	34.2
Carolina	12.5	42.9
Koladeniya	6.0	22.8
Ulapane	21.0	59.6
Hololuwa	17.3	60.4
Sub Total	68.9	227.3
2. Kotmale Oya Cascade		
Agra	5.1	20.0
Tillicoultry	11.4	40.7
Talawakelle	40.0	132.0
Yoxford	43.5	138.8
Palmerston	2.2	5.6
Sub Total	102.2	337.1
3. Amban Ganga Cascade		
Kiula	22.3	98.9
Makeliwewa	15.0	68.2
Kumbaloluwewa	40.0	151.2
Moragahakanda	40.0	150.0
Sub Total	117.3	468.3
4. Uma Oya Cascade		
Bomurella	6.5	27.5
Puhulpola	7.3	22.3
Ettampitiya	22.1	70.4
Upper Uma Oya	25.5	100.4
Dematepelessa	21.5	85.5
Lower Uma Oya	30.0	117.7
Madulu Oya	6.9	26.2
Needankanda	5.9	24.3
Sub Total	125.7	474.3
5. Badulu Oya and Loggal Oya Cascade		
Andeniya	14.1	35.2
Kalawelpota	6.1	14.6
Taldena	14.5	49.9
Pallewela	10.0	36.3
	44.7	136.0
6. Other tributaries of the Mahaweli	43	140
7. Kelani Ganga		
Below Polpitiya	15	80
8. Kalu Ganga		
Kukula	100	445
Ratnapura	20	82
9. Walawe Ganga		
Samanalawewa	180	400
10. Kalu Ganga, Gin Ganga and Nilwala Ganga		
Jasmine Complex	65	283
TOTAL	881.8	3073.0

Thermal Power with

E. Carlo Fernando

Sri Lanka's electrical energy will be met mostly by her hydropower resources until the 1990's. After that, the development in this source of energy will be slow due to

— limited potential in this resources;

— restricted speed for irrigation development in the multipurpose projects (caused by constraints posed in the fields of manpower, organisation and management, timely preparation of studies, social infrastructure and settlement;

— slow progress possible in installing numerous medium hydropower plants; and

— the minute contribution our mini-hydropower plants can make in this respect.

If the CEB's demand curve grows at 10-11% per year, the total energy demand will be about 14,000 million kwh units in the year 2000.

This is particularly true in the context of the accelerated Mahaweli Programme, the Free Trade Zone and the increased industrial activity in the island, and also in view of diminishing oil supplies and their resulting high costs together with the changing over of oil operated machinery, transport and urban cooking to electricity.

Assuming hydropower development is in the range of 5,000 million units by that time, the alternative energy requirement is (14,000 - 5,000) 9,000 million kwh units. Even if a lower growth rate is assumed and the alternative energy requirement will be say 6,000 million kwh units, a power plant of about 1,000 MW is required to provide this energy.

FIREWOOD

By the year 2000, the population is expected to be about 20 million. This large population in this small island will need energy to cook their meals. Already our forest reserves have been depleted on a large scale to grow food. If our forests continue to be cut down to meet the firewood requirements of the increase in population, the forest cover is bound to reach a dangerously low level, making the country barren. If energy is not provided to meet at least some percentage of the cooking requirements of the population, trees will continue to be felled

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Imported Coal for the 1990's

at an undesirable rate, with disastrous ecological results.

Now, very high level priority is being given to afforestation. But two tree planting campaigns (though these were sponsored at the highest level), have to all practical purposes been complete failures. So we have to be cautious about plans to meet energy requirements for cooking by firewood. As an Indian official has aptly put it "even if we somehow grow enough food for our people in the year 2000, how in the world will they cook it."

It is said that 62% of the total energy consumption in the country is met by firewood and more than 90% of the population still use firewood for cooking purposes. So, to sustain a large population, large blocks of alternative energy are required if the country is to be saved from soil erosion, increasingly severe flooding, expanding deserts and declining soil fertility as has already occurred in some parts of the world. Already the increase in kerosene prices to Rs. 10.70 a gallon (now Rs. 13.63) is moving the people toward electrical cooking.

To meet these large blocks of energy demands, any thought of developing alternative sources like solar, wind, bio-gas, tidal waves, ocean temperature gradient, geothermal is not the answer. None of these sources have been technologically developed to meet our requirements. Even mini-hydro could solve only a minute fraction of the problem.

All the high hopes regarding these sources of energy will end up in the same way in which Sri Lanka planned for 7 years to sell power to South India. If we plan to depend on these sources we will finally have to end up having to install gas turbines fuelled with oil in an oil-starved world.

NUCLEAR

At the present level of power development in the international field, and taking the oil crisis as well into account, to produce base load energy of the magnitude required in Sri Lanka in the 1990's, coal is the only likely source available. Advanced countries which hold a monopoly over nuclear technology have raised the cost of nuclear power from small power plants to be on a par with oil. Thus, at today's costs the economical nuclear

power plant is in the order of 600 MW. This coal proposal is an alternative to nuclear and not to oil, as oil is not being considered at all.

The shortage for an alternative source of energy will start in the late 1980's at, say, zero and develop to 6,000-9,000 Gwh units in the years 2000-2005. In power systems, the largest set has to be within 15% of the load in the system. This, following the high growth rate of 10 to 11% per year, will be 1,000 MW in 1990, 1,600 MW in 1995 and 2800 MW in the year 2000. The economic size of a nuclear set according to today's costs is said to be 600 MW; 15% of 2,800 MW is 420 MW. So even by 2000 a 600 MW set will not fit into Sri Lanka's power system. Moreover, by that time the economical size will not be 600 KW but will be considerably larger. This means nuclear power has to be ruled out in Sri Lanka in this century.

When dealing with this subject we should realise that Sri Lanka's power system is very small and we should not imitate those giant power complexes in the advanced countries, in planning. Even in Taiwan, the installed capacity today is 8,000 MW whereas it is only 300 MW in Sri Lanka. Taiwan is only one half the size of Sri Lanka.

The development of alternative energy has to take place in stages in the order of, say, 250-300 MW at each stage, and this should develop to about 1,000 MW by 2000. For such progression at the present level of power development in the international field, coal is the only source available.

The recent accident at the Three Mile Island Nuclear Power plant in Pennsylvania USA, which reached near crisis proportions, clearly shows the need not only for extremely advanced technology and high precision maintenance but also for a great deal of precaution. This should make us aware of our very scant knowledge of nuclear technology, our sloppy maintenance of machinery and the generally careless, off-hand manner of our equipment and plant operators. The population of our whole island (an area of 25,000 sq. miles) could be severely contaminated with radioactive elements, if such an accident were to occur here.

The question in the case of an accident is where can the population be evacuated in this small island. Here we should note how efficient our fire brigade has been. The fire at the milk factory at Welisara was smouldering for nearly a month.

COAL

Sri Lanka has no coal and thus a thermal power plant fuelled with imported coal has to be planned. Although a 1,000 MW installation is required in the year 2000 or so, the first stage (250 MW) will have to be commissioned in the late 1980s. Even in advanced countries, for a power plant of 1,000 MW fuelled with local coal, the lead time necessary for planning, design and construction activities is about 10 years. So, in the case of Sri Lanka, a developing country where coal has to be imported, it is already rather late as the required lead time which will apply, possibly about 15 years, has already been cut into, with no steps in this respect taken at all so far.

The design of the power plant has a very strong bearing on the type of coal. So the power station has to be tied up with a particular coal mine. To change from one type of coal to another, the power station has to go through major changes involving about 30% of the cost of the power plant. In this respect, as Sri Lanka has no coal, it has to be imported. First, she has to negotiate with countries like India, Australia, China with large coal reserves and has to sign an agreement for the supply of coal from a particular mine to the power plant for a period of about 30 years, the life of the plant. Some of these countries are eager to enter into long-term agreements to supply coal. Such an agreement is undoubtedly an advantage to us.

This involves an international agreement and it will take a fairly long time to weigh the pros and cons before a settlement can be reached. In some instances a new mine has to be surveyed and planned. Opening a new mine to produce 10,000 - 30,000 tons of coal a day is in itself a vast problem. If they are open cut projects as found in Australia for brown coal, it occupies some thousands of acres.

Next, the transport from the mine to the harbour in that country and from there to Sri Lanka

has to be looked into. Coal required for a 1,000 MW power plant is in the order of about 10,000 tons of coal per day of superior quality, enough to fill a freight train more than a mile long. In the case of inferior coal this requirement can be about 30,000 tons per day. As the coal will be transported in ships, the best location for the power plant is by a harbour. The power plant can be located by an existing harbour or by a harbour which has to be constructed for this purpose. This will eliminate costly land transport and double handling.

Apart from eliminating the costly land transport of coal by incorporating the harbour and the power plant together, its vicinity to the sea solves the large cooling water requirements of thermal power generation. So, in Sri Lanka's case where coal has to be imported, siting the power station by the sea with harbour facilities will serve a dual purpose, eliminating costly land transport and also eliminating complicated problems involving cooling water requirements.

Following the main guidelines regarding installing a large power plant fuelled by imported coal, as pointed out above, a suitable site for such a plant is in the vicinity of the harbour at Trincomalee. Here a large natural harbour lies idle. Vast un-built-up areas of hard laterite soils suitable to receive heavy loadings of between 20 to 60 foot contour are available. However, Trincomalee is some distance away from the load centre, the Colombo area.

But here in Colombo new harbour facilities will have to be provided and suitable un-built up areas are not available. Pollution in the metropolitan area will be an added problem. In this case power transmission has to be weighed against the provision of new harbour facilities and the acquisition of vast areas of built up land required for the project. Trincomalee is suitable for further power plant extensions say for another 1,000 MW as the need arises.

In the case of a 1,000 MW power complex fuelled by imported coal the area of affected land may be some thousand acres. Large areas are necessary for coal storage reserves to meet a few months supply in case of a break down in supply lines due to strikes, war and the like. Added to these, dis-

RURAL ELECTRIFICATION

Mohan M. N. Wirasinha

Sri Lanka consists of about 25,000 villages, of which a little over 2,000 have so far been electrified. This amounts to about 8 percent of the villages and 5 percent of the rural population. The Ceylon Electricity Board is solely responsible for the construction of rural distribution lines and electrifies about 250-300 villages a year, catering for about 10,000 rural households. Against this spread of electrification, over 30,000 new households come into existence each year due to population increase.

posal grounds to receive wastes have to be provided.

The problems involved in siting and planning a 1,000 MW power plant are very complex indeed. It is not a matter for one or two individuals. Only a firm of consultants well experienced in this specialised field could prepare a worthwhile feasibility report on this project taking into account all multi-disciplinary and long-term aspects.

While planning for a 1,000 MW power plant, it would be prudent to leave provision for an extension of a further 1,000 MW to make use of the same harbour facilities. Trincomalee is suitable for such an extension of the power plant.

IMPLEMENTATION

A 1,000 MW plant's total coal requirement during a period of 30 years will range from about 100 million to 250 million tonnes depending on the grade of coal. In a case like this, a new mine has to be explored, developed and kept reserved for this plant. The power station has to be sited simultaneously, with harbour facilities and transmission factors taken into account. The first set will have to be commissioned by about 1988 or 1990. The development of the mine, the construction of the harbour, railways if necessary, and that of the power plant, will take a minimum 5 years. That means the construction will have to start in 1983-85. Thus, we are left with only 4-5 years to negotiate long-term international agreements, plan, design, seek finance, prepare contract documents, call for bids and start construction.

Thus, the number of households remaining unelectrified is increasing over time. Where electricity is not available, the alternative source of energy for lighting is kerosene and for industrial motive power diesel or kerosene. It is thus reasonable to assume that with the ever increasing price of petroleum products, the urge to electrify more households each year will be greater.

History

Until the early 1960's rural electrification (RE) was mainly undertaken by the village councils. Funds were set aside from the councils own resources and supported by grants and loans from the Central Government. The Government first made provision for RE in 1955-56 under the Reserve Extension and Renewal funds of the Department of Government Electrical Undertakings (D.G.E.U.) The qualifying criterion for village electrifications then was a 20 percent annual return. (annual revenue as % of capital cost) if funds were obtained through loans; and a 12 percent return if funds were generated from its own resources. In 1961, a rural electrification project called the "fifty village scheme" was started, the financing was to be Rs. 3.26 million of the D.G.E.U.'s own funds and Rs. 1.73 mn from the PL 480 Loan. This was subsequently withdrawn after utilisation of Rs 400,000 and after the United States Government withdrew the PL 480 loan facility. For these schemes the annual rate of return was fixed at 5 percent. In 1968 a RE Project called the "Five Hundred Village Scheme" was started by the Government, for schemes that were to be approved by the Minister of Irrigation Power and Highways. The criterion for acceptance of schemes was fixed at a 12 percent return. This procedure was adopted until 1976, except that in addition to the 500 villages already selected, special schemes were approved by the Minister which came up to the criterion of 12 percent.

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In 1976 these criteria were revised to 5 percent annual return on overall cost and 12 percent return on LT line cost, as at that time most schemes could not come up to the criterion of 12 percent on overall

ble to find any scheme giving an overall return of more than 4 percent (For example, a quarter ml. single-phase extension would require about 30 houses of average consumption to be connected to give a re-

venue from that RE scheme is not enough to meet the operations and maintenance cost. However, the Government gains mainly by way of the reduction in the subsidy of kerosene and diesel resulting from the changeover, to electricity and also by way of the BTT and taxes imposed on the sale of materials used in RE work. The consumer gains by way of an overall reduction in his energy bill. The surplus monetary benefits to the Government and the consumer are very much greater than the loss to the CEB and therefore it is clear that even though RE is not profitable to the CEB, it is economically profitable to the Government.

From a Government point of view the social benefits of rural electrification can broadly be summarised as follows:

- (a) It discourages population converging in the cities and thus relieves housing and other associated urban problems.
- (b) It provides an environment about equal in comfort and convenience to that enjoyed in the cities and this encourages rural welfare.
- (c) It encourages the establishment of factories in the rural areas where cheap labour and raw materials for particular industries are available.
- (d) It provides power and incentives to develop cottage industries.
- (e) It helps raise the standard of living in rural areas by providing additional employment opportunities for people living in rural areas.
- (f) It provides electricity for lift irrigation, especially in the arid zone.
- (g) It helps increase agricultural production by farm mechanization and intensive cultivation.

