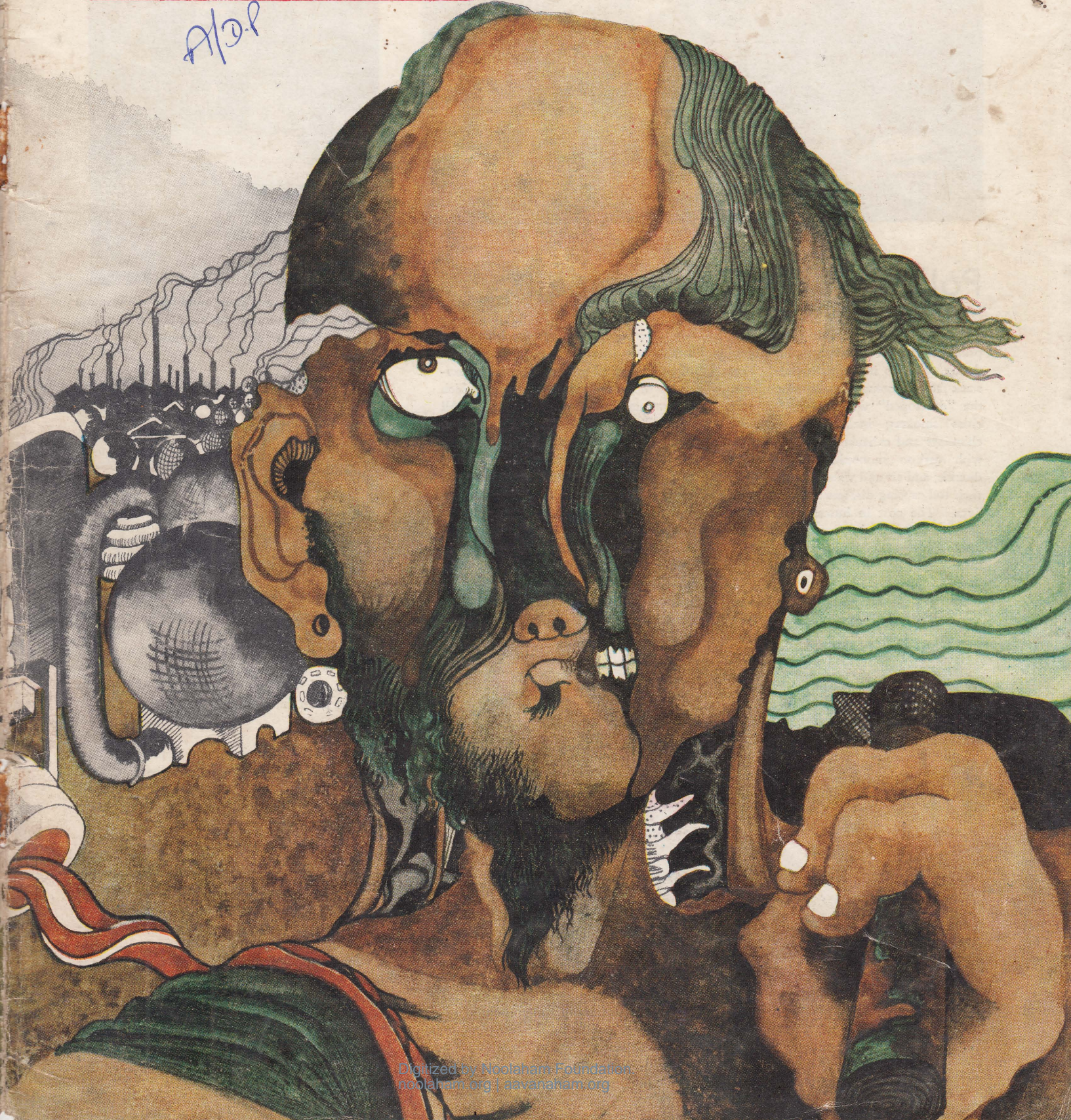


# ECONOMIC REVIEW

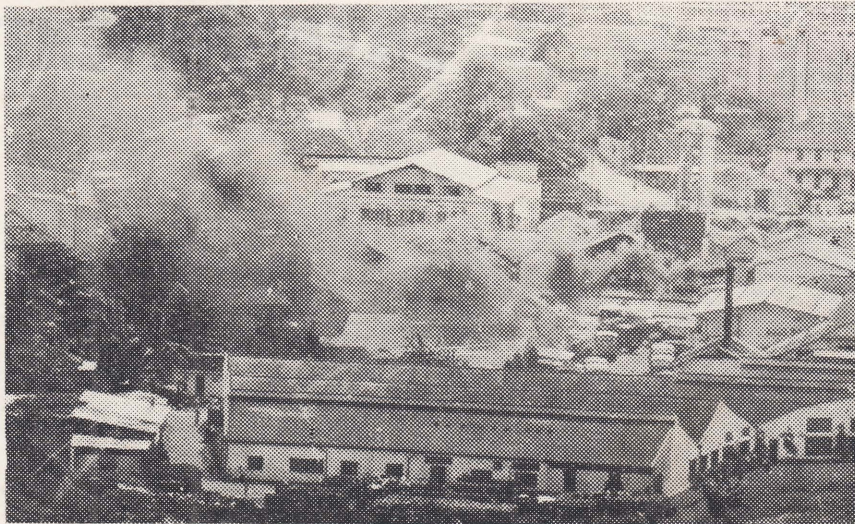
1980  
FEBRUARY

# ENVIRONMENT

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## Polluting the Environment

Man has been found to be both the prime source of environmental degradation and also its prime victim. This stark fact has come out very strongly in the "developed" world where in most cities smoking incinerators, belching chimneys and exhaust fumes fill the air with carbon monoxide and sulphur dioxide; and air and water pollution take their toll causing diseases and shortening lives. The cost in human suffering is incalculable; but the annual economic cost has been estimated at several billions of dollars.

Man and his environment are inseparably linked—the organisms which give

him disease, the vectors (such as flies) which help transmit disease are all part of an ecological system. It is the interaction of man and his environment which determines the incidence of disease. All aspects of human health and well-being within the living and working environment are directly linked with the stability and proper functioning of our surroundings. Unfortunately it has not been sufficiently recognised that many of our environmental problems stem from a narrow, single-purposed approach in public or private action that affects the human environment; whether in agricultural, industrial or urban development.



*Air pollution (left), unhygienic water and drainage and congested living conditions in the heart of the city pose problems for the environment.*



There appears to be a limited awareness among governmental and non-governmental authorities and the general public of the significance of this issue. The main reason is that the pollution of the environment has not been looked at as an immediate problem.

This is obviously a short-term approach which many of the "developed" countries have realised at heavy cost.

The cities of the Third World have fortunately been saved this fate so far though many of them are already beginning to feel the dangers of environmental pollution. In Colombo, though industrial pollution has not reached the dangerous proportions of the developed countries, the polluting of the environment of the poor through the water systems and the houses they occupy is higher. The pictures here illustrate some aspects of environmental pollution in Colombo.



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**FEATURES**

*Richards*  
*D. Karunairajan* 24 Use of Pesticides and Insecticides—An organic  
agricultural point of view

*Ignacy Sachs* 29 Looking into Interdependence

**BOOK REVIEW**

*Chrys Guneratne* 31 Michael Scott—Aid to Bangladesh: For Better  
or Worse?