Even though these are significant benefits socially, since they are unquantifiable, it is not easy to give them a value in a cost-benefit analysis. In the survey done by Tata consulting engineers, these benefits have come out in terms of increase in labour productivity, extension of work

FINANCING OF R.E. SCHEME

No. of RE Financial Provision Rs. Million

	Schemes executed.	Grant, Govt.	DCB	CEB	Total	Total Expenditure.
1972	59	—	—	4.5	4.5	5.08 M
1973	66	12.0	—	18.5	30.5	6.37 M
1974	101	10.0	—	19.5	29.5	9.30 M
1975	116	10.0	—	10.8	20.8	12.84 M
1976	168	15.0	9.1	17.5	41.6	18.47 M
1977	166	5.0	31.4	20.0	56.4	23.83 M
1978	272	—	67.7	—	67.7	34.76 M
1979 (Up to Aug.)	281	20.0	62.82	—	82.02	52.2 M

cost. The reason was that construction costs had gone up drastically each year while the tariff had remained constant since 1972. From the end of 1976 the "Decentralised Budget" (DCB) funds were used for rural electrification as well. The procedure was for an MP, after identifying the desired RE Scheme to transfer the required funds from his DCB allocation to the CEB. After the DCB funds were allocated to the CEB, the Central Government's grant to the CEB for RE got progressively reduced after 1976. The table above shows how the funding of rural electrification took place.

Costs

One of the major hindrances to rural electrification is the high cost of construction. This has a direct bearing on the financial return and it has become almost impossi-

The Standard Construction Costs for 1979 are as follows.

CONSTRUCTIONS COSTS — 1979 R.E. WORKS

	1 ph.	2 ph.	3 ph.	33 kV	11kV	HT
(PER/KM)	64,600	71,600	787,00		78,00	72,200
7/110 (-PER/AL)	103,360	114,560	125,900	7,102	124,800	115,520
7/134 (-PER/AL)	108,00	121,600	84,500		102,600	96,800
(-PER/KM)	67,500	76,000	135,200	7/161	164,160	154,880
33/LT S/S	11/LT					
61,300/-	50	46,600/-				
70,000/-	100	54,600/-				
84,800/-	150	71,200/-				
125,200/-	250	105,500/-				
154,800/-	400	129,800/-				
175,000/-	500	156,500/-				

ternal wiring and his monthly bill of electricity consumption.

Benefits

Electrifying rural areas is in general, a loss to the CEB, even if the initial capital cost of the scheme is given as an outright grant to the CEB. The

WORLD OIL OUTLOOK

S. Sivasundaram

Why is petroleum used more than other energy resources? It is because petroleum is superior in economy. Economy of an energy is determined in terms of quality, quantity and price. Since the latter half of the 1950's when a large quantity of petroleum started to be produced in the Middle East, petroleum has decreased in price and come into top position among the energy resources in use. Hence, society changed toward mass petroleum consumption. The world had become unable to be kept up without cheap petroleum. Meanwhile the crisis situation developed in the Middle East and the price of petroleum soared, bringing about confusion in the world economy and the start of the energy crisis. In other words, the substance of our energy problems can be summarised as the petroleum resource problem. It resulted because the world eco-

nomy depended too much on cheap petroleum. The energy crisis does not mean that energy resources ran dry suddenly, but it means oil consuming nations were no longer able to get oil at low prices.

period, possibility of more effective mass media, and greater social benefits.

Future Rural Electrification

The Central government last year felt that the cost of constructing electricity lines is far too great to be met to the DCB and, hence, decided to request the Asian Development Bank (ADB) to finance a rural electrification project. The ADB in turn appointed Tata Consulting Engineers to formulate such a project. Consequent to this, a RE project of 1,150 villages will be financed jointly by the ADB and OPEC. The foreign cost of this project is 15.3 million dollars (to be financed by the ADB, 9.3 M.US \$) and OPEC (6 M. US \$), and the local component of 16.5 million dollars will be given by the Central Government, on a grant basis to the CEB. The proceeds of the loan, too, will be given as a grant to the CEB by the Government.

The project will commence towards the end of 1980 and be completed towards the end of 1983 or the beginning of 1984. It consists of 210 KM of 11 kV and 670 KM of 33 kV Transmission Lines 5,140 KM of 415 V distribution lines and 910 consumer substations catering

to 57,500 consumers.

The Tata Consulting Engineers further point out that there is no financial return on RE but only an economic return by way of saving in kerosene to the Government and thus justified the electrification on the internal economic rate of return (IERR). The 1,150 villages have an IERR greater than 16 percent. The consultants further showed that there is an operating loss to the CEB of rupees 44 million over the (1980-84) period and the CEB has requested the Central Government to give this amount as an outright grant per year to the CEB.

The perennial problem that any government faces in the provision of Rural Electrification is to decide whether the channelling of development funds are best utilised for this purpose. One has to decide whether channelling this amount of money for other basic requirements like fertilizer, would give a better cost benefit ratio and be more beneficial to the masses. However, with the income disparity between the urban and rural population fast closing, there has been a marked increase in demand for rural electrification in recent times.

CAUSES OF OIL CRISIS

Maldistribution of Petroleum.

- 50% of the world's oil deposit is in the Middle East.
- 67% of the world's oil export is from the Middle East.

Thus, oil producing areas and consuming areas are unevenly distributed, making the world's economy uneasy.

TABLE I
Production and Consumption of Oil in the World — 1978
(in million barrels per day)

Region	Production	Consumption	Difference
US and Canada	11.84	20.18	- 8.34
Latin America	4.965	4.19	+ 0.775
Western Europe	1.82	14.6	- 12.78
Middle East	21.29	1.655	+ 19.633
Africa	6.115	1.24	+ 4.875
Asia	2.41	2.0	- 0.41
Japan	0.01	5.42	- 5.41
Australasia	0.45	0.8	- 0.35
U.S.S.R.	11.705	8.385	+ 3.32
Eastern Europe	0.43	2.070	- 1.64
China	1.93	1.705	+ 0.225
TOTAL	62.965	62.245	
TOTAL OPEC MEMBERS:- 30.155			

The above Table I shows the production and consumption of oil in the world in million barrels per day.

Limited Oil Deposits

Knowing the deposit level of oil resources and the yearly amount of oil production/consumption is very important to achieve an understanding of the real energy crisis.

The following Table II gives comparative estimates of known total recovery of crude oil by region, based on surveys made in the past and a most recent survey conducted by the Rand Corporation. The figures in the two columns on the left are smaller in quantity because they are based on known resources, while the others include probable resources as well.

The figures for regions of the USSR and Asia-Oceania are small in the survey made by Rand Corporation. Among the studies represented in the tables, it appears that the Rand Corporation's survey is most valid.

(Estimated in part using data Moody and Esser and from D.A. Holmbren, J. D. Moody and H. H. Emmerich, "The Structural Settings for Giant Oil and Gas Fields" Proceedings, Ninth World Petroleum Congress, Vol. 3 (Exploration and Transportation), Applied Science Publishers, London 1975 — p.46).

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TABLE II Comparative Estimates of Known Total Recovery of Crude Oil by Region (in billion barrels)

REGION	Internat. petroleum Encyclopedia as of 1.1.76	World Oil (as of 1.1.76)	Moody and Esser (as of 1.1.74)	Meyerhoff (as of 1.1.75)	Rand Corporation (as of 1.1.76)
US & Canada	156.4	155.7	168	171	163.2
Latin America	81.5	75.1	83	88	85.0
Western Europe	28.2	21.6	24	29	24.6 (+)
North Africa	53.5	52.9	46	47	52.9 (+)
USSR & East Europe	134.6	112.9	140*	143*	102.4 (+)
Central & South Africa	32.1	21.3	31	31*	22.7
Middle East	453.6	425.6	499	538	509.9 (+)
China	23.0	20.2	10*	20*	2.30 (+)
Asia-Oceania	29.9	28.9	36	38	27.8
WORLD	992.8	914.2	1,037	1,105	1,011.5 (+)
World Reserves end 1978	638.8	560.2	683	751	657.5

* Estimated

The estimated ultimate crude oil resources are consolidated by region in Table III. The total amount is (1700 — 2300) x 109 barrels, which is equivalent to 60-90 years based on the current world consumption of oil.

The total known deposits are given in the above Tables II and III and out of the known deposits about 35% has been consumed at end 1978. Hence, the proven reserve crude oil available at end 1978 is 657.5 billion barrels. This at present consumption rate would last for only about 29 years. The estimated ultimate crude oil resources of Table III are expected to last for 45 - 75 years at end 1978.

However, the most important point to note here is that world production of oil will start decreasing and economic confusions are inevitable in countries depending largely on imported petroleum, unless some measures are taken immediately. The consumption of crude oil did not decrease at all even with the steep price increases. Thus the economic value of this resource is higher than its selling price. Therefore, the price of crude oil would keep going up while production will decrease in extremely serious problem for non-producer oil consuming countries.

TABLE III Estimated Ultimate Conventional World Crude Oil Resources by Region (in billion barrels)

Region	Known	Potential	Total
North America	179.8	100 - 200	280 - 380
South America	68.4	52 - 92	120 - 160
Western Europe	24.6	25 - 45	50 - 70
Eastern Europe/Soviet Union	102.4	63 - 123	165 - 225
Africa	75.6	45 - 94	120 - 120
Middle East	509.9	350 - 630	860 - 1140
Asia - Oceania	50.8	54 - 104	105 - 155
TOTAL	1011.5		

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nationalism. The price of oil started to rise rapidly after 1973, bringing forth large increases in the oil income of the OPEC nations. The considerable amount of dollars flowing into the oil-producing countries is a big problem to the world economy. The soaring price of crude oil fanned worldwide inflation and boosted commodity prices. The use of the oil dollar is the most difficult problem for the present and future economy of the world.

Further, due to the large increase in the oil income, the OPEC countries are in a comfortable position to reduce oil supplies and still meet the income requirements of their countries.

Oil Income

The maldistribution of oil has been turned to advantage by oil-producing countries, especially by the Arab nations, by resource

OIL PRICE INCREASES

Crude Oil Imports of Sri Lanka

Since the start-up of the oil refinery in 1969 crude oil has been

TABLE IV Average Price of Crude Oil Imported by Sri Lanka in U.S\$. per barrel

Date	F.O.B. Cost	Freight Cost	Total C&F Cost
1969	1.39	0.23	1.62
1970	1.39	0.25	1.64
1971	1.65	0.27	1.92
1972	1.79	0.32	2.11
1973	2.50	0.46	2.96
1974	10.73	0.64	11.37
1975	10.69	0.54	11.23
1976	11.11	0.57	11.68
1977	12.47	0.60	13.07
1978	12.67	0.68	13.35
1979 January	13.40	0.66	14.06
February	14.15	0.71	14.86
March	13.73	0.71	14.44
April	14.78	0.51	15.29
May	13.89	0.74	14.63
June	17.10	1.16	18.26
July	18.51	0.83	19.34
August	19.69	0.99	20.68
September	20.21	1.36	21.57
October	20.53	1.41	21.94
November	18.71	1.46	20.17
December	23.36	1.46	24.82

imported by Sri Lanka for processing. The actual average price paid by Sri Lanka for import of crude oil and the trends of increase in prices are given in Table IV.

The actual quantity of crude oil imported and the cost of same is given in Table V. (The quantity and value of refined products imported to meet shortfalls are not included).

TABLE V
Gross Imports of Crude Oil
Quantity Value
(min. barrels) (min. US\$)

1969	4.35	7.09
1970	13.35	21.89
1971	11.43	21.95
1972	13.43	28.47
1973	12.91	38.21
1974	12.84	147.27
1975	10.77	121.70
1976	10.70	129.68
1977	11.29	147.89
1978	10.60	141.82
1979	10.37	200.1

Based on the above data, a two to three-fold increase in the value of crude oil imported by Sri Lanka is expected to take place in 1980, in view of the sharp price increases during 1979 and expected increases in 1980.

PROBABLE SOLUTIONS TO OIL CRISIS

The energy substitutes for limited petroleum are the most practical solutions for the oil crisis. World nations are at present trying to develop various substitutes for oil energy.

With OPEC oil costing US\$.20-25 per barrel delivered to European or US refineries, the cost of some of the processes for generating energy from other non-oil "feedstocks" are examined in Table VI.

Since the estimate in Table VI was made, the crude oil price has further increased to U.S.\$35-40 per barrel delivered to European or US refineries. This is expected to encourage the development of substitutes for oil energy.

Coal

The known coal reserves of the world are about 750 billion metric tons hard coal equivalent, which is about 3,600 billion barrels of oil when converted to petroleum. The economically recoverable reserves are equivalent to more than 6,500 billion barrels of oil and the ultimate world coal reserves are estimated to be about ten times those of oil. Also coal is not so unevenly distributed as oil and with the high oil prices of today, consideration is now being given to coal. Besides the use as solid fuel, a great amount of coal will be used as material for synthetic gas or oil. The current world coal consumption is about 13.22 billion barrels of oil equivalent per year and could be considered the lowest cost substitute for oil energy.

Coal-based processes, of course, have disadvantages that are not directly measurable in dollar terms. Coal mining is a dirty, unsightly business and large quantities of coal are vastly more difficult to handle and store than oil. More

TABLE VI
Energy Production Costs
(Excluding taxation, refining, storage, transmission and distribution costs)

	US\$.per barrel of oil equivalent
Indigenous coal (US)	3 - 5
Imported coal (NW Europe)	8 - 14
Indigenous coal (NW Europe)	10 - 15
Nuclear fuel	7 - 11
Low BTU gas from indigenous coal (US)	20 - 25
Liquified Natural gas imports	10 - 25
Synthetic Natural gas from indigenous coal (US)	20 - 25
Liquids from indigenous coal (US)	30 - 40
Liquids from imported coal (NW Europe)	30 - 45
Liquids from oil sands	15 - 25
Liquids from oil shale	15 - 35
Biomass liquids	30 - 60
Solar hot water (35° latitude)	50 - 130

Source: Shell "World Energy Prospects" October 1977, updated by Major energy Corporations spring 1979.

importantly, the conversion processes are large potential polluters. In a typical Fischer-Tropsch plant, the ratio of coal import to fuels, feedstocks and chemical output is nearly 3:1. This means that nearly two-thirds of the coal mined goes to waste in one way or other. Because of these very considerable disadvantages, coal has to be sold at a substantial discount to oil in terms of equivalent thermal values to compete with it as a feedstock. The Sasol 2 Complex now under construction in South Africa, for example, will take coal at \$ 5-7/ton, yet will only compete with oil at \$25 per barrel.

Although the more exotic coal conversion techniques have yet to be proven industrially, there are three processes capable of producing synthetic gas already in commercial operation; Koppers-Totzek dust gasification, the Winkler fluidized-bed process and Lurgi's fixed-bed high pressure gasification.

Liquified Natural Gas

The proven resources of natural gas deposits in the world are about 450 billion barrels of oil equivalent. The current world natural gas consumption rate is about 9 billion barrels of oil equivalent per year. Natural gas is a clear fuel and an ideal substitute for light petroleum oil. But additional investment is required for production, storage and transport facilities. However, this could be considered as an im-

portant substitute fuel by countries importing petroleum or coal.

Shale Oil and Oil Sand

The oil contained in shale is obtained by dry distillation of shale. The oil contained in oil sand is

of high viscosity. Both energy sources are distributed world-wide and the deposits are considerable.

British Petroleum, in a briefing paper published last year, quantified these petroleum resources. The Company estimated that shale oil resources totalled 3,000 to 4,000 billion barrels of which perhaps six per cent could be considered recoverable. Tar sands and heavy oil accounted for another 3,000 to 5,000 billion barrels of which about 10% might be recovered.

Even taking these modest recovery factors into consideration, it is possible to foresee unconventional oil reserves contributing some 600 billion barrels to future oil supplies, almost as much as the present proven reserves of conventional oil.

Improving Recovery of Conventional Oil

Rising prices and improving technology also have a bearing on the way more conventional oil reserves are exploited. Here, too, there is a strong possibility that the amount of recoverable oil will be stretched as time passes. At present, some 70% of the oil in commercial fields is being left in the ground because it is either too difficult or too costly to extract. Given the right conditions and encouragement, the oil industry should be able to improve that recovery factor, at least to 40 or 45%. In many oil fields the industry could do even better.

To do this, companies need to apply far more exotic and commercially more risky production techniques than are generally used at present. With only a few exceptions, the oil that is currently produced flows to the surface either as a result of natural reservoir pressures or by means of injected water or natural gas. The oil that is left behind is vast in quantity but it presents the industry with one of the biggest technological challenges. Some of the oil will remain untouched for ever, isolated from the producing wells by geological conditions. The rest of the residue is the hard to get oil that may form a film on the walls of the rock pores or it may be locked in the reservoir by droplets of water.

There is no ready-made key to unlock this store of oil, each reservoir is unique and the quality of oil can vary greatly from being thinner than water, on the one hand, to being thicker than cold molasses on the other. To tease this oil out of the ground, production engineers may have to inject steam, encourage a fire in the reservoir, pump in chemicals or mix the trapped oil with a gas. Latest estimates of the U.S. Department of energy show that the minimum price of oil required to justify the use of such methods is as follows.

	1979 US \$ per barrel
Steam drive	11 - 16
In-site combustion	13 - 20
Co 2 flooding	13 - 23.50
Surfactant/polymer flooding	20 - 32

Again, it is clear that at least some of these methods are beginning to look economically feasible. In recent years, major oil companies have developed a closer liaison between their research and production teams so that they are in a better position to judge which of their natural oil fields could benefit from the introduction of such new technology.

Shell, in a report published in March, 1979 estimated that the national reserves that could be made available by the application of enhanced recovery techniques could be as much as 400 billion barrels, coincidentally, the cumulative amount of oil produced to date in the world.

Overview of Future Prospects and Policy

Minister of Power and Highways,
Mr. D. B. Wijetunge

"The Energy Study Committee in its first interim report presented to Government, pointed out that further shortages of power are likely to arise in the mid - 1990's if present higher rates of increase of demand persist. The Committee therefore recommended that the balance hydro resources of the country should be taken up for investigation and programmed for development, immediately, considering that the lead time between feasibility studies, investigations, construction and commissioning of a hydro scheme takes 8 to 10 years. Government has accepted this recommendation. Financing possibilities are now being explored to undertake the investigation of all the balance hydro potential in major schemes outside the Accelerated Mahaveli Programme. An important aspect of our electric power and energy policy therefore, is the quickest possible development of all our hydro power resources. This is justified by the further fact that quite obviously, the sooner these resources are developed, the cheaper their capital costs will be. Admittedly the major constraint is finance but that, although important, is a problem to be dealt with separately. As far as policy is concerned, I am convinced that it is absolutely important to achieve the most rapid possible development of our maximum hydro electric potential."

"What do we do when our hydro resources are exhausted?"

"Here we are talking of a time horizon of around fifteen to twenty years. By that time perhaps using petroleum fuels to generate electricity may be completely out of the question. In this respect, I am comforted by the fact that this is a problem which affects not only Sri Lanka, but the entire world and in that context, I am certain that solutions will be found within the next decade or so by human ingenuity and the skills of science. There are the obvious alternatives of nuclear generation and coal based generation, as well as other alternatives like ocean thermal technology and solar technology — all fields where intensive research is now being carried out all over the world. We in Sri Lanka are lucky to be blessed with so much solar energy potential, and with potential from a rich bio-mass. I have no doubt, by the time we exhaust our hydro potential, science would have found viable ways and means of using other natural resources for the generation of electrical power".

Minister of Trade and Shipping,
Mr. Lalith Athulathmudali

"For non-oil producing countries particularly, the problems arising out of the oil crisis are mounting gradually. From 1973-1979 the combined current account deficit of oil importing developing countries has almost quadrupled from \$11 billion to \$43 billion. The borrowings to cover these deficits, too, have risen sharply. Nevertheless, Sri Lanka has done much better than many other developing countries in external debt management".

"Sri Lanka's prospects of meeting the growing energy problem would depend on several factors, such as the likely changes in demand for and supply of commercial energy, the technological and resource limitations on development and exploitation of alternative energy sources. At present about 90 percent of total energy consumption (excluding firewood) is met from oil products. This is despite the fact that about 85 per cent of our factories are run on electricity. In the future, however, the composition of energy consumption and the relative importance of oil could be expected to change considerably due to the substitution effect that is likely to result from higher oil prices. According to recent projections, requirements of petroleum products are expected to decline slightly in the immediate future and would increase gradually thereafter at about 3.5 per cent per year. However, the requirements of electricity are expected to grow at a much faster rate of about 12.1 per cent per year. These trends indicate that a certain amount of substitution of electricity for oil is taking place in the economy. Once other substitution possibilities such as solar energy, wind energy, biogas, fuel alcohol are under way, perhaps we may be able to reduce our requirements of petroleum products to a considerable extent."

"Among the measures for the future, an urgent need exists for an institutional arrangement for energy management and for the formulation and implementation of a national energy policy. Such a policy will have to embrace of the all aspects of ways and means of meeting those requirements within the resource limitations of the country. It will also have to recognise the constraints to development that energy availability poses and the consequent necessity for re-structuring economic policies to avoid the economic, social and even political catastrophes that otherwise await us."

Poor Nations Make Another Attempt

Third world countries are making yet another effort to extract an agreement on international economic cooperation from the world's rich nations. Following the failure of UNCTAD V at Manila and the more recent setback for the developing world at UNIDO III in New Delhi the foreign ministers representing the "Group of 77" ended a meeting in New York in mid March this year with a call for a United Nations conference on global negotiations for international economic cooperation. Their specific objective this time is to work out an agreement with the industrial nations within a definite time-frame. The ministers were showing concern that negotiations with the developed nations were now in a stalemate in several areas such as trade and natural resources.

The UNCTAD Secretariat has also come in once again and through its Trade and Development Board hopes to draw up a strategy for submission to the special Session of the UN General Assembly in September. Late in March this year the Trade and Development Board adopted a resolution which indicated the growing mood of impatience among most of the developing countries. The resolution put to a vote "recommends that the special problems of the peoples and countries under colonial domination or foreign occupation should be explicitly recognized and integrated in the formulation of the new International Development Strategy" and also ("recommends that the United Nations system, including UNDP, should during the Third Development Decade mobilize adequate resources for providing assistance to National Liberation Movements recognized by regional intergovernmental organizations and to the peoples under colonial domination and foreign occupation") The vote was 62 for the resolution, which had been submitted on behalf of the Group of 77, 13 against, and 14 abstentions.

The Board (TDB) also requested the UNCTAD Secretary-General, in consultation with the Executive Director of UNIDO, to take the necessary steps to convene a meeting to consider further the related issues concerning the trade and

trade-related aspects of industrial collaboration arrangements. This resolution specifies that costs are to be covered from existing resources of the two organizations. The issue of "funds" appears to have become a sensitive issue among some of the western nations.

The UNIDO III conference in New Delhi was also deadlocked when a proposal for the creation of a new Global Fund for stabilising industrialisation of the developing countries failed to gain acceptance. A proposal for a global fund of US \$ 300 billion by the year 2000 to aid industrialisation of the Third World formed the central part of the Plan of Action document prepared by the Group of 77 and became the principal bone of contention between the two camps. It was unequivocally rejected by the developed countries. So strong was their opposition that they also rejected a watered-down, face saving formula of the Indian foreign minister, which substituted the US \$ 300 billion stipulation with the exhortation that "the total assistance channelled through the fund should reach a level of US \$ 15 billion per year as early as possible".

At New Delhi the developed nations also gave no quarter to make way for progress towards the target that 25 percent of the world's industrial output should come from the developed world by the year 2,000. Rather, they seemed to question this very target which had been unanimously agreed to five years earlier in Lima, Peru. This target had in fact been diluted over time into a dubious programme of "generalised trade liberalisation" and relocation of bits and pieces of industrial production through the "redeployment of multinationals". But even this distorted version of the original Lima objective has not been pursued seriously either by the multinationals themselves or by the developed countries (as is seen, for example, in the protectionist measures taken by them in respect of textiles and made-up garments). Half way through the Delhi conference it became clear that the developing countries' delegates would have to return home empty handed.

Third World observers were unanimous in their view that there

was little leverage for the "have-nots"; while, the "rich" refused to see reason. It appeared as though the gap between rich and poor on the question of accelerated industrialisation of the Third World had grown during the conference. Writing in the Madras Hindu of February 16, the day after the sessions ended, Indian commentator Nitish Chakravarty succinctly summed up:

"In the cold emotionless world of pounds and dollars, there is little use for logic or rhetoric. The dramatic developments on the concluding day of UNIDO III, when the holding of the final plenary session had to be deferred over and over again, showed that the rich nations, especially the super powers, would not flinch from their fixed positions unless they were compelled to do so. But there was little leverage in the hands of the have-nots to make the rich see more reason. Hence it was idle to expect that a thaw would set in merely because India had taken the initiative and emerged as the nodal point of a compromise formula.

In fact it had become apparent quite early in the three-week long deliberations that UNIDO III was unlikely to fulfil the hopes it had aroused among the world's poorer nations. The formal statements that delegation after delegation placed before the plenary sessions left hardly any room for hope that a bridge could be built between the inflexibility of the industrialised nations and the expectations of the Third World aspiring for a share of the wealth now almost wholly monopolised by the rich".

Finally, "the 133 nation meeting adopted a "New Delhi Declaration and Plan of Action" presented by the Group of 77, with no likelihood of its implementation. It received support of 83 countries, while 22 voted against" was the complacent comment of the London *Financial Times* was "If this is what the Third World nations want they will get it most willingly from the rich, but if this is all such international gatherings would achieve the poor are going to soon see the pointlessness of hankering for an agreement on a New Economic Order".

The stark truth that "negotiations" initiated since the first oil price hikes in 1973 (the first major success of a North-South confrontation) and the adoption in 1974 of the charter on a New International Economic Order have been effectively fruitless is now becoming apparent to more developing nations.

TRADE

Impact of liberalisation shows in accelerating level of imports

The full impact of the liberalisation of trade, introduced in November 1977, was beginning to be felt only during 1979. The original expectation was that when the controls on trade were removed the immediate result would be a 'flood' of imports and once pent up demand was met, imports would settle down at a reasonable level. But the anticipated 'flood' did not take place in 1978 mainly because on the supply side importers reacted slower than expected, with old importers taking time to re-establish their trade connections and new importers watching the situation before they came in fully; while, on the demand side consumers apparently appeared to need time to decide that they could spend freely on the wide range of imports coming into the country.

The reaction to the 'liberalisation' was belated; but when it did come in 1979 the result was an almost four-fold increase in the country's trade deficit last year over that of 1978. The trade balance was a surplus of Rs. 631 million in 1977, a deficit of Rs. 1,480 million in 1978 and a deficit of Rs. 7,288 in 1979, according to Customs data. In SDR terms the country's import expenditure rose from 774 million in 1978 to 1,121 million in 1979 or by 45 percent. On the other hand export earnings increased from SDR 674 million in 1978 to SDR 750 million in 1979 or by 13 percent. Imports were up from Rs. 6,007 million (SDR 630 mn) in 1977, to Rs. 14,687 million (SDR 774 mn) in 1978 and Rs. 22,560 million (SDR 1,121 mn) in 1979. The upward

trend in imports was gaining momentum through 1979 and continued apace into 1980 with import values exceeding Rs. 2,500 million in January 1980 as against imports valued at Rs. 1,593 million in January 1979 and Rs. 688 million in January 1978. The situation grew even more acute by the end of

during the first two months of 1979. The end result was an alarming deficit in the country's balance of trade which had reached Rs. 3,044 million by the end of February 1980; nearly half the total deficit of 1979. The deficit for the same period in 1979 was Rs. 1,268 million.