**SPECIAL REPORT****3 ENVIRONMENT****COLUMNS**

2 Diary of Events : *December 1979*

17 The Economy : *Inflation in 1979*

18 Foreign  
News Review : *Gold passes the \$800  
an ounce mark*

20 Technology : *Industrial products from natural  
or waste materials*

21 Industry : *Local industries and import  
liberalisation*

22 Commodities : *TEA-Drop in world  
production  
RUBBER-Agreement on  
natural rubber*

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**

- Estate Labour—Immigration and emigration, Labour shortages and surplus, Social conditions
- Subsidies and the economy
- The garments industry in Sri Lanka
- Paddy harvests in 1979
- Fertilizer - the role of regional warehouses

**COVER ARTIST**

Nayanananda Wijayakulathilaka

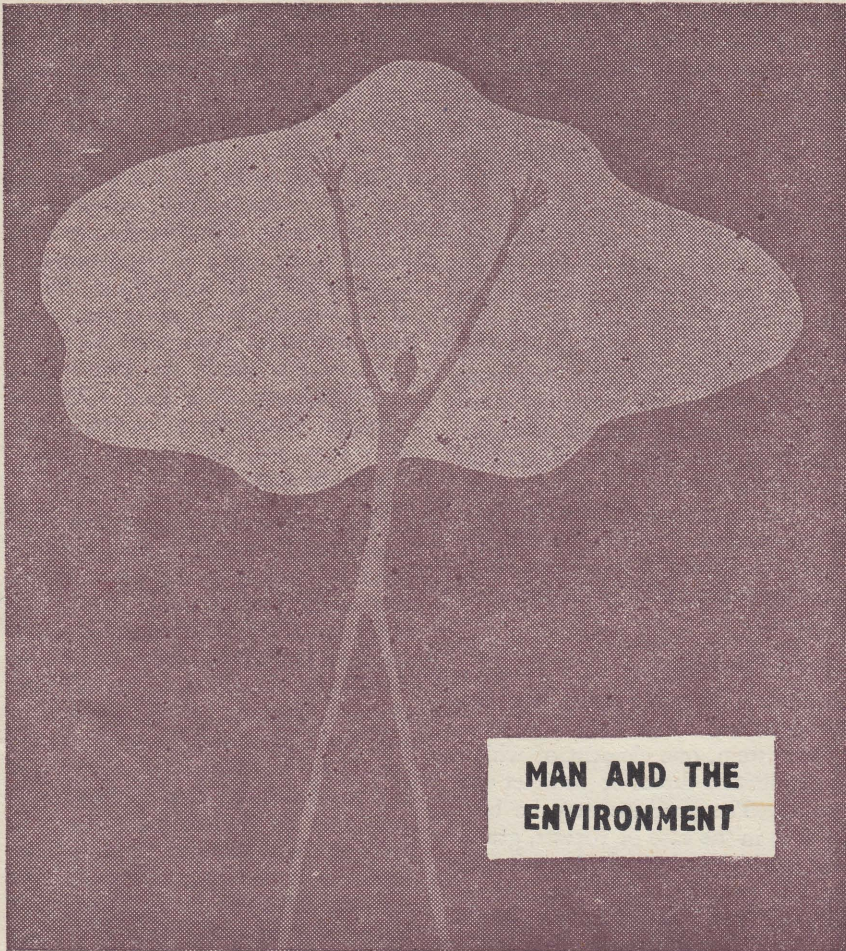


# Diary of Events

December 1979

- 1 The International Wheat Council (IWC) announced that the world food situation had generally improved, with a steady expansion in cereal production since 1974, but there were serious problems in some countries, according to a *Reuter* report from London. It said average wheat production rose by 5 million tonnes (14 per cent) to 418 million tonnes in 1977-79 from 1973-75. The growth in developing countries was an impressive 22 per cent; but many importing developing countries faced financial constraints imposed by the energy problem and rising freight rates.
- 2 OPEC Oil Ministers have approved plans to set up a common fund to aid developing countries at an informal meeting in Saudi Arabia, the Iranian Oil Minister Ali Akbar Mofta stated in Teheran, according to a *Reuter* report. He added that the meeting also emphasised that the industrial countries which buy 90 per cent of OPEC oil, must share in this fund.
- 3 A relatively small buffer stock would suffice to stabilize the price of tea, if the price corrections called for were situated around the longer-term equilibrium price trend, according to an UNCTAD Secretariat report presented to an inter-governmental group of experts on tea who began a week-long session in Geneva. For a buffer stock scheme designed to stabilise prices at 100 pence per kg. (plus or minus 20 per cent) over the period 1980-84, a buffer stock of 16,750 tons would have to be accumulated over a five-year period. The total costs of this would amount to about \$25 million according to the UNCTAD study.
- 5 Citibank N.A. of the U.S.A. opened a branch in Colombo. Officials stated that this Bank will concentrate on promoting and developing an active exchange market for the Sri Lanka business community.  
  
Australia made available to Sri Lanka a grant of A \$ 500,000 (approx. Rs. 8.6 m.) for the purchase of development commodities of Australian origin in terms of an agreement signed in Colombo.
- 10 Major Western oil consuming countries and Japan set country-by-country oil import limits for 1980 and resolved to adjust them as needed to keep oil supply and demand in balance according to a *Reuter* despatch. The 20-nation International Energy Agency (IEA) meeting in Paris put an overall ceiling of 23.1 million barrels a day on imports next year and an import target of 24.6 million barrels a day for 1985.
- 11 Iraq's Oil Minister announced in Baghdad that the Iraq Fund for External Development would provide interest free long-term loans totalling over US \$200 million to developing countries that are linked with Iraq in direct oil relations. Among the beneficiary countries named by the Minister were Sri Lanka, India and Bangladesh.
- 11 The United States expressed misgivings about proposals by tea exporting countries for an international agreement to regulate the world tea market by a system of export quotas supported by a buffer stock, according to a *Reuter* report from Geneva. A 40-nation UNCTAD convened meeting was discussing proposals of nine major tea exporting countries who were beginning to express disappointment at the attitude of some of the major importers and consumers. The US was opposed to the concept of "remunerative" prices.
- 13 The Government announced its decision to alter working hours of nearly half a million employees in the public sector from January 1980. This decision which was taken on the results of a public opinion poll among the public servants will set their new working hours from 8 a.m. to 3.30 p.m. with a 30 minute break for lunch.
- 14 The Government has decided to set up a National Committee, headed by the Minister of Coconut Industries, to consider as a matter of national urgency the restoration of the Coconut Industry, according to a press announcement.  
  
Pollution is forcing Sweden's King Carl Gustaf and Queen Silvia to move out of their Stockholm Palace, so that their two young children can have a healthier place to play, a court spokesman said, according to a *Reuter* report from Stockholm.
- 18 The Netherlands will allocate a total of 927 million Guilders (\$485 million) as aid in 1980 to 13 countries, stated a *Reuter* report from the Hague. Among the recipient countries is Sri Lanka which gets 40 million Guilders, in the form of both loans and grants. India and Indonesia are the two largest aid recipients.
- 19 The Government has picked eleven firms, ten foreign and one local, to start mining for gems and possible mineral deposits in 43,900 acres of land which will be permanently submerged under the Mahaweli and Samanalawewa schemes, according to a press announcement.  
  
The State Pharmaceuticals Corporation will set up a factory at a cost of Rs. 10 million next year for the manufacture of certain fast moving drugs, said the Secretary of the Ministry of health.
- 20 The Organisation of Petroleum Exporting Countries decided to grant US \$ 16,000 million in financial aid to those developing nations worst hit by this year's 65 percent rise in the price of crude oil, at their meeting in progress at Caracas, Venezuela. The subsidy is to come from the OPEC \$ 1,000 million Special Aid Fund created in 1976.  
  
Finland and Sri Lanka signed an agreement in Colombo regarding programmes and projects in the field of development cooperation between the two countries.  
  
The West German Ambassador in Sri Lanka officially informed the Government that his country has earmarked 400 million German marks (Rs. 3,560 million approx.) to be spent over a period of six years on the Nandenigala-Rantembe project of the Mahaweli scheme.
- 21 A committee to consider the revision of the Company Law of Sri Lanka and to submit draft legislation on this subject has been appointed by the Minister of Trade and Shipping, the Ministry's Secretary announced.
- 22 A number of short-term and long-term measures for the establishment of a capital market have been recommended by a committee appointed by the Trade Minister, stated press reports.
- 24 A total of 100 projects, involving an investment of Rs. 1,647 million in foreign exchange had been approved by the Foreign Investment Advisory Committee of the Finance Ministry upto the end of November this year, a Ministry spokesman announced. These projects are additional to the 80 projects approved for investing in the Katunayake Investment Promotion Zone.
- 27 The Government has accepted in principle the recommendations of the Ministry of Finance and Planning to revitalise and stimulate the dormant Colombo Stock Exchange, stated a press report.