A disappointing feature in the country's pattern of trade was that while imports (in rupee terms) nearly quadrupled in 1979 the increase in earnings from exports were virtually negligible and failed to offset the impact of the rising import bill. The growing strain on

TABLE 2

FOREIGN TRADE INDICES 1970 - 1979

Year	Volume		Index Number (1978 = 100)		
	All Exports	All Imports	Prices		Terms of Trade
			All Exports	All Imports	
1970	107	77	17	16	106
1971	104	68	17	17	98
1972	102	67	17	18	94
1973	103	60	20	24	82
1974	89	42	31	42	72
1975	107	52	29	49	58
1976	102	57	34	44	78
1977	94	73	55	54	102
1978	100	100	100	100	100
1979	101	123	109	152	72

SOURCE: Central Bank of Ceylon

February when the import bill increased to Rs. 2,955 million. Total import values for the first two months of this year reached Rs. 5,504 million as against a total of Rs. 3,362 million in the first two months of 1979. The latest available import data therefore shows that in the first two months of this year the country's import bill had climbed 64 percent over that of the same period in 1979 and was 250 percent up over that of the first two months of 1978. More significant was the tardy pace of growth in export earnings during this period which went up to Rs. 2,460 million in 1980 over that of the Rs. 2,094

the country's foreign reserves to meet this import bill was cushioned by increasing recourse to foreign resources that have been made available under various aid programmes and investments, and partly from foreign remittances of nationals employed abroad; and this course was being justified as part of "Sri Lanka's medium-term economic stabilization programme".

In keeping with the new economic policies all controls were to be relaxed and imports allowed in freely with a view to resuscitating the economy. One result anticipated was an increase in productivity and a rapid export-oriented growth. But the latter objective has not materialised so far to the extent expected. The changing pattern is seen more clearly in the two tables on this page which reveal that for two consecutive years, Sri Lanka had enjoyed trade surpluses, but in the next two years with the sharp rise in imports and the accompanying low growth rate in exports, there has been a considerably increasing trade deficit. As seen in table 2 the volume of imports, as measured by the Import Volume Index (1978=100) rose by 23 per cent. Import prices as mea-

TABLE 1

EXTERNAL TRADE ACCOUNT 1975-1979

		(SDR Million in brackets)			
	1975	1976	1977	1978	1979
Exports:					
Rs. Millions	3.933	4.815	6.638	13.206	15.282
	(466)	(495)	(659)	(676)	(759)
Imports					
Rs. Millions	5.251	4.646	6.007	14.663	22.570
	(617)	(477)	(630)	(774)	(1121)
Trade Balance	-1.318	+170	+631	-1.457	-7.288
Rs. Millions	(-151)	(+18)	(+29)	(-98)	(-362)
Terms of Trade					
(1978 - 100)	58	78	102	100	72

SOURCE: Central Bank of Ceylon

TABLE 3 MAJOR ITEMS OF EXPORT IN 1977, 1978 AND 1979

	Value Rs. Million			Percentage of Exports		
	1977	1978	1979	1977	1978	1979
Tea	3,503	6,383	5,699.7	53.0	48.5	37.4
Rubber	931	2,021	2,491.3	14.0	15.3	16.4
Textiles & Textile articles	285	734	1,430.8	4.3	5.6	9.4
Coconut (kernel) Products	335	972	1,298.8	5.0	7.4	8.5
Mineral Products	149	376	700.4	2.2	2.9	4.6
Gems and Jewellery	302	536	4,95.5	4.6	4.1	3.3
Fish and Crustaceans	95	233	309.6	1.4	1.8	2.0
Sub-Total	5,600	11,255	12,426.1	84.7	85.6	81.6
Other Exports	1,015	1,920	2,802.	15.3	14.4	18.4
Total Domestic Exports	6,615	13,175	15,228.1	100.0	100.0	100.0
Re-exports	23	31	44.			
Total Exports	6,638	13,206	15,272.2			

SOURCE: Sri Lanka Customs Returns

sured by the Import Price Index (1978=100) indicated an increase of 52 percent. In comparison the export performance was rather disappointing. The volume of exports, as measured by the Export Volume Index (1978=100), increased by less than one per cent. However, export prices, except that of tea, have shown improvement in 1979. The Export Price Index (1978=100) showed a rise of 9 per cent. It may be observed that the terms of trade (1978=100) had reached down to 72 as compared with 102 in 1977. The lowest point, however, in this Central Bank Trade Index was reached in 1975 when it went down to 68. A significant feature of the trade situation in 1979 was the higher price ranges for both import and export items. Despite higher prices the demand for capital and intermediate goods in the country was stepped up with the general economic climate showing signs of improvement. By contrast the value of all major export commodities — tea, rubber and coconut as well as most of the minor agricultural crops — declined during the year due to the uneven production performance arising from adverse weather and problems in management and marketing.

minor agricultural exports, petroleum products and manufactured good exports increased. Tea exports suffered with declining prices and the incentives given by the exchange reform in 1977 were maintained through a reduction in export duty in July 1979. Coconut prices, however, were better during 1979 but the country was unable to reap the full benefits due to a shortfall in the volume available for export. Rubber, on the other hand benefitted from the buoyant prices though here too production could not keep pace with brighter demand prospects.

The value of tea exports amounted to Rs. 5,700 in 1979 as against an export value of Rs. 6,383 in 1978. In SDR terms the decline in export value amounted to 13 percent which was the result of decline in volume of exports by 3 percent, and a drop in prices by 8 percent. In these circumstances the tea industry appeared to be affected badly from a liquidity-cum-profit squeeze due to deteriorating prices and heavy taxation, and the Central Bank struck a warning note that "this major industry deserves urgent corrective measures if it is to lead the much desired export growth in a liberalized trade regime".

Exports

Export earnings in 1979 show only a small increase over that of 1978; in rupee terms it was a 16 percent increase and SDR terms a 13 percent increase. Earnings from tea and gems declined, while those of rubber, coconut products

TABLE 4. COMPOSITION OF IMPORTS BY CATEGORIES 1975-1979
(Percentage shares are given within brackets)

	(Rs. Million)				
	1975	1976	1977	1978	1979
	(50)	(36)		(38)	(35)
1. Consumer Goods	2,651	1,689	2,534	5,618	7,824
a. Food & drink	2,520	1,491	2,181	4,127	4,807
b. Textiles	20	49	150	531	1,536
c. Consumer durables & other goods	111	149	203	959	1,481
		(49)	(44)	(38)	(41)
2. Intermediate Goods	1,888	2,359	2,648	5,591	9,143
a. Fertilizer	208	99	51	252	673
b. Petroleum	872	1,164	1,441	2,403	3,912
c. Other	808	996	120	446	502
	(12)	(14)	(12)	(23)	(24)
3. Capital Goods		641	746	3,367	5,459
a. Building materials	169	104	129	150	368
b. Transport equipment	116	175	232	988	1,615
c. Machinery & equipment	322	1,364	286	1,846	2,900
	(2)	(1)	(1)	(1)	(1)
4. Unclassified	59	54	79	110	134
Total	5,251	4,645	6,007	14,687	22,560

SOURCE: Central Bank of Ceylon

TABLE 5. MAJOR ITEMS OF IMPORT IN 1977, 1978 AND 1979.

	Value Rs. million		1979	Percentage of Imports		
	1977	1978		1977	1978	1979
Petroleum	1,490	2,433.7	3,960.5	24.8	16.7	17.6
Boilers, Machinery and Appliances	313	1,800.3	2,089.0	5.2	12.3	9.3
Motor vehicles and parts	233	1,681.6	2,075.5	3.9	11.5	9.2
Flour	930	2,203	1,703.9	15.5	14.4	7.6
Rice & Cereals	1,061	841.6	1,183.4	17.7	5.8	5.3
Iron & Steel	188	927.8	1,159.5	31.	6.4	5.1
Textiles & Yarn	459	1,217.6	924.1	7.6	8.3	4.1
Sugar	199	562.9	890.7	3.3	3.9	3.9
Fertilizers	18	251.6	673.8	0.3	1.7	3.1
Pharmaceuticals	87	156.8	232.1	1.4	1.1	1.0
Sub Total	4,987	11,979.8	14,892.5	82.9	82.1	66.1
Others	1,029	2,633.6	7,667.9	17.1	17.9	33.9
Total Imports	6,007	14,613.4	22 560.4	100.0	100.0	100.0

SOURCE: Department of Commerce. Sri Lanka Customs Returns

In the case of rubber, however, value of exports rose by as much as 25 percent which was due entirely to a rise in prices by 33 percent. The quantity of rubber exported in 1979 fell by 7 percent when compared with that of 1978. Earnings from coconut too recorded a sharp increase of 34 percent and this too was due entirely to world price increases of coconut products in 1979. The volume of coconut kernel products exported in 1979 dropped by 10 percent.

A significant feature of the country's export picture was that earnings from gems dropped for the first time in seven years. Despite the tax reliefs granted to the industry the fall in value terms in 1979 over that of 1978 amounted to 8 percent.

Exports from the Industrial Processing Zone at Katunayake are expected to make a major contribution to the country's export ef-

TABLE 6

IMPORTS 1976, 1977, 1978 AND 1979
SRI LANKA'S 25 MAIN SUPPLIERS OF FOREIGN PRODUCTS IN 1979

	1976		1977		1978		1979	
	Rs.m.	%	Rs.m.	%	Rs.m.	%	Rs.m.	%
1. Japan	376	8.0	398	6.6	1,590.4	11.0	3,005.3	13.3
2. India	181	3.9	377	6.2	1,242.0	8.6	2,334.4	10.4
3. U.K.	275	5.9	327	5.	1,396.1	9.6	2,014.9	8.9
4. Saudi Arabia	596	12.8	747	12.4	1,385.3	9.6	1,569.7	7.1
5. Singapore	79	1.7	126	2.1	405.0	2.8	1,358.8	6.0
6. Germany F.R.	183	3.9	223	3.7	831.9	5.7	1,222.1	5.4
7. U.S.A.	379	5.8	538	8.9	1,104.6	7.6	1,211.0	5.4
8. Australia	273	5.8	291	4.8	738.4	5.1	1,077.9	4.8
9. China	56	1.2	284	4.7	452.5	3.1	1,039.2	4.6
10. Iran	499	10.7	586	9.7	858.3		704.0	3.1
11. Iraq	4	0.1	—	—	20.5	1.5	517.3	2.3
12. Hong Kong	25	0.5	44	0.7	213.5	1.2	491.9	2.2
13. Pakistan	274	5.9	273	4.5	172.2	4.8	481.7	2.1
14. France	294	6.3	231	3.8	690.7	2.6	477.0	2.1
15. Netherlands	70	1.5	107	1.7	380.3	0.7	354.2	1.6
16. Union of South Africa	5.	.1	10	.2	100.4			
17. Sweden	59	1.2	33	0.5	106	0.7	352.3	1.6
18. Switzerland	14.	.3	22	.4	100.7	0.7	295.6	1.3
19. Canada	106	2.3	71	1.1	264.4	1.8	291.3	1.3
20. Burma	231	4.9	167	2.7	498.7	3.4	196.1	.9
21. U.S.S.R.	72	1.5	131	2.1	237.5	1.6	167.8	.7
22. Thailand	171	3.7	287	4.8	47.7	0.3	167.0	.7
23. Belgium	56	1.2	73	1.2	230.7	1.6	141.9	.6
24. Malaysia	16.	.4	29.	.5	100.4	0.5	140.3	.6
25. New Zealand	15.	.3	23.	.4	134.3	0.9	106.8	.5
Sub-Total	430	92.8	5398	89.9	13,302.5	91.0	20,458.3	90.7
Others	335	7.2	609	10.1	1,310.9	9.0	2,102.1	9.3
Total	4,645	100.0	6007	100.0	14,613.4	100.0	22,560.4	100.0

SOURCE: Sri Lanka Customs Returns

ECONOMIC REVIEW, MAY 1980

fort. In the second year since manufacturing units went in to production there the gross value of exports was Rs. 115 million for 1979; of this ready-made garments alone accounted for Rs. 107 million. The overall value of garments exported from Sri Lanka is reported to have risen in 1979 by about Rs. 1,100 million; an increase of nearly 125 percent over that of 1978.

Imports

Import expenditure rose considerably, as was noted earlier. The increase in the volume of imports during 1979 has been estimated at 23 percent while import prices were up by 52 percent. One significant feature of the import pattern appears to be the increasing percentage of intermediate and investment goods and the gradual decline in the share of consumer goods coming in to the country.

As seen in the table 4 the overall share of consumer goods imported has kept coming down from about 50 per cent in 1975 to 35 percent by 1979. The value of consumer goods imported, however, increased by Rs. 2,206 million or by

39 percent during 1979. Food and drink represented nearly 61 percent of the Rs. 7,800 million of consumer goods imported; while textiles took up another 20 percent and other consumer durables the balance 19 percent. The increasing levels of capital and intermediate goods were an indication of an improving investment climate as nearly 53 percent of the capital goods imported constituted machinery and equipment, while 30 percent was transport equipment and 7 percent building materials.

In the case of expenditure on intermediate goods which rose to Rs. 9,143 million from Rs. 5,591 million in 1978, nearly two-third of the increase was a result of higher prices for petroleum and fertilizer as seen in table 5. The proportion of flour and rice imports in the total import bill recorded a drop in 1979. Together rice, flour and sugar constituted about 17 percent of the total value of imports in 1979 as against about 24.5 percent in 1978. However, the total expenditure on these three commodities together increased marginally in 1979 as the value of

sugar imports went up by 50 percent and rice imports by 28 percent, though the value of flour imports declined by nearly 25 percent. The largest item in the country's import bill continued to be petroleum. The next most important items were machinery and appliances; and motor vehicles and parts. Electric machinery and equipment were also a significant item of import in 1979, taking up 4 percent of the total import bill. An added incentive for the import of intermediate and capital goods during 1979 was the reduction of import duties on several items such as mammoets, liquid transporters, lorries and vans, cement, sanitaryware, articles of iron and steel, aluminium ware, radio parts and television equipment.

Sources of Supply

Japan ended up as the most important supplier of Sri Lanka's imports for the second successive year. This was one of the significant changes that had taken place following the liberalisation of the country's trade; Japanese agencies have made the most of the situation. In the three years upto 1977 Saudi Arabia had been the foremost supplier of the country's imports, mainly through its exports of petroleum; but in 1979 the sources of supply of this item were more diversified with Iran and Iraq also providing fair quantities of oil. Japan in the meantime, which exported less than Rs. 400 million annually to Sri Lanka in the years upto 1977, exported goods to the value of Rs. 1,590 million in 1978 and Rs. 3,005 million in 1979. India has also moved in as a major source of supply almost doubling the value of her exports from Rs. 1,242 million in 1978 to Rs. 2,334 million and pushing UK into third position. UK's exports to Sri Lanka were up from Rs. 1,396 million in 1978 to Rs. 2,015 million in 1979.

The other major sources of supply were Saudi Arabia, Singapore, West Germany and U.S.A. Together these first seven sources supplied nearly 57 percent of Sri Lanka's imports. The emergence of Singapore among the first five main suppliers is worthy of note. Upto 1978 the value of imports from Singapore ranged between 1 and 3 percent of the country's total import bill but in 1979 as much as 6 percent of the value of imports was accounted for by Singapore. The value of supplies from Iran and their proportion in the total import bill recorded a marked drop

TABLE 7
EXPORTS 1976, 1977, 1978 AND 1979
THE 25 MAIN BUYERS OF SRI LANKA'S PRODUCTS IN 1979

	1979		1976		1977		1977		1978		1979	
	Rs.m.						Rs.m.		Rs.m.			
		%		%		%		%		%		%
1. U.S.A.	335	6.7	52	7.5	924.9	78.6	11,524.5	8.1				
2. U.K.	465	9.7	42	8.0	1038.5	7.0	1,585.2	6.8				
3. Japan	213	4.4	55	4.3	766.3	7.9	1,230.8	5.9				
4. Germany F.R.	163	3.4	68	3.9	564.9	5.8	1,037.1	5.6				
5. China	481	10.0	98	6.5	955.6	7.3	902.4	4.5				
6. Pakistan	363	7.6	153	8.0	689.4	4.3	256.8	3.2				
7. Netherlands	116	2.4	127	2.8	367.3	5.2	686.2	3.1				
8. U.S.S.R.	153	3.1	199	1.9	197.0	2.8	484.6	3.1				
9. Iraq	145	3.0	69	5.4	457.7	1.5	477.0	2.9				
10. Saudi Arabia	122	2.5	94	2.6	626.9	3.5	464.6	2.8				
11. U.A.R.	101	2.1	201	4.6	559.6	4.8	448.6	2.8				
12. Italy	131	2.7	168	1.6	307.7	4.2	432.3	2.2				
13. Iran	100	2.0	123	1.8	568.4	3.0	426.9	1.9				
14. Syria	79	1.6	110	2.5	362.4	4.3	326.7	1.7				
15. Union of South Africa	141	2.9	304	3.0	201.4	2.8	298.2	1.6				
16. France	56	1.2	175	1.4	172.2	1.5	259.9	1.5				
17. Poland	42	0.8	356	1.0	165.1	1.3	252.7	1.5				
18. Australia	129	2.7	125	3.0	254.8	1.3	241.1	1.5				
19. Canada	117	2.4	186	1.9	291.1	1.9	228.1	1.1				
20. Hong Kong	121	2.5	534	2.3	198.3	2.2	226.3	0.8				
21. Singapore	143	3.0	434	1.5	278.0	1.5	159.5	.5				
22. New Zealand	143	3.0	261	1.0	127.8	2.1	125.6	.5				
23. Switzerland	25	0.5	321	.8	151.5	1.2	79.5	.4				
24. Yugoslavia	20	0.4	528	.6	60.5	.5	76.7	75.7				
25. Sweden	24	0.5	500	.7	67.1	.5	60.5	10.4				
Sub-total	3,827	79.7	5,283	79.9	10,357.4	21.4	3,703.6	24.3				
Others	974	20.3	1,332	20.1	2,817.6	100	15,228.1	100.0				
Total	4,801	100.0	6,615	100	13,175.0	1000	22,560.4	100.0				

SOURCE: Sri Lanka Customs Returns

in 1979. Australia and China also continued to be among the main suppliers of Sri Lanka's imports. The 25 main supplying countries, which accounted for over 90 per cent of Sri Lanka's imports, are listed in table 6. The balance 9.3 percent of the country's imports came in from nearly 60 other countries around the world.

Foreign Markets

For the first time USA emerged as the leading market for Sri Lanka when it took Rs. 1,585 million worth of goods or accounted for as much as 10.4 percent of the value of the country's total exports in 1979. Largely responsible for this situation were the increasing quantities of tea and industrial products finding their way into the US market. UK which was the country's main export market in 1978 occupied second position last year, accounting for 8.1 percent of the total value of Sri Lanka's exports. Japan has taken third position moving up from fourth place in 1978 and seventh place in 1977, which proves that overall Sri Lanka-Japan trade relations have strengthened considerably during the last two years. West Germany has also moved up as an important trade partner of Sri Lanka, occupying fourth position as a buyer of Sri Lanka's products and sixth position as a source of supply of the country's imports. This is the first time that the FRG has come within Sri Lanka's five principal markets. China, largely as a result of her rubber purchases, has taken fifth place as a market for Sri Lanka's products.

The other major markets in 1979 were Pakistan, Netherlands, U.S.S.R. Iraq, Saudi Arabia, UAR, Italy and Iran. Together the first thirteen markets accounted for 61.4 percent of the total value of the country's exports. The main markets listed in table 7 accounted for about 76 percent of the total value of exports in 1979. The balance 24 percent went out to nearly a hundred other countries.

Of the East European countries, Poland and Yugoslavia continued to be among the first 25 of Sri Lanka's markets; while among the Asian nations were Pakistan, India, Singapore and Hongkong, and the main Middle Eastern markets were Saudi Arabia, UAR, and Syria.

ECONOMIC REVIEW, MAY 1980

THE ECONOMY

Interest Rate Changes

The Central Bank announced a change in the bank rate in the first week of May, 1980. The rate was increased by 2 per cent. This was one of the many policy alternatives available to the Central Bank to counter the growing inflationary trends in the economy. At present the inflation rate is believed to be over 20 per cent. However, in certain sectors it is noticeable that the rate is even higher. The Central Bank interest rate operation is one of the traditional methods of restricting the excess liquidity in the economy. Two such methods are:

1. by enhancing domestic savings
2. by restricting credit creation.

DOMESTIC SAVINGS

Popularly, interest rate manipulation is believed to be a mopping-up operation of the excess liquidity M^1 and M^2 and particularly M^2 . (M^1 is the money supply 'narrowly' defined as currency and demand deposits. M^2 is the 'broad' money supply consisting of currency, demand, time and savings deposits).

However, the efficiency of interest rate policy depends to a large extent on the particular circumstances and the structural setup of the economy in which it operates. In under-developed economies, like that of Sri Lanka, the effectiveness of an interest rate policy as an instrument of savings promotion has to be looked into more closely. A savings decision if looked at as a postponement of present consumption will reveal certain factors other than that of interest which acts as its determinant. How far high rates of interest could divert funds from consumption to savings in the particular context of our economy, will depend on

1. income levels
2. distribution patterns
3. the effectiveness of the banking system
4. the market situation (price and availability of goods & services).

One important feature noticeable under inflationary conditions, particularly in our context, is the increasing tendency for "speculative consumption". Speculative buying

and hoarding are not very new under fairly acute inflationary situations. In Sri Lanka, today, decisions to save are too often postponed due to "speculative demand" for consumption. The consumer has a marked preference for immediate consumption rather than to save say Rs. 1000/- and earn Rs. 200/- at the end of one year at a 20 percent rate of interest.

For any commodity like a bicycle or a 12" T.V. which is now available at Rs. 1000/- may later not be available at Rs. 1200/- (200 earned interest at 20%) due to possible price increases or it may not be available at all due to import restrictions that may set in as a result of foreign exchange difficulties. The increased consumer satisfaction of 'early' ownership of a commodity also adds to this decision.

The Central Bank report of 1977 mentioned that interest rate policy was tuned to catching up with the market rates. However, in Sri Lanka where there is a substantial non-formal sector it is observed the rates of interest in that sector are far above the prevalent bank rates. There are host of money dealers both in Colombo and in the outstations whose interest rates are enormously high in the non-formal market. The people with small balances are encouraged to lend them through intermediaries like the boutique keepers, money lenders or lawyers on a very short term basis; the shortest being a 12 hour loan for which earlier Rs. 10/- was charged on every Rs. 100/- and now the charge varies between Rs. 15/- and Rs. 20/-. The rate on this type of advance remains virtually the same up to about a maximum of 6 months. It is also observed that the lending period in the non-formal sector even stretches upto medium term on which about Rs. 25/- Rs. 35/- are levied for Rs. 100/-. It becomes evident in this context that lending small amounts through the intermediaries in the non-formal sector is more attractive than depositing in banks. However, the risk element is high for new entrants in this category but it may be surmised that the total volume of funds involved are substantial.

Earlier in January 1977, the interest rate was increased by 2 percent to 8½ per cent. It was further increased by 1½ per cent in August

of the same year to 10 percent. The National Savings Bank put up its rates upto 8.3 percent on savings and 12 percent on 6 months deposits.

The performance of the N.S.B. and the Commercial Banking sector both in the savings and the term deposits categories over the last 2 decades shows a close co-relation between the interest rates variation and the total deposit mobilisation. The interest rates in 1965 was a mere 5 percent which had subsequently been revised to reach 12 percent in 1980.

Year	1960	1965	1968	1970	1977	1980
Interest rate	4%	5%	5½%	6½%	8½%	12%

The N.S.B. deposits from about the year 1965 shows a gradual rise in their volume. The term deposits (fixed deposits) in the N.S.B. were practically non-existent before 1971. Since 1971 there had been a gradual build up of this category of deposit in the N.S.B. too. The total of term deposits as at the end of 1978 was Rs. 1,265.4 million.

In the commercial banking sector, the savings deposits show a more even growth pattern. Perhaps the significant development is that by December 1978 the volume of total savings in this sector had overtaken that of the N.S.B. which had hitherto maintained a certain "superiority" in savings deposit collection. In the year 1965 the total savings deposits in the commercial banking sector was Rs. 223.9 million; half of that of the NSB. (Rs. 513.7 million). In the commercial banking sector there had been a continuous rise in the total savings

TABLE 1

SAVINGS DEPOSITS

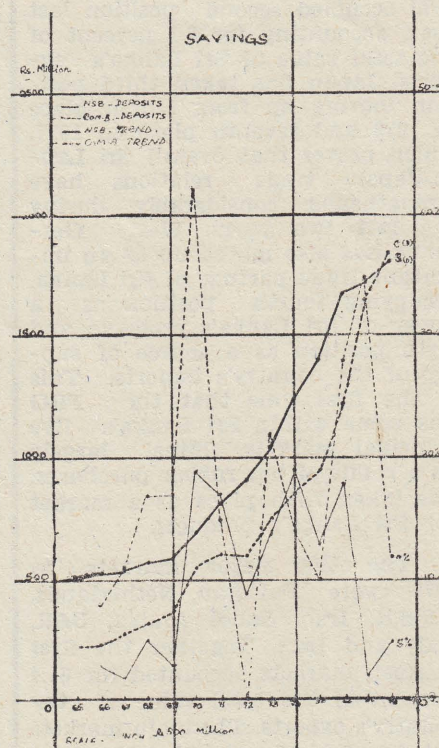
(Rupees Million)

NATIONAL SAVINGS BANK				COMMERCIAL BANKS			
Year	Deposits	Variations	Percentage	Deposits	Variation	Percentage	Total
1965	513.7	114.7	14.26	223.9	—	—	737.6
1966	529.6	15.9	3.10	243.7	19.8	8.84	773.3
1967	543.8	14.2	2.68	243.7	28.3	11.61	815.8
1968	573.5	29.7	5.46	319.9	47.9	17.61	983.4
1969	592.5	19.0	3.31	375.6	55.7	17.41	968.1
1970	707.2	114.7	19.36	534.8	159.2	42.39	1242.0
1971	831.7	124.5	17.6	615.0	80.2	15.00	1446.7
1972	913.0	81.3	9.78	610.6	4.40	.72	1523.6
1973	1043.2	130.2	14.26	749.6	139.0	22.76	1792.8
1974	1244.1	200.9	19.26	857.4	107.8	14.38	2101.5
1975	1413.7	169.6	13.63	947.4	90.0	10.57	2361.1
1976	1678.9	265.20	18.76	1216.1	268.70	28.36	2895.0
1977	1727.3	48.40	2.88	1645.1	429.00	35.28	3372.4
1978	1825.0	97.70	5.66	1846.0	200.90	12.21	3671.0

Source: Central Bank of Ceylon

deposit position, at a rate faster than that of the N.S.B. Term deposits in the commercial banking sector too show an increase in their volume. It was Rs. 3179.5 million as at end of 1978. (see tables 1 and 2).

However, the trend observed with the help of certain indicators in both the savings deposits and term deposits behaviour is not in conformity with the emerging picture shown in the total deposit position. The years 1970 and 1977 are significant in this context; inspite of the increase in rates the relative growth, which indicates the trend was negative. The savings trend in the N.S.B. shows a rise from about the year 1966; but between 1971 and 1973 this rise slows down, showing a small slump, and once again a



Above is a diagrammatic representation of the total savings, deposits and time deposits over the last two decades; in the commercial banking sector as well as with the NSB, (indicated through the thick dark line and the thick dotted line respectively). The thinner lines indicate the annual variation in growth in savings and time deposits, in the commercial banking sector and the NSB, from which the trend lines were projected and produced in the four diagrams on page 25.

TABLE 2.

FIXED DEPOSITS

(Rupees million)

NATIONAL SAVINGS BANK				COMMERCIAL BANKS			
Year	Deposits	Variations	Percentage	Deposits	Variation	Percentage	Total
1965	—	—	—	382.8	—	—	382.8
1966	—	—	—	358.9	23.9	6.24	358.9
1967	—	—	—	428.8	69.9	19.48	428.8
1968	0.1	—	—	506.3	77.5	18.07	506.4
1969	0.4	.3	300.	610.1	103.8	20.5	610.5
1970	0.5	.1	25.	633.7	23.6	3.87	634.2
1971	25.0	24.5	4900.	702.3	68.6	10.83	727.3
1972	53.2	28.2	112.8	914.4	212.1	30.2	967.6
1973	100.3	47.1	88.53	662.2	252.2	27.58	762.5
1974	167.6	67.3	67.1	803.4	141.2	21.32	971.0
1975	243.1	75.5	45.05	780.8	22.60	2.81	1023.9
1976	307.6	64.50	26.53	975.3	194.50	24.91	1282.9
1977	771.5	463.90	150.81	1796.4	821.10	45.71	2567.9
1978	1265.4	493.90	64.02	3179.5	1383.10	76.99	4444.9

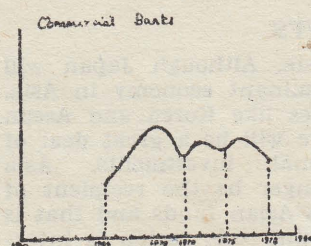
Source: Central Bank of Ceylon.

substantial rise in 1974 which was not continued in 1975 but re-emerged in 1976. From 1976 there is a fall in this trend. In the term deposits category, although the absolute total indicates a continuous growth, the trend takes an initial downward slope finally slumping by 1975 and then changing into a rising trend which reaches its highest point in 1977, from which year again there is a downward trend.