## MAN AND THE ENVIRONMENT

# ENVIRONMENT

**Environment**—Surrounding; surrounding objects, region or circumstances  
—*The Concise Oxford Dictionary.*

The environment in relation to an individual means the sum total of that individual's reality, for today the physical as well as the cultural, is regarded the environment. It is also defined in terms of the participator or component of that environment. So we speak of the environment of mind as easily as of the environment of a forest. The environment is thus seen as a complex, dynamic process which gains subjective reality only on the defining of its parameters.

As biological entities we can define our natural environment as the 'biosphere' or that region of the planet that can support life, or on a more local scale our environment can be defined as our Island.

The study of the interactions between the participator and the environment is termed Ecology. Arising from the Greek root *Oikos* a 'house' and *logy* 'the study of', it attempts to take into consideration as many of the interactions between the participator and the environment.

The environment can be benign or hostile in relation to the participant. Thus it is possible to use the human values of "good" and "bad" when assessing the net effect of an environment on its participants.

This view is open to question as being vulnerable to subjectivity but is only so when considered from an individual assessment. However, there are objective methods that are

relatively independent of individual values and such perspectives are useful when defining as "good" or "bad" environment for a group.

In order to achieve this the human must be considered from two fundamental, but related, perspectives. (1) human beings are biological entities responding to the same physical/chemical laws that all biological organisms respond to and (2) human beings are also socio-cultural entities.

A concrete illustration of this point, where the natural processes and ecosystem were upset by human interference is clearly seen in this example as recounted in the *Natural History Magazine*. In a village in Borneo health workers sprayed the walls of the villagers' huts with DDT in order to control the mosquitoes that spread the malaria parasite. However, the lizards that patrol the walls of the huts inevitably absorbed large quantities of DDT, both from contact with the sprayed walls and from eating poisoned prey and they died. This had the unfortunate effect of killing the cats that ate the moribund and the now poisonous lizards, leaving the straw-loving catpillars (hitherto kept in check by the lizards) that inhabited the thatched roof free to gorge without limit. The end result was a plague of rats and destruction of the roofs of the villagers huts.

Still another example can be drawn from the case of Brazil where it has now been realised that it is not all that easy to reverse the natural order whereby converting its two million square miles of Amazonian forests into what planners dreamt could become thriving cattle ranches and farms. (See Box on page 5). While Brazil's colonisation programme of settling one million families alongside the trans-Amazon highway has been abandoned (not more than 6000 families were officially settled) the authorities have at last grown alive to the potential dangers of this policy. Nearly half of this dense forest cover of 2 million square miles has now been declared ecological and forest reserves and natural parks. The signals of the damage done so far appear alarming indeed, with fears that "injection of carbon dioxide



into the planet's atmosphere would increase by at least 8 percent as a result".

Now an objective grading of the environment (good or bad) can be approached. For the biological being, the environment that produces more of the necessities of biological life (measurable by criteria such as physical well-being, nutrition, etc.) would be better than that which produced less. For the socio-cultural being the environment that produces a more benign social atmosphere (measurable by criteria such as crime, suicide, contentment etc.) would be better than one that produced a more hostile social atmosphere. Although any absolute grading that meets with unanimous concern may not exist we can determine an environment that would create an atmosphere relatively free of negative criteria, corresponding to some social norm.

In recent years this grading of the human environment has been attempted by many workers. To achieve some degree of objectivity they have been presented as indices. The PQLI and NEW are some examples. All these attempts incorporate a fundamental ecological principle: the inter-relatedness of process (see Box below).

Carbon dioxide returns to the atmosphere or is absorbed by water bodies like the ocean; much of the water is again evaporated and comes back as rain, while the energy is let into space. Energy lost in this manner is always replenished by that never ending source—the sun. Most of the others are used again or recycled at some stage or other. There is therefore a close inter-relationship between those that have life, like plants and animals, with those that do not,

like carbon dioxide, water, oxygen etc., and that all these form part of a system or process. Such a system is called an Ecosystem or an Ecological System. An important process going on in any ecosystem is the flow of energy.

Another question which occurs in this connection is "what is a natural ecosystem?" or perhaps "what is an unnatural ecosystem?" Is the Beira Lake in Colombo or the city of Colombo itself a natural ecosystem, or has it somehow been rendered unnatural, or at least improved? Is the Ruhunu National Park, managed for recreational and aesthetic objectives, a natural ecosystem? Does the very act of management render an ecosystem unnatural. Thus, natural resources available to man, are intimately connected with ecological considerations.

#### Natural Resources

A natural resource ecosystem has been described as an integrated ecological system, one element of which is a product of direct or indirect use to man. The produce may be biological as in the case of forests, grasslands, agricultural products, fish and wild life; physical, as in the case of water, air and soil or both. In all cases, the distinguishing fact, of a natural resource ecosystem, is that man has a direct involvement in the complex set of ecological interactions.

'Man has a direct involvement' and that is a point that should be emphasised; that no ecosystem, natural or unnatural, can escape from this involvement.

A natural resource might be defined as anything found by man in his natural environment that he may in some way utilize for his own benefit. Natural resources thus include mine-

rals, fossil fuels, and radio-active energy sources, water and soil, as well as the native vegetation and indigenous wild life. It also includes the land and landscape, the atmosphere, the ocean and solar energy. They might be classified as non-renewable or fund resources and renewable or flow resources. Renewable resources include water, soil and vegetation and non-renewable as fossil fuels, minerals and radio-active energy sources. Natural sources might also be classified into marketable products—coal, timber, fish etc. or amenities such as harbours, waterfalls or scientific and aesthetic values which are not marketable in the accepted sense.

The resources listed above might be considered "natural" if they are provided by nature in the place where they are or may be used or put into useful form. In these terms we might classify a Dry Zone forest of the palu (*Manilkara bexandra*), wira (*drypetes sepiaria*), burutha (*Chloroxylon swietenia*) and Kaluwara (*Diospyros ebenum*) trees as a "natural" ecosystem and a teak plantation on cleared Dry Zone forests as an "unnatural" one. In practice, the distinction becomes academic, it is difficult to identify the point at which this condition of being "natural" ceases to exist, and many would think of a teak plantation as a way of managing what is basically a natural ecosystem.

The concept of what constitutes a natural resource or a natural resource ecosystem varies according to man's capacities, interests and objectives. The concept is a dynamic one that changes with the needs of man, the state of his technology, and the choices he is prepared to make in order to achieve his aims. Two hundred years ago, coffee plants which grew wild in the Kandyan Hills, were not used for the preparation of a beverage from its beans, but only its tender leaves made into curries, and its delicate jasmine-like flowers for ornamenting temples and shrines. Similarly, the apatite ores found at Eppawala, which are a good source of natural phosphate fertilizer were unknown till about 10 years ago and hence were insignificant natural resources. If there were any Sri Lankans, still living in the twenty-fifth century they will possibly consider the mud dug from the Beira Lake as a valuable

#### The Physical Quality of Life Index (PQLI)

The PQLI takes into account human factors such as health and educational factors in a society as well as the factors referred to in the GNP. However even this index suffers from a lack of accounting for the values and relations within a society.—The realization of rights to freedom, justice, truth, culture, participation and sharing.

#### Net Economic Worth (NEW)

Where the 'bads' such as pollution costs, environment maintenance as well as the 'goods' such as manufactured products etc. are computed. In such an index maintenance work too is included. The GNP for most nations including the US has been rising but the NEW has levelled off. Indicating that the real economic situation has not been improved by an ever larger production of goods — Nordleaus & Jukim, 1972.



natural fertilizer resource, or the rubble that was once the Colombo Fort a useful natural resource of building material.

Pollution in terms of the environment is to add to any system substance or processes that change the nature of the system. Pollution is caused when a change in physical, chemical or biological conditions in the environment harmfully affects the quality of human life, including effects on other animals and plants, industries, and cultural and aesthetic assets. Most pollution may be characterized as a production excess resulting from manufacturing or growing more than is to be consumed or as a result of discarding products after use. Though pollution is generally attributed to material substances (gases and particulate matter from smokestacks, chemicals in water or solid wastes, paper, glass used machinery and motor vehicles) pollution may also be non-material such as an excess of noise and lights. Pollution in all its forms is a more serious problem in the heavily industrialized areas of the world than it is in predominantly agricultural regions. In most cases the effects of pollution are detrimental to the system. The fact that all processes are inter-related to some degree in the environment makes the assessment of the impact of pollution most important. Pollution then, is equated with the 'bads' in environmental assessment.

The production of pollutants are not confined to man's systems only. Pollutants are often produced in natural ecosystems but these are 'treated' by nature. In other words nature recycles and renders less harmful these pollutants in her natural process. Man has consistently used nature to treat his pollution too. A favourite dictum among industrialists was "The solution to pollution is dilution". However, the sheer volume of man's poisons and the fact of Biological Magnification has shown this dictum to be grossly naive. (See Box on page 6.)

### Industrial Pollution

Environment pollution has become a major issue, on a global scale, only in recent years. The types of pollution are many and the action of pollutants on the environment vary from the obvious to the subtle. The

### SPARE THAT TREE

An almost complete reversal of Brazil's policy of "opening up" the country's share of the 2m-square mile Amazon forest is being urged by a government-appointed committee. The committee's report recommends that no more forest land should be leased to companies, and that about 600,000 square miles should be designated as national parks and ecological reserves and 300,000 square miles as national forests.

Although powerful interests will oppose this drastic change of policy, it is likely to have strong support from President Figueiredo. He lost no time in setting up the forest policy committee when he took office in March, and since then he has created three new national parks in the Amazon region. Previous Brazilian governments' ambitious attempts to open up the forest led to spectacular failures, primarily because the belief that the soil was prodigiously fertile has proved to be false.

The Amazon tributaries have been found to be almost as pure as distilled water, showing that the soil of the region contains hardly any nutrients for plants. The exuberant vegetation is produced by a closed system of recycling, the nutrients from decaying vegetation being re-absorbed into the tree roots without creating a deep fertile topsoil. Up to half the rainfall is provided by evaporation from the tropical forest itself.

So neither cattle ranches nor small farms have prospered. Between 1966 and 1976 the official Amazon development agency, Sudam, approved the setting up (mainly by businessmen from Sao Paulo) of 354 ranches with an average size of 50,000 acres. Fortunes were made from the lavish tax rebates granted to the cattle companies. But many of them have found that the African grasses they planted on the cleared forest land grew less well after the first few years, and that they faced huge outlays on fertiliser and on remedies for soil leaching and poisonous weeds.

Sudam itself has become alarmed at the harmful impact of the process it



initiated. It has approved only four new cattle projects since 1976. In 1976, too, the government abandoned the colonisation programme that was to have settled 1 m families alongside the 3,000-mile Trans Amazon highway, built in 1970. Only about 6,000 families had moved into the region as official settlers. However, hundreds of thousands of unofficial ones have swarmed in along the new road, squatting on virgin forest land held by absentee landowners. Only a few of the consequent conflicts were reported in the press, but hundreds of squatters have been killed while resisting eviction and many thousands had to leave.

It is estimated that about a tenth of Brazil's Amazon forest has already been cut down, and that destruction is still occurring at a rate of about 400 square miles a year. The unprecedented six-week drought in Manaus this year was probably the first sign of climatic change caused by the clearing of forest near that town. The destruction of the greater part of the world's biggest remaining area of tropical forest would not only transform the local climate but also affect that of the whole planet, by leading to a massive injection of carbon dioxide into the atmosphere. It has been calculated that, after allowing for half of this carbon dioxide to be absorbed by the oceans, the world total would increase by at least 8%. This would be additional to the rise of about 16% caused during the past century by the destruction of forests and the burning of coal and oil.

### A Special Correspondent,

*The Economist*, December 8, 1979.

fact to be faced is that this phenomenon is a by-product of the development and maintenance of the modern industrial civilization and it poses a serious threat to human existence on our planet.

Industrial pollution is one of the most visible, and once established, one of the hardest to control. This is due to the economic stance (maximization of profits) that industry is based on. The pollutants that are emitted from a factory are considered "waste" and is ejected from the pro-

cess as fast as it is produced, for an accumulation of waste impedes growth and production. The waste is got rid of in the most economically expedient manner. Often, the finished product is costed so that to "treat" or install machinery to 'treat' the waste will increase or even over price the product. Secondly, the costs of 'treating' the pollutants are increasing with the cost of energy; thus there will be a point in some industries' lives where pollution control has to be abandoned or the levels of pollutants increased to



## BIOLOGICAL MAGNIFICATION

Biological magnification refers to a concentration of substances along food chains. It is also referred to as Pesticide Accumulation. When one animal eats another it absorbs and retains a percentage of the substance being concentrated in its own body. Thus the more food it eats the more of the substance it concentrates in its body. In the case of poison, the concentration at the time of application may be small; but by the time it has reached an animal along the food chain the concentration may be dangerous. Some chemicals like DDT may be absorbed by the skin in addition to infection by food.

The table below indicates measurements made on the concentrations of certain pesticides and radioactive materials along the food chain. However, the effects are subtle and often sub-lethal; thus people are not immediately aware of the effects.

DDT		Radioactive Phosphorous (32P)		Radioactive Strontium (80 Sr)	
Water ...	1	Water ...	1	Water ...	1
Plankton ...	800	Insects ...	3	Sediments ...	200
Minnows ...	11,600	Swallows ...	75,000	Water plants ...	300
Big fish ...	34,600	Duck Eggs ...	200,000	Minnows ...	1,000
Fish-eating birds ...	92,000			Large fish ...	3,000
				Mammals ...	3,900

Concentration factors (Ratio amount in organisms to amount in environment)

maintain the profits. The action of the pollutants on the environment however will remain the same and will worsen with continued additions

Industrial pollution can be defined in two broad categories, primary and secondary. In primary industrial pollution the pollutants affect the human directly. This is seen in the case of lead poisoning; it is effected by injection. If eaten in food about 10 percent of it will enter the bloodstream but if inhaled, upto 50 percent may be absorbed. It has been demonstrated to be absorbent in a greater capacity in women and children. J. A. Miller reporting in the British Medical Journal *Lancet* states "even modest elevations of blood-lead may be associated with biochemical abnormalities in the human brain." In Sri Lanka the sum total of primary pollutants have not yet been assessed. In the absence of a concentration of vast industrial complexes in this country it is a matter of conjecture whether the concentration of toxic substances and gases exceed the limits and impair the health of the people. But, it is certainly not too early to begin monitoring the atmosphere for pollution.

The cases of lead poisoning in the industrial areas and generally by battery manufacturers are now commonplace. However, one aspect of lead that is quite often unnoticed is

the lead in air. This lead usually comes from car emissions. Lead is added to our petrol supply as an anti-knock agent. The amount per gallon is infinitesimally small but the volume of petrol being used quickly brings this figure up. In Switzerland measurements were kept of the amount of lead in the city dust and it was found that there is a strong correlation between the number of vehicles in use and the concentration of lead in dust (see figure.) Thus in present society motor cars add greatly to the reservoir of lead as a primary industrial pollutant.

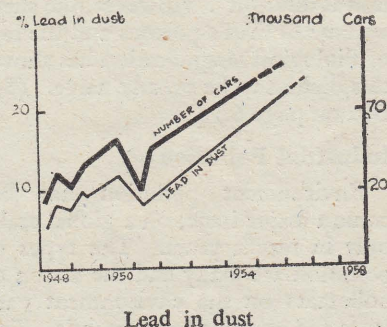
The secondary effects of industrial pollution are more subtle and often far longer-reaching than the primary effects. Chemicals that are considered 'safe' have been known to act synergistically with other chemicals or micro-organisms to produce extremely dangerous toxins. The case of mercury poisoning in the Minimata Bay in Japan is a good example. Another aspect of secondary industrial pollution is when biological concentration is considered. A toxin released into the environment in relatively low concentrations, can be picked up and concentrated to a level dangerous to humans by a plant or organism which is eaten by humans. There are many instances where the effluents of the batik and other textile industries are allowed to flow freely

into drains, streams and rivers. One probe some time ago regarding the Wellawatte Canal, revealed it was being polluted not only by industrial wastes, but also by dumping untreated sewage by the CMC and faecal pollution by all those persons who had converted it into a public convenience. The tanneries along the Kelani and the Petroleum Corporation dump much of their effluents either directly into or into the vicinity of the Kelani river. The high concentration of toxic heavy metals in the vegetables (keera) grown in the adjoining swamp lands is the result. The keera produced here is eaten by the residents of Colombo City.