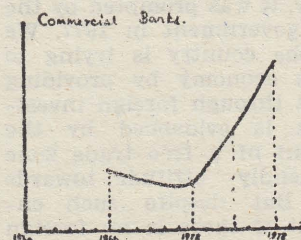
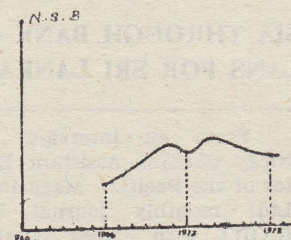
The observed trend in the commercial banking sector in the savings category is a fluctuating one; the first phase covering the year 1966-1970. From 1970 to about 1976 there is an uneven growth and from 1976 to 1978 savings show a downward trend. In the term deposit category of the commercial banks, however, a downward trend is seen upto the years 1972-75 and then from 1976 it shows a continuous upward turn.

Perhaps it is reasonable to conclude that in the context of a developing economy like that of Sri Lanka the efficiency of interest rates policy is limited. The annual report of the Central Bank commenting on the economy in 1979 gives the following example to backup this contention. The bank rate remained at 10 percent, as during the previous year. However, effective from 4th September, 1979, a progressively increasing graduated scale of penal rates ranging between 15 and 25 percent was introduced in order to discourage commercial banks from resorting to excessive Central Bank credit.

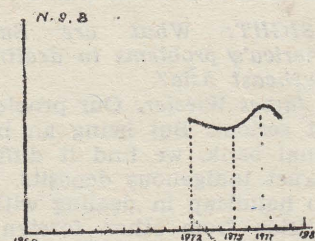
The fairly high penal rates did not directly affect the deposit and lending rates of commercial banks, but pushed up the inter-bank call loan rate from the previous levels of 7 and 9½ percent to a level between 10 and 13½ percent. Analyzed in the context of fairly heavy borrowing by banks, especially the major banks at high penal rates, this would indicate a relatively high insensitivity of major banks to current interest costs. It is undoubtedly a very useful instrument in mobilising savings deposits but perhaps other structural and administrative measures should be used simultaneously as a package to enhance its efficiency. Savings in Sri Lanka invariably is tied up with the "piggy bank" idea. In the absence of a developed money market, mobilisation of medium and large scale deposits has become rather difficult. In fact sources of potential medium and large scale deposits have yet to be



SAVINGS DEPOSITS



TERM DEPOSITS



clearly identified and measures devised to mobilise them. The savings funds, unit trusts, or building societies are some of the other sources of savings available in more developed market economies. (Since writing of this note, the Central Bank announced its scheme of issuing Bearer Bonds in Rs. 5,000/- denominations).

CREDIT CREATION

The interest rates changes, particularly the upward movements, have a greater bearing on the credit creation aspect of the economy. This is true particularly of a developed economy where the proportion of liquid money is less than that of "bank money". Every time the bank rates increase, credit tends to become expensive. This also has a salutary effect on the rate of inflation itself as the commercial banking sector naturally pushes its lending rates to match the bank rate. On the other hand a high interest rates policy results in a quantitative limitation in credit unless the demand for credit is matched by a similar savings mobilisation effort, because under high rates of interest the sources of refinance available to banks would be either limited or expensive particularly in the context of developing countries where capital shortages are acute. The purpose of increasing the bank rate and thereby pushing up the interest rate levels is to limit credit expansion in the banking sector as a counter measure against inflation. However,

the efficiency of this instrument in regulating the supply of credit will depend on the total coverage of the banking system as of the economy. In Sri Lanka, in the non-formal sector, where financing is done mostly by non-institutional sources, credit is bound to be more expensive as the lending rates in this sector are much above the commercial bank rates.

Perhaps another effect of a rise in interest rates would be a dampening of the private entrepreneurship which is undoubtedly counter-productive in an economy like that of ours. As interest rates shoot up private individuals show a preference towards "indirect investment" in finance houses or banks to that of a direct entrepreneurial undertaking which carried a certain amount of risk and perhaps a lower rate of return per unit of capital.

For instance, a person with Rs. 100,000/- could earn a minimum of Rs. 20,000/- per annum by investing it in a bank, without having to face all types of organisational difficulties and risks if he had made a "direct investment".

A high interest rate on the whole discourages investment as much as it acts as a counter inflationary measure. In most parts of the world, including the United States where the interest rates have shot up tremendously, there is a growing feeling that recession is at hand. At least a few business houses in the West faced difficulties due to high cost in lending

Continued on Page 27

INTERVIEW

ASIA THROUGH BANK OF AMERICA'S EYES PLANS FOR SRI LANKA

From an interview by Nicky Careem, Assistant Editor of the Pacific Magazine's Ltd: monthly journal INSIGHT, with James Wiesler, the executive vice president, Asia/Pacific, of Bank of America.

INSIGHT: What are Bank of America's problems in dealing with Southeast Asia?

James Wiesler: Our problems are not serious. But being an international bank, we find it difficult to attract indigenous deposits. This is no handicap in dealing with competition from other foreign banks but when it comes to competition from large local banks, it does slow our growth in local currency loans which are sometimes more profitable than Eurodollar loans.

Are these problems caused by nationalism?

Yes. There is a lack of reciprocity between most countries in Asia/Pacific and the U.S. While they have a high degree of freedom to enter the US and either establish a number of branches or buy a US bank which can be partly or wholly owned, there are restrictions on US banks operating in the region. However, we do recognise that these countries want to establish their own financial systems without depending on foreigners. And what is encouraging to us — as outsiders — is Asia's desire to help itself.

ASIAN EARNINGS

What percentage of BOA's earnings comes from this region?

Including Japan, it runs to 7 percent of total BOA earnings. Our major contributors are Japan, Hong Kong, Korea, Singapore and the Philippines. At one time, Japan was the dominant contributor with 60 percent of the Asia division's earnings. Now it is less than 20 percent. This is due partly to the structural change and partly to the slow growth of foreign banks — sometimes registering negative growth — in Japan. But mostly, it is due to increased business activity in the

rest of Asia. Although Japan will be the dominant economy in Asia, as countries like Korea and Asean grow, there will be a great deal of intra-regional investments. Asia will no longer be the recipient of purely non-Asian funds and that is why we think this region is interesting.

Was this your reason for opening up in Sri Lanka?

Initially, it was prompted by the change in government in 1977. We feel that the country is trying to upgrade its economy by providing employment through foreign investment. This is evidenced by the establishment of a free trade zone and a friendly attitude towards foreigners. But despite such encouragement if there is no foreign investment, then there is no business for us. However, we found that many of our customers were affected by the high cost of labour in some Asian countries. In Sri Lanka, they discovered an efficient and cheap supply of labour. This was another reason for our decision.

What kind of banking will you do in Sri Lanka and how soon will you be profitable?

Essentially it will be in the trade area. But we may well be lending to major projects, particularly government sponsored ones. We hope to raise our lending base both domestically and from abroad. We intend doing offshore and on-shore business. But there is a shortage of US dollars and Eurodollars and the unknown quantity is how successful we will be in developing local funds for local lending. As regards returns, we hope to be profitable at the end of the first year. But if we average a 15 percent return at the end of five years, we would be satisfied.

Will BOA finance the oil needs of South East Asia and if so, how does it evaluate the risk factor of countries?

We look at the degree of political stability, the quality of government bureaucrats, plans for developing foreign exchange through exports and the capacity of the economy to handle development programmes. To establish a country's risk factor, we study IMF figures, Central Bank figures, in

addition to our evaluation system. Depending on these we will finance the legitimate needs of any business, any government or any group of people.

FIGHTING INFLATION

Most countries want to restrict credit to control inflation. How can you follow this guideline and also make profits?

We try not to lend money to those projects that are inflationary or are particularly speculative. We try and stay with trade financing or with government sponsored projects. For example, we have grown reasonably well in Hong Kong although there is inflation in that city. Just because there is inflation it does not mean that there is no growth. We have been financing the increasing volume of trade in Hong Kong and as that volume increases, so does our business. But we are careful in lending to speculative businesses or those contributing to inflation like the property market in Hong Kong. Our loans have been very small in that area.

How are you facing up to competition from European banks in Asia?

Swiss and German bankers are particularly competitive and they are coming to Hong Kong because of what is happening in their own countries. The German economy is not growing rapidly enough as a result of the recession a few years ago and German companies find themselves in a very liquid position. So German bankers are looking to areas where they can grow to offset the loss of profits they usually make at home. Switzerland is a very small country but they take in a lot of deposits and are faced with a similar European situation. The markets with good growth potential are Africa, Latin America and Asia. But the work ethic in Asia is much higher and will therefore attract international bankers. To meet this challenge, we are improving our management and marketing skills, be more aggressive in certain areas and expand in others — like Sri Lanka — and lower costs. But we have a profitability criteria. Unlike Japanese banks, we are not going to do things just for the sake of market penetration. We have standards that relate to the quality of our management and we feel that we are a well managed bank because we have profitability standards. Furthermore, we look carefully at return on assets and we cannot get

ECONOMIC REVIEW, MAY 1980

involved in all the competition because much of it is so low-priced, particularly in the term business. Here, the spread can be as low as 0.5 percent over a long time. We look a 15 percent return on capital and we cannot do that on such low spreads, especially for fixed term loans. For many years, BOA and other banks have been working on a 10 per cent to 11 per cent annual return on equity. But the high cost of money on the capital markets forced us to change our sights to a 15 percent return on capital. We hope to improve our management and service to meet this challenge. By these measures, we hope to attract more depositors to increase our capital to make that 15 percent.

CHINA'S GROWTH

In which areas or regional banks would you like to see change?

We would like to see opportunities for developing local resources so that we can be in the mainstream of domestic banking in the region. For example, we cover Australia from the Asia/Pacific region. There are six trading banks in that country and we are not allowed to do business other than in the field of offshore financing. After Australia reviews its domestic banking, we hope to be allowed into that domestic market. The only way we can enter most of the local markets in the region is through a merchant bank or a finance company.

Financial highlights of Bank of America, US\$ 1,000

	1977	1978
Assets	81,988,575	94,902,464
Deposits	66,405,379	75,828,044
Net loans	41,531,154	49,312,903
Net income	396,276	497,920

Continued from page 25

and the subsequent narrowing of margins. Business and trade circles in most countries have become very apprehensive about a rise in interest rates. In a developing economy like that of Sri Lanka although development, broadly defined, could be compatible with slow growth whether the present policy targets of high investment priority could be achieved by slowing down of growth rates, is an important aspect that needs careful consideration. In effect, changes in interest rate policy by itself has both its negative and positive aspects to be weighed against each other in making an assessment of its use as a policy instrument.

ECONOMIC REVIEW, MAY 1980

FEATURES

Role of Regional Fertilizer Warehouse Complexes

C. R. Kuruppu

Availability of fertilizer in adequate quantities and also in time and at a fair price has been a major problem for the agricultural sector in Sri Lanka; particularly for the small holders in plantation crops and small cultivators of paddy and subsidiary food crops. The various factors responsible for the inadequacies in the system have been highlighted in many reports, as this paper shows, but basically it has been the drawbacks in the system of distribution that has brought about the situation. The Government has therefore decided, after due consideration, to establish a chain of five Regional Fertilizer Warehouse complexes to supply the needs of the entire country. In this paper C. R. Kuruppu, Director of the National Fertilizer Secretariat, Ministry of Plan Implementation, discusses this new scheme and emphasises the need for efficient management and operation of the complexes.

There is considerable scope to substantially increase agricultural productivity in Sri Lanka. This could be clearly observed from a comparison of the average production with the potential in respect of the four major agricultural crops of the country, tea, rubber, coconut and paddy (rough price) as given in Table I.

TABLE I
ACTUAL & POTENTIAL ANNUAL YIELDS OF MAJOR CROPS

	YIELD	
	Actual	Potential
Made tea, upcountry	1,500 kg.	2,500 kg
Made tea, lowcountry	1,500 kg.	4,500 kg.
Rubber	700 kg.	2,000 kg.
Coconut	4,000 nuts	16,000 nuts
Rice (rough)	2.5 tons	5 tons

SOURCE: Masterplan on Promotion of Fertilizer Distribution Consumption — Main Report, Table I. Page 3.

To realise a higher level of agricultural productivity, it is necessary to adopt a package of measures such as the use of high yielding varieties; proper weed, pest and disease control; soil and water conservation with appropriate drainage facilities; and the application of fertilizer conforming to the dosages recommended by

the relevant Research Institutes. Of these measures, fertilizer application is one of the most important since the present consumption of this commodity in the agricultural sector is far from satisfactory as indicated in the data in Table II, where the current fertilizer use in relation to the quantities recommended by the appropriate research organisations are given.

TABLE II
CURRENT FERTILIZER USE

	Current Fertilizer use in Relation to Recommended Dosage (in %)
Tea	75
Rubber	35
Coconut	20
Rice	37

SOURCE: Masterplan, Main Report, Table II - Page 3.

The application of fertilizer in the large plantations, both in the private and public sectors, are at present quite satisfactory. The transport that brings the produce of the estates to the metropolis take fertilizer on their return journeys back to the plantations. Thus, there is no serious problem in the supply of fertilizer to these plantations. However, the position is totally different among small holders and farmers. In this sector, an important factor that constrains the consumption of fertilizer is the non-availability of the different varieties of this commodity in adequate quantities at the ap-

propriate times. The current system of fertilizer distribution does not adequately serve these users of this vital commodity.