## Food Contamination and Chemical Control

Industrial waste has never been monitored systematically or controlled in Sri Lanka. A recent study conducted by the Division of Occupational Hygiene of the Department of Health indicates a concentration at 200 PPM, an alarmingly large figure, when they tested the Keera (green leafy vegetables) from fields around the Kelani river. The source of the chromium was found to be the tanneries upstream of the vegetable growing area. The effluents of these tanneries were dumped, untreated, into a convenient paddy field or marsh which would drain into the Kelani river. The diluted chromium would be picked up, to be biologically magnified in the Keera fields further downstream.

The same study indicated that the levels of pesticides and insecticides in Keera far exceeded W.H.O. standards for human health. It is unfortunate that there exist no specific standards in Sri Lanka to regulate the amount of pesticides and heavy metal containments in the food sold





## ECOLOGICAL IMPERIALISM

In the short run, growing environmental pressures and restrictions in the developed countries will probably result in the export of polluting industries to some of the less industrialized LDC's (Less Developed Countries) who will for the most part be delighted to accept ecological degradation along with economic benefits. However, only a few favoured countries will benefit significantly. Moreover, without continued growth in the now industrialized nations, the growth prospects of the Third World are dim; our growth is essential to their's (Boseru 1975, Quigg 1974). Thus, although the basic rich-poor polarization will be moderated by many complex interdependencies, there is no escaping the basic opposition of interests created by ecological scarcity.

TABLE 1  
DDT Concentration Factors  
(Ratio amounts in organisms to amount in the environment)

Water	...	...	1
Plankton	...	...	800
Minnows (small fish)	...	11,600	
Predatory fish	...	34,800	
Fish-eating birds	...	92,000	

(From Woodwell, Wurster and Isaacson, *Science*, 1967).

Because predatory birds are being wiped out by DDT and man himself is threatened (he cannot escape being part of the food chains), society has been forced to consider reducing, or banning outright, this pesticide that was once heralded as the solution to all insect pest problems". (*Odum*, 1913).

in this country, though testing of samples is carried out occasionally by the Standards Bureau and other institutions.

The contamination of 'Keera' is particularly cruel in the fact that 'Keera' is the cheapest vegetable to be found on the market and forms a staple in the diet of the poorer classes in the city. It is fed to children in various forms of preparation for its nutritive value.

Keera, however, is not alone as contaminated food. In a random sample of some food, prepared and unprepared, tested by the City Analyst of the Public Health Department of the Colombo Municipality it was found that some vegetables of the fruit type (i.e. chillies, brinjals etc.) and some pulses (i.e. green gram and cowpea) contained insecticide residues. The prepared foods indicated

containments introduced in the manufactory process as in condensed milk (Table 2). One of the most irresponsible containment sources detected by this Department was the sweet and cordial production industry. For instance, a food dye called Metanil yellow, proven to cause cancer has been found in popsicles, boiled sweets and cordials.

TABLE 2

Results of tests on four random samples of condensed milk (local).

Sample No.	Concentration of tin
1	750 parts per million
2	600 parts per million
3	1000 parts per million
4	700 parts per million

The allowed amount of tin (sn) by the British Standards Act is 250 parts per million

PVC or Polyvinylchloride is a ubiquitous chemical in modern society. It is used in records, insulation for cables, floor coverings, furniture, hosepipes etc. But as vinylchloride, the monomer from which PVC is made, it is extremely toxic. The story of the research done on the toxicity of vinylchloride and the secrecy that the chemical companies cloaked the results in, emphasises their philosophy of "Profits before People".

In May of 1970 a toxicologist named Pierlugi Viola presented a paper where he reported the formation of tumors in rats given larger doses of vinylchloride. As a result of this work, Cesare Maltoni of the Bologna Cancer Institute was commissioned by a consortium of Europe's leading chemical companies to repeat and extend Viola's research.

By the end of 1972 Maltoni concluded that Viola was right; Vinylchloride did produce cancer. He also demonstrated that Vinylchloride was toxic at far smaller doses than Viola first reported. In October 1972 the Manufacturing Chemists Association (MCA) of the U.S. joined the consortium sponsoring Maltoni's work but no mention was made of Maltoni's work or that vinylchloride was proven to cause cancer in the liver and kidneys of people and animals exposed to it.

It was not until the end of January 1974 that the MCA released Maltoni's

data. This event was precipitated when a physician named John Creech announced that he had found four cases of a rare liver cancer among Vinylchloride workers. Since then over 40 workers in Vinylchloride are known to have died from this rare cancer.

Referring to this problem of increasing untested chemicals, Gus Speth, the Chairman of the Toxic Substance Strategy Committee says "we can't wait around for people to start dropping". He also notes that between 20-38 per cent of all cancers can be correlated with occupational exposure to these carcinogens.

The E.E.C.'s Sixth Amendment requires all companies that want to market new chemicals to assess the effects of their products on the environment and on human health before they are made. It has been acclaimed as one of the most far-reaching social reforms enacted by the European Communities Council of Ministers. What the amendment means is that the long, irresponsible, spree of the chemical industry has come to a halt.

The quantity of man-made organic chemicals that are manufactured is large. It grew from 7 million tonnes in 1950 to 63 million tonnes in 1970. Today over 30,000 different chemicals are produced in quantities over one tonne a year. Scientists have long suspected about 1,000 of them as causing cancer. The present trend of industry means an ever-increasing number of chemicals the average Sri Lankan would be exposed to.

Sri Lanka has fortunately been spared the horror that has gripped so many countries during the last decade, the horror of a disaster involving a chemical industry. Seveso, Louisville, Michigan, Camden and Bridesburg are just some names of towns that were virtually crippled by chemical disasters. In many cases the losses involved family as well as property.

The greatest danger from this flood of man-made organic chemicals comes from the fact that many are sub-lethal and often carcinogenic. This means that the chemical lowers the vitality of the victim and in the case of carcinogens, the symptoms of cancer sometimes occur decades after the victim has injected the chemical.



## Another Third World Disease

The publication of the International Research Centre on Environment and Development in its monthly issue of March 1979 drew specific attention to the dangers to the Third World countries from the chemicals in pesticides. Reproducing a paper from Anil Agrawal under the title "Pesticide Poisoning—Another Third World Disease" it stated;

"An estimated 500,000 people throughout the world are killed or incapacitated by insecticide poisoning every year, though no detailed statistics are available. The WHO Expert Committee on the Safe Use of Pesticides, which met recently in Geneva, strongly recommended that developing countries should start setting up national control agencies for registering pesticides as a priority. These agencies should not only register pesticides but also evaluate the nation's needs for new ones and control their introduction. The WHO committee also stressed the importance of health education by well-trained personnel who will go out into the field to instruct farmers in choosing pesticides, storing them and using them safely.

Most peasants and health workers continue to use replacements for DDT in the same way as they used DDT. They still make chemical solutions with their hands and carry bucketsfull of pesticides on their heads. Changing such habits will take a long time, given the difficult administrative conditions in these countries.

The Third World can also expect some very nasty surprises with pesticides. Another WHO committee—its Expert Committee on Vector Biology and Control—has just reported the full details of the 1976 poisoning disaster in Pakistan with malathion, a pesticide that is considered relatively safe (*Chemistry and Specifications of Pesticides*, Technical Report Series No. 620). More than 2500 malaria field workers were poisoned and five of them died. Some time elapsed before the pesticide was linked to the illness and many workers, in fear of losing their jobs, just kept on working. The incident was caused largely by failure to use even elementary precautions during handling and spraying. This shows, says WHO, that poor handling will occasionally occur in large-scale vector control programmes in developing countries, despite clear directions and package labels.