Present System of Supply to Retailers

Today the supply of fertilizer is undertaken at the wholesale level in Colombo by a number of

public and private sector institutions; at the intermediary level by 102 District Warehouses scattered all over the island; and at the retail level by Multi-Purpose Co-operative Societies, Agricultural Service Centres, Private Authorized Dealers as well as by outlets belonging to the Coconut Cultivation Board and the Tea Smallholders Development Authority. Although there are at present sufficient stocks of fertilizer at the wholesale level, the position is not satisfactory at the intermediary and retail levels. This adversely affects the total overall consumption of this commodity by the agricultural sector.

(The Agricultural Service Centres are operated by the Commissioner of Agrarian Services functioning within the Ministry of Agricultural Development & Research).

The main function of the District Warehouses is the bufferstocking of fertilizer to ensure its ready availability in different varieties to retailers at all times. Unfortunately, for a number of reasons, these warehouses have failed to effectively perform this task. For one thing, these warehouses are unfavourably located in relation to the railway and the main highways of the country. In fact, only a few of them are connected to the National Railway System. Consequently, transport costs to these warehouses are considerable with changes in the means of transport from rail to road. Moreover, the small storage capacities of the District Warehouses do not enable them to benefit from large scale rail transport. Instead of utilising trains consisting largely of fertilizer wagons, this commodity has to be transported in a few wagons which increase the turn-round time of the CGR.

On the other hand, these warehouses suffer from a lack of competent managerial staff with appropriate training and experience. This is reflected in the average annual through-put of these warehouses which is as low as 1.1 whereas in some private retail outlets it is as high as 16.0. The lower through-put factor naturally increases their average operational cost. Moreover, most of these warehouses function as isolated units without any active contact with either the retailers, whom they are expected to serve, or the higher levels of the distribution system. This managerial deficiency together with the absence of proper transport facilities

have contributed to poor planning and control of fertilizer stock movements at the intermediary level.

These shortcomings of the existing distribution system at this level were high-lighted in the Masterplan on Promotion of Fertilizer Distribution and Consumption prepared by a team of local and foreign experts and released in early 1978. The Masterplan indicated that there are far too many warehouses at the intermediary stage at too many different places and that these difficulties were compounded by the fact that most of these warehouses are unfavourably located in relation to the centres of fertilizer demand. The Masterplan concluded that a few strategically located large warehouses under proper management would be sufficient to satisfy the island's requirements of fertilizer at the intermediate level.

(See Masterplan on Promotion of Fertilizer Distribution and Consumption Main Report, Page 52).

Regional Fertilizer Warehouse System

Taking these factors into consideration, the Government has decided to establish a chain of five Regional Fertilizer Warehouse Complexes to supply the fertilizer needs of the retailers of the entire country. The implementation of this scheme would be largely financed with foreign assistance*. All these Regional Warehouses would be connected to the National Railway System and would also be in close proximity to one of the main Highways of the country. The establishment and operation of these Complexes is the responsibility of the Ceylon Fertilizer Corporation that falls within the purview of the Ministry of Agricultural Development and Research. Co-ordination of the relevant work of

different Ministries and other institutions for the efficient functioning of the Regional Warehouse System would be undertaken by the National Fertilizer Secretariat of the Ministry of Plan Implementation**.

The Master Plan on Promotion of Fertilizer Distribution and Consumption recommended that the following factors be taken into consideration in determining the location of Regional Fertilizer Warehouse Complexes***.

- 1) Since the cheapest form of large scale transport in Sri Lanka is the rail, these warehouses should be located close to the railway line so that they could be connected to the National Railway System with the least expenditure.
- 2) It should be close to a national highway as most retailers would be transporting fertilizer from the complex to their stores by truck.
- 3) Proximity to the main fertilizer demand areas is preferable since it would minimise the total transport cost.
- 4) The retailers in the District should be able to re-fill their retail stores within one day from the Regional Warehouse.
- 5) Location in a District or sub-District capital would be advantageous since it would ensure easy accessibility to Government institutions at the District or sub-District levels.
- 6) To facilitate the recruitment of suitable managerial personnel and retaining their services, it is prudent to site these complexes in places where minimum social and private infrastructure facilities are available such as schools, hospitals, shops, theatres and other recreational facilities.
- 7) Ready availability of water and electricity and easy access to the telephone system.

* The local costs of the First Regional Fertilizer Warehouse Complex at Maho are financed mainly from the counterpart funds of the Federal Republic of Germany. This country also financed the foreign expenditure involved in the provision of ancillary facilities such as the supply of trucks and a mixing plant. It is expected that the proposed Weligama Regional Fertilizer Warehouse Complex would also be largely financed by the Federal Republic of Germany.

** Since a number of Ministries, State institutions and private sector establishments are involved in various aspects of fertilizer activities such as import, local production, distribution, consumption, transport and handling, a National Fertilizer Secretariat was established in early 1979 under the Ministry of Plan Implementation primarily for the purpose of co-ordinating the activities of these institutions and to undertake the formulation and implementation of national fertilizer policies.

*** Masterplan on Promotion of Fertilizer Distribution and Consumption, Main Report, Page 53.

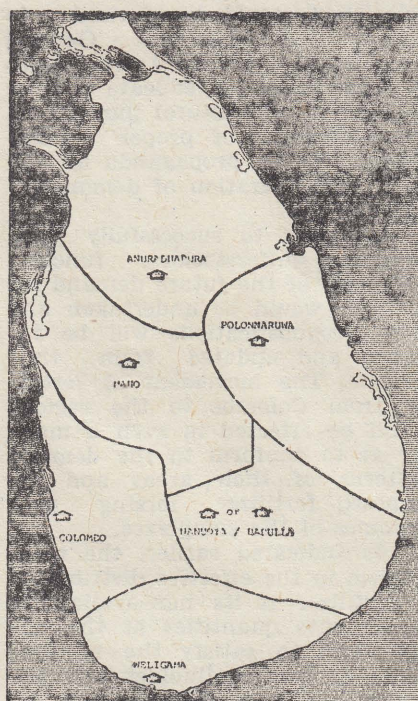
The first Regional Fertilizer Warehouse Complex at Maho is already in partial operation and is expected to be fully commissioned shortly. This Regional Warehouse has a capacity to store 16,000 tons of bagged fertilizer while its mixing plant is capable of mixing 10 tons of fertilizer per hour. Work on the establishment of this Regional Warehouse commenced prior to the release of the Masterplan applicable to the entire island. Thus, it does not conform to some of the important criteria mentioned above such as location in a District or sub-District capital, minimum infra-structure facilities and the ready availability of water.

(This warehouse is already experiencing difficulties due to the lack of satisfactory social amenities and the absence of an adequate supply of good water. Action is, however, being taken to overcome or minimise the adverse effects of these deficiencies).

However, most of the important factors enunciated earlier have been taken into account in determining the location of the balance Warehouses. These are to be established at Welligama to serve the South, Anuradhapura for the North, Polonnaruwa for the East and the bulk of the area to be covered by the Mahaweli Development Scheme, and a location in the Uva province or the Nuwara Eliya District to cater to the central region of the island. Colombo would perform an important regional function at the intermediary level by supplying directly by road the requirements of the retail outlets in the adjacent Districts such as Kalutara, Ratnapura, Kegalle and a section of Kandy, apart from the Colombo District itself. A map indicating the geographical areas to be served by these complexes covering the entire country is given in the figure above.

The Regional Fertilizer Warehouse System will serve mainly the retailers that supply the fertilizer requirements of smallholders of tea, rubber and coconut as well as the growers of vegetables, fruits and other food crops. However, they would undertake retail sales on a limited scale to serve the needs of fertilizer users in the surrounding areas. As at present, the estate sector (largely concentrated on tea and rubber crops) will continue to obtain their requirements direct from Colombo.

Bufferstocking of different



LOCATIONS OF REGIONAL FERTILIZER WAREHOUSES WITH SERVICE AREAS

varieties of fertilizer would be only one of the functions of these Complexes. Their management would undertake promotional activities to encourage the greater use of fertilizer in their respective areas. They would also engage in the mixing of fertilizer to produce different fertilizer mixtures that would be relevant to the agricultural activities of the regions that they serve. For this purpose, it is proposed to provide all Complexes with facilities for the mixing of fertilizer.

In connection with promotional activities, these Complexes would operate technical services to extend technical advice to retailers on methods of fertilizer handling, management practices, fertilizer application, as well as provide them with relevant hand books and literature. This would enable the retailers to perform their tasks satisfactorily while simultaneously transferring the relevant know-how to the smallholders and farmers that they serve. The latter development would in turn increase the over-all demand for fertilizer at the level of the smallholder and farmer.

With the inauguration of the Regional Fertilizer Warehouse System, the existing District warehouses would progressively cease to engage in fertilizer supply at the

intermediary level. However, an effort will be made wherever feasible to use the facilities of existing District warehouses to supplement the storage capacities of the Regional Warehouses. District warehouses with storage capacities exceeding 1,000 tons and satisfying certain requirements such as favourable location and minimum infra-structure facilities will be integrated with the Regional Warehouse Complexes and centrally managed by the main office of the Complex located at the Regional Warehouse. Thus, the Regional Fertilizer Warehouse Complexes will comprise of the Regional Warehouses together with one or more satellite warehouses.

Fertilizer Mixing Facilities at Regional Complexes

The mixing of fertilizer would facilitate the bufferstocking function of these complexes. By the constant review and adjustment of the fertilizer mixing programmes, it would be possible to increase the stocks of those fertilizer mixtures that move fast while reducing the stocks of other mixture where sales are correspondingly slack. This flexibility would enhance the ability of these complexes to make available all required fertilizer mixtures at all times in adequate quantities. In this connection, it should be noted that the existing District Warehouses deal mainly with fertilizer relevant for paddy and subsidiary food crops. However, the Maho Regional Fertilizer Warehouse Complex as well as the other complexes to be established will handle fertilizer for all crops that are applicable to their respective catchment areas.

Originally, the provision of facilities for the mixing of fertilizer at the Regional Fertilizer Warehouse Complexes was not envisaged since sufficient capacities were available in and around the metropolis to satisfy the requirements of the nation. The Maho Regional Warehouse Project, as stated earlier, was implemented prior to the release of the Masterplan on the Promotion of Fertilizer Distribution and Consumption and, therefore, provision was included for the installation of mixing facilities. However, the establishment of similar facilities in the other Regional Warehouses was not contemplated.

This matter was recently reviewed in the light of the substantial increase in the consumption of fertilizer in 1978 in relation to its use

in the previous years,* and the economies in handling arising from the operation of mixing facilities in the regions. Recent studies conducted by Agra-und-Hydratechnik for the German Agency for Technical Cooperation of the Federal Republic of Germany indicated that considerable economies could be realised by the mixing of fertilizer in the Regional Warehouses rather than in Colombo. A comparative analysis reveals that the mixing of fertilizer at the proposed Weligama Regional Fertilizer Warehouse Complex itself rather than at the Hunupitiya Mixing Plant of the Ceylon Fertilizer Corporation would result in a saving of Rs. 71/- per ton in respect of bagged fertilizer and Rs. 65/- per ton in the case of bulk fertilizer. It is, therefore, economical to directly transport the imported or locally produced fertilizer to the Regional Warehouse for mixing, overcoming additional cost arising from double handling, double book keeping and similar operations. The study concludes that the findings for Weligama would be applicable to the other proposed Regional Fertilizer Warehouse Complexes as well**.

For this reason, it is now the intention of the Government to provide such facilities also in the balance Regional Fertilizer Warehouse Complexes to be established at Weligama, Polonnaruwa, Anuradhapura and at a location in the Uva Province or Nuwara Eliya District.

Importance of the Managerial Factor

To promote the use of fertilizer conforming to the dosages recommended by the relevant Research Institutes, the management of the Regional Fertilizer Warehouse Complexes will maintain a continuous dialogue and contact with the retailers that they serve. Measures will be adopted to ensure that sales are effected in a convenient manner with the minimum of bureaucratic procedures. Difficulties of retailers with regard to matters such as storage at the retail level and credit facilities would be ascertained and measures formulated to overcome serious constraints. Simultaneously, action will be taken to train retailers to perform their functions effectively. ***Moreover, an effort will be made to obtain feed back information from retailers as to the factors that constrain the proper use of fertilizer among the smallholders and farmers so that suit-

able steps could be devised to remedy shortcomings. General promotional activities will also be undertaken to educate those engaged in agricultural pursuits on the advantages of proper fertilization, both by propaganda as well as by the operation of demonstration plots.

In order to successfully perform the bufferstocking function a forecast of the future demand for fertilizer would be undertaken and these prognostications will be reviewed and updated from time to time. The movement of fertilizer from Colombo to the regions would be effected in such a manner as to conform to the demand patterns of their areas and the proposed fertilizer mixing programmes of the complexes.

As indicated earlier, the main problem in the effective distribution of fertilizer is its non-availability in adequate quantities at the village level to satisfy the requirements of the smallholder and the farmer. The recent report of the market survey in the Kurunegala, Anuradhapura, Matale and Puttalam Districts undertaken by the Regional Fertilizer Warehouse Complex at Maho in co-operation with the Agra-und-Hydratechnik of the Federal Republic of Germany states that "since 1977 the supply situation for the country has changed considerably with ample stocks available in Colombo", but refers to "the problem of lack of fertilizer in the village sales centres". This report goes on to state that the problem of lack of fertilizer at the village level is the result of other problems such as "lack of transport facilities, lack of storage facilities at the dealer's level, and may be lack of purchasing credit". ****

One of the functions of these Complexes would be to ensure that retailers possess adequate stocks of their own prior to the commencement of the fertilizer seasons to meet the first wave of demand and thereafter replenish

their stocks from the Regional Warehouse on a regular basis so that fertilizer of different varieties are always available. Higher sales margins, a well thought out transport rebate system and appropriate credit facilities, both for the purchase of fertilizer and for the establishment of storage facilities, are some of the incentives that could be offered for this purpose.

(To overcome the problem of inadequate transport facilities at the village level, the Regional Fertilizer Warehouse Complexes propose to operate a fleet of lorries to transport fertilizer from their warehouses to the retail sales outlets when necessary.)