Further investigations of the pesticide samples from Pakistan, however, revealed that their toxicity has increased considerably in recent years. Organophosphorus impurities in malathion can increase its toxicity to exceptionally high levels by inhibiting enzymes in the human body which normally break down, and thus detoxify, malathion. This has been known for 20 years, but, until the Pakistan incident, the impurities were never considered of critical importance to man.

Now WHO investigations have revealed that the concentrations of these impurities

## POLLUTION AND HEALTH

Some of the industries that could cause pollution of the atmosphere and water in this country are—Paper, Agro-Chemicals, Cement, Petroleum, Leather Ceramics, Textiles, Rubber, Rice and Saw Mills, Construction Industry, Asbestos and Chemical factories, states the report on "Environmental Management in Sri Lanka".

It is reported that there are three ways by which toxic substances may enter the human body, namely by ingestion, absorption through the skin and by inhalation. It is also reported that the majority of occupational diseases is caused by inhalation as it affords rapid intake of contaminants by the body.

The following table details out some of the agents or pollutants in air and on land and their possible effect on the health of human beings.

<i>Agents or Pollutants in Air</i>	<i>Possible Effect on Human Health</i>
Oxides of sulphur in combination with airborne particles (smoke)	Aggravation of existing respiratory diseases and contribution to their development, impairment of lung function, sensory irritation.
Airborne particles	Increase in the effects of gaseous pollutants such as sulphur dioxide, possible toxic effects depending on chemical composition (e.g. particles containing lead or asbestos).
Oxidants including ozone	Eye irritation, possible association with asthmatic attacks; impairment of lung function in diseased persons.
Carbon monoxide	By combining with haemoglobin deprives tissues of oxygen; individuals suffering from cardio-respiratory disease are more sensitive; psycho-physiological effects possible even at low concentrations; smoking is an important source, perhaps more significant than exposure to motor vehicle exhausts.
Lead	Intake through water, air and food enhances the total body burden of this element; in excessive amounts it may develop poisoning.
Asbestos	A possible factor in the incidence of lung diseases along with other air pollutants and smoking—pleural calcification observed also in non-occupational exposure.
<i>Agent or Pollutant in Land</i>	<i>Possible Effect on Human Health</i>
Human excreta	Schistosomiasis, taeniasis, hookworm and other infections.
Sewage	Urban filariasis, flies and other disease vectors.
Garbage and vectors inhabiting it	Rodent-borne disease, pollution of water and air from disposal practices.
Industrial and radioactive waste	Effects from stored toxic metals and other substances through food chains.
Pesticides	Contamination of vegetation and secondary foodstuffs and entry into food chain.



can increase several-fold during shipping and storage in tropical countries. Isomalathion (formed by the isomerisation of malathion) has become a major toxicity amplifier in the Pakistan samples. Surveys conducted by WHO in other parts of Asia also revealed samples from Sri Lanka and Nepal that were too toxic to be sprayed indoors. Samples from Indonesia had very low safety margins. WHO has now set the highest acceptable value of isomalathion as 1.8 per cent of the nominal malathion content.

Similar toxicity-boosting mechanisms may not occur in other pesticides because of their different chemical structure. But increases in the use of pesticides in public health and agriculture could increase the danger of toxic effects. The patents of several important pesticides such as malathion has expired—or are about to. This will permit Third World countries to begin to manufacture and formulate these pesticides locally. Dependable quality control systems will then become even more important.

While some international organisations believe that Third World countries should proceed with pesticide manufacture and formulation, others are not yet convinced that this is advisable. Good quality control by Third World governments is necessary even if they don't manufacture pesticides, because even pesticides imported from reputable Western manufacturers could turn out to be of low grade. WHO says all the European manufacturers that supplied malathion to Pakistan gave their full cooperation in investigating the increased toxicity of the pesticide. But the Sri Lanka anti-malaria campaign office is currently facing litigation by a French firm for refusing to accept supplies of malathion which Sri Lankan officials felt were substandard.

Apparently, the WHO and other international organisations have shown great concern about the danger of the toxicity of malathion though Health Authorities in Sri Lanka needed much prodding before they ceased to store their stocks of malathion in the heart of a highly residential area in Colombo and in the immediate vicinity of the country's premier hospital and medical institution.

## Air Pollution

Air pollution in Sri Lanka is partly a consequence of the Industrial complexes with unchecked emissions, but it is more (especially in the cities) a consequence of vehicular traffic. The first effect of vehicular traffic is dust. It is estimated that every breath carried about 40,000 particles of dust in open clear countryside. In the city, particularly where vehicular traffic has a high flow, the number of dust particles carried in each breath is estimated to be over 80,000. In addition, the operation of 120,000 vehicles (approximate vehicular population of Colombo) will add 200-350 tons of carbon monoxide, 20-50 tons of hydrocarbons and 10-20 tons of nitrogen oxides daily.

Today, air pollution from vehicular traffic especially exhausts of cars, buses, lorries and other internal combustion engines is taking its toll not only on human health but also on the ancient treasures. Many of the 'ruins' of the ancient civilizations of Sri Lanka are showing effects of chemical erosion. There exists a strong correlation between this damage and the accessibility to buses and other vehicular traffic. A similar problem is faced by India where the Taj Mahal stands in danger of being eroded by air pollution.

The oxides of nitrogen are particularly harmful to the lungs. They contribute to an increase in respiratory diseases and cancer in urban populations. When the incidence of lung disease, especially in children are looked at an ominous pattern emerges. The greatest concentration of the affected children are either urban or live near major roads or factories.



A healthy lung (top) and a diseased lung (bottom). Cigarettes and air pollution alike shrink our lungs, color them black, and shorten our lives. (R. J. Henning, St. Vincent's Hospital), Courtesy "Problems of American Society air and Water Pollution". Washington Square Press.

To watch a two or three year old fighting for breath, then walk onto the road to be met by a cloud of exhaust emissions that makes one cough and to be aware of the real damages of air pollution is a sobering experience. The oxides of nitrogen further combine with the hydrocarbons and other pollutants under the force of sunlight to produce a synergism. (See box) This is the infamous photochemical smog of

## SYNERGISM

When two or more substances react so that the total effect of the interaction exceeds the sum of the effects of each substance. Some examples are the oxides of nitrogen from car exhausts, these by themselves are harmful to the lungs causing respiratory disease, cancer etc. but they combine with hydrocarbons and other pollutants when activated by sunlight to form photochemical smog. Another example of synergism is the way in which relatively safe inorganic mercury was changed by microbial action into the much more deadly organic form.

It was this fact that led to the disaster at Minnamata.

The lungs possess the ability to clean themselves of dangerous particulate matter such as asbestos. This is done by an ever moving sheet of mucus propelled by the cells of the lungs. Smoking or inhaling sulphur dioxide interferes with this function and increases the danger of cancerous growths being initiated in the lungs by dangerous particulate matter.

The liver is the organ that is responsible for the detoxifying (rendering harmless) many of the poisons that affect the body. It does this by producing enzymes

(chemical components) that detoxify the poisons. Each poison is detoxified by a different enzyme. This is why some commonly used poisons, are found to be relatively 'safe' for humans. We possess an enzyme that detoxifies it efficiently at low dosages. Enzymes are produced within the cells; but often, there are substances which inhibit or block the mechanism of the cell that makes the enzyme. So, if an individual is exposed to a chemical that inhibits the production of the enzyme that detoxifies a specific poison he will not be immune to that poison even though he might have been before exposure to the chemical inhibitor.



**WEIGHTED SOUND LEVELS AND HUMAN RESPONSE**

Sound Source	Decibels	Response Criteria
	150	
Carrier deck jet operation	140	painfully loud 130 limit amplified speech
Jet takeoff (200 ft.)	120	maximum vocal effort
discotheque auto horn (3 ft)	110	
Riveting machine	100	
Jet takeoff (2,000 ft.)	90	hearing damage (8 hours)
Shout (0.5 ft.)	80	very annoying
New York City subway station	70	annoying
Heavy truck (50 ft.)	60	telephone use difficult intrusive
Pneumatic drill (50 ft.)	50	quiet
Freight train (50 ft.)	40	
Freeway traffic (50 ft.)	30	very quiet
Air-conditioning unit (20 ft.)	20	
Light auto traffic (50 ft.)	10	just audible
Living room	0	threshold of hearing
Bedroom		
Library		
Soft whisper (15 ft.)		
Broadcasting studio		

\* Weighted sound levels taken with a sound-level meter and expressed as decibels on the scale approximating the frequency response of the human ear.

Source: Department of Transportation from "Encyclopaedia Britannica".

America, Mexico City and Tokyo. Today, all one has to do is walk out on to the Galle Road or any other major trunk road by 8.30 a.m. on a sunny morning to witness the phenomena in Colombo.

Carbon monoxide, the largest substance emitted by vehicular traffic combines with the oxygen transporting pigment haemoglobin in the blood to inhibit its action. When the oxygen supply to the body is reduced the heart and the lungs have to work harder. An exposure of eight hours in an environment containing 80 parts per million (PPM) carbon monoxide has been found to have the same effect as the loss of one pint of blood. Consider the effect of this pollution, which may reach 440 PPM in traffic jams in our cities. Symptoms of carbon monoxide poisoning include headache, loss of vision, nausea and abdominal pains, familiar complaints of people stuck in rush-hour traffic.

**Noise Pollution**

A recent development in the world is noise pollution. It is usually a feature of highly populated industrial areas, highways and airports. The volume of noise from a given source is measured in decibels (dB) the threshold of hearing is represented by 0 dB. It has been demonstrated that even a brief experience of intense noise can cause a temporary hearing loss, while constant exposure results in a permanent hearing loss.

There is increasing scientific evidence that noise in the 90 dB range may cause irreversible changes to the nervous system, while noise levels as low as 50-55 dB interferes with sleep and results in a feeling of fatigue on working. Heavy automobile traffic emits sound in the 90 dB range while jet aircraft emit sound at around 120 dB. When considering this unit of measurement every increment of 10 dB means the loudness of the sound has doubled, so 20 dB is twice as loud as 10 dB, 30 dB four times as loud etc.

Due to the recent interest in re-opening Ratmalana airport to Jet aircraft, a survey was done in testing sound levels at Katunayake. This data were computed with figures available from British airports and the zone where people would hear noise



that could affect them was plotted out (Fig. 2). The picture that emerges is very uncomfortable. The re-opening of Ratmalana for jet aircraft would

affect the area from Dehiwala in the North to Lunawa in the South, including areas like Peliyana, Maharagama and Boralesgamuwa.

## MONITORING POLLUTION

It has been clearly established that rapid urbanisation together with advances in modern technology and increasing economic and social pressures are resulting in the chemical, biological and radiological contamination of land, air, food and water; destruction of natural resources; harmful physical agents like noise and radiation and complexity of environmental changes that challenge man's adaptive ability.

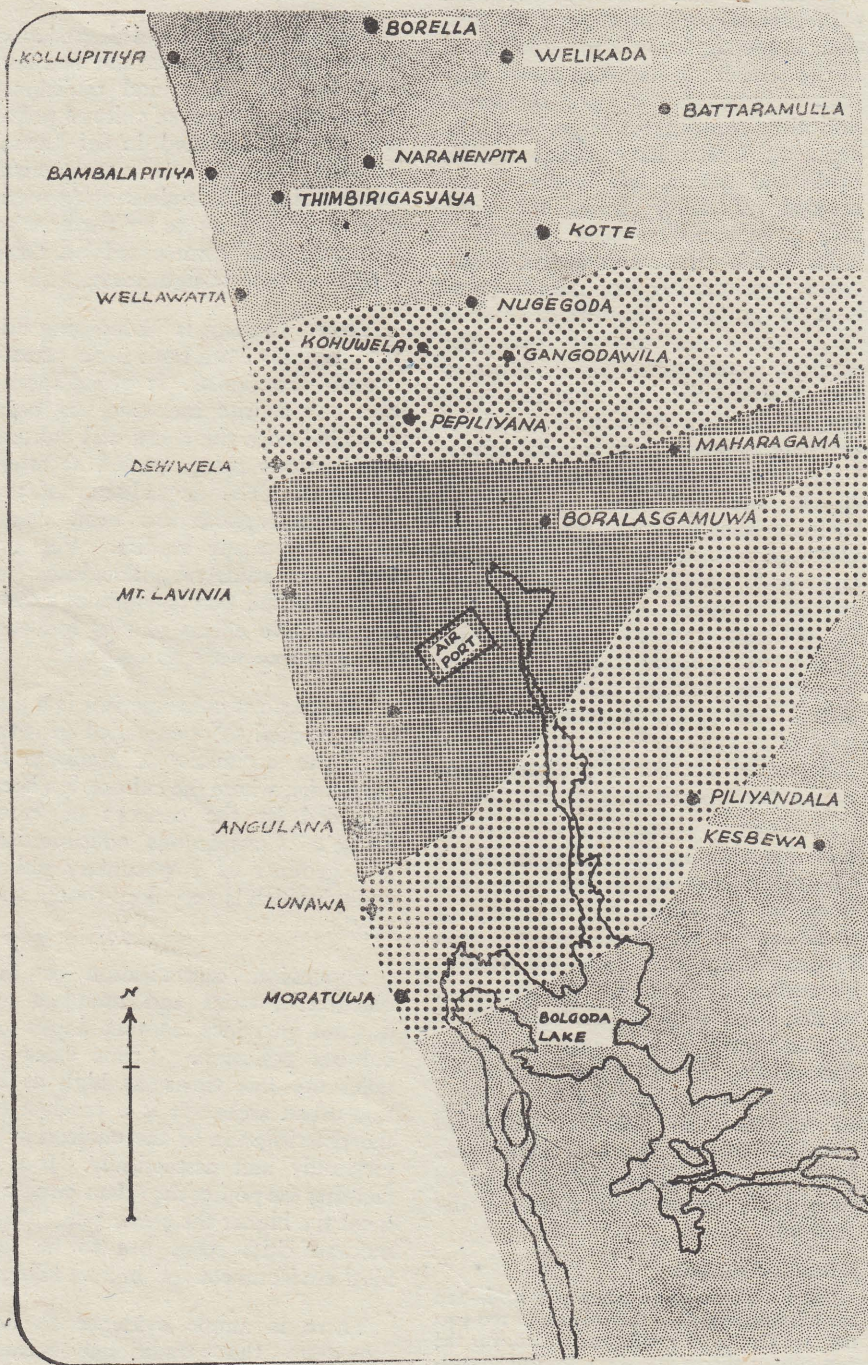
In these circumstances monitoring of contamination of the environment has become a matter of urgency. Collection of solid or liquid samples (e.g. food or water) is fairly straight forward. However, the collection of a sample of an air-borne contaminant, that may adversely affect a person by being inhaled, absorbed through the respiratory system or skin, or ingested by contaminating food, hands and other objects involves the scientific discipline of Environmental Hygiene.

The Committee on Environmental Management in Sri Lanka reported that "Air sampling instruments used in environmental monitoring have to be especially designed to suit various situations. Most of these instruments are very expensive. The Occupational Hygiene Laboratory of the Department of Labour is fairly well-equipped with air sampling instruments as well as instruments used to assess harmful physical agents in work-places. These instruments, used for sampling the atmosphere of work-places, could be used for monitoring the total environment with little or no modification as the scientific principles involved in Occupational Hygiene and Environmental Control are the same.

Both physical and chemical methods are used in the analysis of air samples collected. However, some physical methods, such as dust counting are outside the scope of other laboratories. Facilities for chemical analysis are available in other laboratories namely: the Government Analysts Geological Survey, Drug Quality Control Laboratory and Medical Research Institute".