For the effective discharge of these important and responsible functions the operation of a sound managerial system for the Regional Fertilizer Warehouse Complexes consisting of personnel with professional expertise, adequate experience and correct motivation cannot be over-emphasised. The establishment and maintenance of such professional cadres in a large number of District Warehouses in remote and distant places with limited social amenities is neither feasible nor commercially justifiable. However, the recruitment and retention of such personnel is a practical proposition in a few centrally located fertilizer complexes that enjoy certain minimum social infrastructure facilities. Since the success of these complexes would largely revolve on the quality of the management, those responsible for their over-all operation should devote adequate attention to this matter and ensure that they are staffed with proper personnel who are provided with facilities for training and improvement of their professional skills on a regular basis.

Storage Capacities of Complexes

The storage capacities of the five Regional Fertilizer Warehouse

instruction on auditing and stock control, managerial skills, and techniques in fertilizer handling.

****Report of the Fertilizer Market Survey in the Kurunegala, Anuradhapura, Matale and Puttalam districts undertaken by the Regional Fertilizer Warehouse Complex at Maho in co-operation with the Agra und Hydratechnik of the Federal Republic of Germany, April 1979, page 25.

* The estimated consumption of fertilizer in 1978 was 380,000 tons, whereas in the 4 previous years it ranged between 210,000 tons and 298,000 tons.

** Report of Agra-und-Hydratechnik for the German Agency for Technical Co-operation of the Federal Republic of Germany on "Optimum Location and Capacities of Regional Fertilizer Warehouses", Page 8.

***This would include advice and

TABLE III
Storage Capacities of Regional Fertilizer Warehouse Complexes (in Tons)

Item	Regional Warehouse Complexes					Uva Province/ N'eliya District
	Maho	Weligama	Polonnaruwa	Anuradhapura		
1. Storage Capacities of Affiliated District Warehouses	1,600 Kurunegala	1,630 Matara 1,475 Galle	4,890 Polonnaruwa 3,765 Batticaloa	1,630 Anuradhapura 1,630 Vavuniya 1,630 Jaffna		1,190 Badulla
2. Total	1,600	3,105	8,655	4,890		1,190
3. Storage Capacities of Regional Warehouses	16,000	10,500	13,000	20,000		12,500
4. Total Storage Capacity of Complexes	17,600	13,605	21,655	24,890		13,690
5. Anticipated throughput factor of Reg. Warehouses	3.0	3.3	3.0	2.5		2.5
6. Anticipated throughput factor of affiliated District Warehouses	2.5	2.8	3.5	3.0		3.0

SOURCE: Prepared on the basis of data in the Report on the Optimum Location & Capacities of Regional Fertilizer Warehouses.

Complexes together with the District warehouses to be affiliated to these complexes are give in Table III. This data also includes the annual anticipated through-put factor for the Regional Warehouses as well as for the affiliated satellite District Warehouses. The storage capacities of the Regional Fertilizer Warehouse Complexes to be established were determined in a report on "Optimum Location and capacities of Regional Fertilizer Warehouses" prepared for the National Fertilizer Secretariat of the Ministry of Plan Implementation to which reference has been made earlier. In arriving at its conclusions, this analysis has taken into consideration the future annual fertilizer requirements at the retail level of the areas to be served by these complexes, the capacity of District Warehouses to be affiliated to these complexes, their existing and potential through-put factors, as well as the anticipated through-put factor of the proposed Regional Warehouses.

It will be seen from this information, that nine existing district warehouses with storage capa-

cities exceeding 1,000 tons would be affiliated to the Regional Fertilizer Warehouse System. The largest over-all total storage capacity would be at the Anuradhapura Complex with around 25,000 tons. Such a large storage capacity is required at this Complex since it has to cater to the entire Northern region of the island and the area to be served is substantial in relation to other Complexes.

The total storage capacities of the Polonnaruwa Warehouse Complex would be in the region of 21,500 tons since it has to progressively supply the fertilizer requirements of the Mahaveli Development Scheme as well. Total storage capacities of the other Complexes range from around 13,500 tons at Weligama to 18,000 tons at Maho.

The variation in the anticipated annual through-put is marginal both in respect of the Regional Warehouses as well as the affiliated warehouses. In the case of the former it ranges from 3.0 to 3.5 while in the latter it varies from 2.5 to 3.0 depending on whe-

ther its location is in the dry or wet zones.

SUMMARY

Thus, the network of Regional Fertilizer Warehouse Complexes are not only expected to engage in the mixing, bufferstocking and sale of fertilizer at the intermediary level. More importantly, they are expected to undertake vigorous sales promotional campaigns, conduct market surveys, train retailers in the fulfilment of their tasks and above all impress on the users of fertilizer the advantages of the appropriate application. For the successful performance of these functions, it is most important that these Complexes possess enterprising managerial personnel with a capacity to establish a continuous dialogue with retailers and other imported users and enjoy their confidence. The success of the efforts of the Government to raise the level of fertilizer consumption in the island together with other related cultural practises in order to increase agricultural productivity rests to a considerable degree on the efficient management and operation of these Complexes of the Regional Fertilizer Warehouse System.

The Strategy Smokescreen

Ernst Michanek

Ambassador Ernst Michanek was the Director General of the Swedish International Development Authority from 1964 to 1979. Previously he was Under-Secretary of State for Social Affairs. In a lifetime of development, he served as Swedish delegate to ESOSOC 1951-1953 and from 1957-1960 on the Governing Body of the ILO. In these and other similar roles he has been involved in the elaboration of all of the UN's Development Decades the First in the 1960s, the Second in the 1970s and the Third Development Decade likely to be established next year. In this article he takes a hard look at the basic concept.

Will a global strategy for development in the 1980s help the poor of the earth liberate themselves from their poverty?

I think not.

I can see nothing that could reasonably be said to prove, or make likely, that the United Nations' international "Development Decade" strategies or similar declarations of a general character have influenced actual world development in the 1960s and the 1970s. Possibly, these strategies have contributed to the disappointment, particularly with the UN system, that now exists in many quarters. Probably, they have been of little consequence because they remain largely unknown.

If the proof of the pudding is in the eating, we have now had enough. As I see it today, we got more pudding than strategy. The resolutionary strategists—and I was among them—did not move the main forces of development.

MILESTONES

The quasi-military vocabulary is warranted, because the world is involved in a war of liberation. In a global perspective, the decisive phase of that war may be said to have begun at the end of World War II, with the gradual dissolution of the colonial empire. National decolonization as such took around three decades. You may see India as the first milestone, Zimbabwe and Namibia symbolizing the last milestone on that particular road. But that is only the first act.

The great positive importance of the United Nations in this process is beyond doubt. But the liberation war continues. The freedom forces set out for much more than the political independence of states. On that grey battleship somewhere out in the Atlantic Ocean, when in 1941 the Western powers outlined their postwar goals, four freedoms were proclaimed as the aims of the struggle: freedom from

want, from hunger, from ignorance and from fear.

The social, economic, cultural and political aims of the United Nations were enumerated in article 55 of the Charter of 1945. And in article 56: "all members pledge themselves to take joint and separate action" for these purposes. The constitutions of the UN specialized agencies specify the goals. Using their own words, we could say that the modifications to the ILO constitution made in 1944 were themselves a declaration of war against want—they were preceded already in the 1919 ILO's constitution by the "peace through justice" proclamation. In the same category come FAO's legal foundation, the freedom from hunger declaration of 1945 and UNESCO's basic text of 1946, the eradication of illiteracy.

Among the many ensuing calls upon all states to "unite in a sustained effort" may be mentioned the First Development Decade declaration of 1961, aimed "to break through the cycle of poverty, hunger, ignorance and disease".

In the 1970s, these texts have proliferated. The population explosion, demonstrating day-by-day the necessity of joint action for mankind's survival, has been accompanied by a parallel proclamation explosion.

Headings and preambles have become more and more forceful. In the 1974 declaration and programme of action on a new international economic order, for example, the United Nations members solemnly proclaim their determination to work urgently for the same aims as before...

With due respect and deep regret, I cannot help sighing: let us not deceive ourselves. Paper tigers are dangerous only to those who conceive them.

This outburst does not imply that the United Nations should not be used for the aims in question. The cry is against the inflationary

misuse of such tactics. This is an important reason behind frequent abuse of the UN for alleged ineffectiveness. Such tactics should be used sparingly if they are to remain effective.

The targets of the general "strategies" of development, insofar as they can be measured against reality—and insofar as their attainment has depended in any way upon international action—have not been reached. The best illustration is probably the established fact that the gap has been widening and still widens between the rich and the poor; that today there are more hungry and ignorant and endangered children and men and women than ever before and that their numbers are not decreasing; that the target of international assistance is more distant from implementation than when it was formulated. This statement in no way belittles the efforts made, the difficulties encountered or the positive results achieved. It simply says that the strategies have not been followed by the action that they presuppose—and that therefore they may have been useless or even counterproductive. I cannot remember having met one developing country spokesman who has referred to them as of important to his country's planning or performance.

I am not against planning, nor against plans leading up to targets. As a "half politician" and public servant for more than three decades, I have worked to achieve specified social goals—namely, by planning and opinion-making and planning again that lead to concrete long-term commitments for the implementation of the programmes.

Sweden's recent history—like that of several other countries—is full of such undertakings. Plans to build up a social security network, aimed at creating "freedom from fear" for all citizens, have been made and implemented, revised and restructured. Action programmes for "full employment", "housing for all", "health for all" have been made, costed, financed and implemented step-by-step over many years. The "eradication of illiteracy" belongs to past history. The names of the programmes just quoted embrace universal targets that may, in fact, never be fully met in a literal sense. Such target formulations—like "fundamental freedoms for all" in the UN char-

ter—may nevertheless be useful insofar as they constitute social rights of the individual who in an open society can request the fulfilment of the right not only in principle but in the individual case.

SWEDEN AND AID

My most interesting experience in 'targetry' from an international point of view has been in the field of development assistance. Sweden voted in 1960 and 1961 for the first United Nations resolutions recommending a flow of resources as aid to developing countries, the amount of which should correspond to one per cent of the national income of the developed countries. On the basis of a full public debate and a number of studies on the matter, parliament asked the government for action, and in 1962 a decision on the principles of an aid programme was taken, followed by substantial budgetary increases for activities in development co-operation and the build-up of an administrative structure. In 1968 the previous discretionary and non-systematic annual increases in spending were followed by a detailed seven year plan for the gradual, orderly attainment of a one per cent target for budgetary allocations to 'official development assistance' (actually a more ambitious target than that of the UN).

The plan was unanimously adopted by parliament—after voting down the request of one party for a plan that would have implied reaching the target faster, namely in five years instead of seven. That request for a more ambitious policy in favour of the poor countries was supported not least by youth demonstrations (as you remember, 1968 was a lively year in many countries). The particular aid plan of 1968 was actually implemented in eight years, the 'oil crisis' being one excuse for the year delay. That delay, however, was bitterly opposed in parliament and the press with reference to 'our promise to the developing countries'. Sweden was still the first country to reach the target contained in the United Nations International Development Strategy for the 1970s, specified as 0.7 per cent of each rich country's GNP for transfer as official development assistance. Not a single voice in parliament, has ever been raised against the implementation of this undertaking which followed from the United Nations vote for the strategy resolution. However, it

takes much more than a UN resolution to provoke a multi-billion dollar decision by the Swedish Parliament. But that is another story.

The lesson is, however, that a strategy worth the name deals with the goals to be reached, the main ways to reach them and the forces to be used. A strategy requires not only a strategist to write it but a supreme command and suitable forces to mobilize—and the decision to carry the strategy through. The UN has an intellectually high-powered committee for the purpose (or several) — but what else does it have?

Development is for people and by people. If anything has been learnt from the last few decades, it is that economic and social development cannot be isolated from each other, so, any planning begins with people—their needs, their aspirations, their capabilities of working for the improvement of their lot. In the present situation, anti-poverty policies have to be given priority. Societies with too glaring gaps cannot survive. In other words, in poor countries development planning has to begin with the items that people themselves begin with when they build up their own livelihood in a non-industrialized society; these are water, land, food, sanitation, shelter, knowledge. Targets should be formulated based on the ambition to provide freedom from poverty for all. A number of United Nations special conferences in recent years have made exercises in target formulation for poor countries and poor people everywhere: water for all, health for all, employment for all, a sound environment, knowledge of family planning for all and means to practice it, and so on. Knowledge to read and write and to count seems to me—on the basis also of the Swedish experience—to be of such fundamental importance for advancement in all other fields of human activity, that I cannot understand UNESCO's present unwillingness to push it as the top priority of all development endeavours.

Such targets, formulated for each country's specific situation, should be calculated in relation to physical resources and reasonable standards: cost-estimated and time-planned. Here the United Nations can be of great service to its members. Experiences from other countries' failures and successes should be made known—not just general statistics or the polish-

ed success-stories from the technical assistance treasury. Lessons from neighbouring poor countries should be taught through special subregional endeavours. The UN organizations could get resources for such services to poorer countries by decreasing the production of repetitive resolutions, shortening and dropping conferences—there are said to be 9,000 of them this year—and by concentrating on fewer items. This would also decrease the work load on hundreds of national ministries and would help them provide for higher quality in their participation. Recently in Manila, another 'strategy-like' lengthy resolution emerged from UNCTAD V. It repeated a series of similar texts from earlier years calling for a substantial new programme of action for the least developed countries' development in the 1980s, with particular reference to their most pressing social needs. These countries are called upon to plan ambitiously for their own endeavours. At the same time the resolution says that serious plans can be made and implemented only if there is assurance that substantial additional resources are committed from outside.

In my opinion, the likelihood of such assurances (on top of the expected decision to replenish the World Bank IDA funds) is next to nil, whatever resolutions may be voted. However, if the poorest countries, in collaboration with UN bodies, and making use of the material from the UN special conferences of the 1970s, give priority to the most obvious social needs of their poor, and begin to implement such programmes, their request for external resources should not pass unnoticed. On the basis of such specified programmes for individual countries, some UN body could make aggregate projections in order to see where groups of countries and the world as a whole seem to be moving. Starting from that material, a discussion on priorities could follow which might result in some kinds of 'strategic' statements on bottlenecks and possible solutions.

To apply once again the method of overall projections, followed by general so-called strategies and then requests for unspecified support for the economies of poorer countries will produce no tangible result.

The United Nations must do better than produce dead letters. The world has had enough of them.

ECONOMIC REVIEW

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