## Ocean Pollution

Pollution of the oceans has become a major problem, on an international scale, and more recently a crucial issue for Sri Lanka too with proposals to set up a giant offshore oil storage complex. A team of experts drawn from the Ministry of Fisheries, Petroleum Corporation and Port Authority is now examining this project further after the Cabinet sub-committee appointed for this purpose decided to refer it recently to a technical committee. These further investigations are being carried out following reports that the proposed complex may cause serious ecological problems if adequate precautionary measures are not taken and also speculation that the risks involved



Noise Pollution that will result in opening of Ratmalana Airport to international air traffic. The estimated noise levels can be demarcated as follows:

- Zone 1: Zone where the noise levels will permanently affect the human nervous systems,
- Zone 2: Zone where the noise levels will constitute a nuisance or disturbance.
- Zone 3: Zone relatively free from negative effects.



from possible damage are far greater than the benefits that could accrue to this country.

It has been established that the oceans, which cover more than 70 per cent of the Earth are a critical element in maintaining the world's environment, are the final receptacle for many wastes. Most wastes sink to the bottom, but solid wastes, oil, and garbage contain many floatable materials that are carried great distances by currents and winds. Pollution affects marine life directly through toxicity, which kills some plants and animals and causes reproductive failure in others; it also causes oxygen depletion, biostimulation, and economic losses in shellfish, fishing and recreation industries.

The Island's beaches and the coastal waters are not merely sources of recreation. They are also the means of livelihood for the local population, particularly ma-del fishing and employment in ocean-based recreational activities. It is estimated that nearly 30 per cent of the Island's catch of fish is from ma-del fishing. Beach and coastal water pollution in Sri Lanka are caused mainly by faecal pollution, waste water pollution, industrial pollution and oil pollution. An official Committee on Environmental Management which examined this subject, in collaboration with the National Science Council of Sri Lanka, made a case study of the Hikkaduwa area where it found that the two major sources of oil pollution of the beaches have been: Dumping of waste oil at a distance from the coast; and Dumping of waste oil by fishing boats even within the bay enclosed by the reef at Hikkaduwa. The Committee reported that "it would be difficult to prevent the dumping of waste oil at a distance from the coast. Although a harbour has been built at Hikkaduwa, a number of mechanised fishing boats are anchored in the bay enclosed by the reef", though this in itself was regarded as an environmental hazard.

A large amount of waste oil which pollutes both the sea and the beach, is dumped by these boats into the bay. In addition to the oil being a nuisance to the people using the beach or bathing in the sea, the oil is bound to affect the flora and fauna which include the coral, fish and seaweeds of

this area. If this menace is not stopped immediately, stressed the Committee, Hikkaduwa could lose many attractive features.

Although there are International Conventions on Pollution of the Sea, their implementation is more followed in the breach. It has been found that still a prominent source of ocean pollution comes from large oil spills, some of which have killed marine birds and plants, left layers of encrusted oil along shores and have cost large sums to clean up. Such spills while concentrated and disastrous, account for less than 20 per cent of the large amounts of oil that man introduces directly into the world's waters every year. Most of the chrome pollution originates from the normal tank cleaning at sea off oil carrying tankers, from normal operations of refineries and petrochemical plants, and by fallout of airborne hydrocarbons emitted by motor vehicles and industries. The danger of large-scale accidents increases, however, with the steadily increasing size of tankers: 300,000 ton ships are already in operation, and plans for 800,000 ton tankers have been projected. A single spill from one of the new large tankers could add 20 per cent to the amount of petroleum entering the oceans in a single year.

A further preventive measure in this direction in Sri Lanka is that a Coastal Conservation Authority has been set up under the Ministry of Fisheries which immediately began investigations and recommendations regarding the problem of destruction of the coral reefs on the coastal belt of the country. It is also examining measures to prevent sea erosion along the coastal areas and will be assisting in measures to prevent ecological damage of the ocean's resources. (This subject will be dealt with more fully in a subsequent issue of the *Review*).

#### Cultural Pollution

"Red is all Colombo when you land—red the tall buildings, red the roads and red too the rate flames of spathodea, which, for the rest cannot thrive nor show its full magnificence in the low torrid climate of Colombo. And, up and down in the shade or glare, runs furiously the unresting tide of life. The Main Street is walled in by high barrack-like structures, fiercely western in the heart of the old East, and the big hotels upon its frontage extend their uncompromising European facades. Within them there is perpetual twilight, and meek puss-faced Sinhalese take perpetually the drink orders of prosperous

planters and white-whiskered old, fat gentlemen in sun hats lined with green. At night these palaces are visible realization of earthly pleasure to the poor toiling souls from the farthest lonely heights of the mountains and the jungle". (R. Farrer, 1906)

Cultural pollution is a degradation of the social atmosphere and an attendant loss in values and traditions. Three major sources of cultural pollution can be identified in Sri Lanka. Tourism, conspicuous consumerism and population centralization (growth of cities). The quote by Farrer who witnessed and commented on these aspects in 1906 is significant.

Today, tourism is undergoing critical analyses from both social scientists and economists. It would appear that the tourist industry has been moulded with the social and cultural ramifications being treated as afterthoughts. The degradation of the social atmosphere has been documented in many studies. For example one study on Hikkaduwa (by Mrs. Lakshmi Perera) outlines clearly the negative effects of this industry running free with no controls.

Conspicuous consumerism is a disease attached to open-ended growth. It is the antithesis of tradition in Sri Lanka, where the culture has been moulded by the concept of 'non-desire'. Conspicuous consumerism is a product of a 'pecuniary philosophy' which is very deep-rooted and subtle.

Population centralization or the creation of cities and attendant industries provides another input of cultural pollution. Crime rates in cities are five times as high as in non-urban areas. It is a product of the deterioration of the environment physically and aesthetically. It is a fact that the poorer the urban environment the higher the crime rate. Thus modern cities seem not to be the ideal environment for human beings.

There is ample evidence to demonstrate that traditional culture patterns break down in cities. But unfortunately planning of cities often do not take into account these features. High rise apartments for the low income groups are a glaring example. In England and in St. Louis in the U.S. high rise blocks, which on planning appeared the answer to



urban squalor were found on construction to create tremendous social stress. So much so that many of these blocks are now being demolished only 15 years after they were built.

Cultural pollution is not so immediate nor overt in polluting the social environment, as say Industrial pollution is on the physical environment. But the overall effects are deep-rooted and subtle, and once established becomes one of the most difficult types of pollutants to dislodge.

If we now look around us and consider our environment we can see how our environment can be degraded by pollution, be it the poisoning of the drinking water or the use

of carcinogenic asbestos for construction and housing.

### Pecuniary Philosophy

The effect of a pecuniary philosophy on culture: "This produces pecuniary truth in which that which is true is that which sells, that which you want people to believe, and that which is not legally false. The philosophy had led (in America) to a pecuniary psychology, pecuniary history, even a pecuniary biology which deals with "product evolution" and in the end produces a pecuniary conception of the human animal, with which we can judge the individual worth of our fellows based on their income producing abilities and their public dis-

play of symbols of wealth". Such a philosophy had led to what Wagner has termed a 'backwards' technology. Instead of solving problems and meeting needs as expressed by a segment of the population, an attempt is made to create, through definition, a problem or "need". Next, efforts are made to "educate" people so that they will accept definition and finally a solution to the problem is marketed. (J. Moles, 1977).

### The Resource Base

Our environment is limited. That is, the amount of resources available to a given group of people is limited to what is present in their geographical areas. In the end, the world

## ENVIRONMENTAL PROBLEM—THE DOMINANT TECHNOLOGICAL CULTURE

In terms of the degradation of the physical and biological environment of the spaceship earth (phrase coined by Buckminster Fuller) the past half decade in man's existence has caused more irreversible damage than ever before. Man, during this period has trebled the production and consumption of consumable goods with emphasis on the variety available as against fulfilling basic needs, thus creating a monstrous and dominant technological culture which led to an exponential increase in the levels of utilization of resources both renewable and non-renewable. Writers such as Alvin Toffler, a Sociologist (Future Shock) and Kenneth Watt, an Ecologist (Unsteady State: Environmental Problems, Growth and Culture) amongst others have investigated the nature and impact of the dominant technological culture on the life-style of the individual and society. Toffler concentrates mainly on the socio-cultural and psychological impact of the dominant technological culture on Western Society. The following chosen subject titles found in his book 'Future Shock' illustrate the nature of the problems facing modern man affected by this culture:

'Break with the Past', 'The Technological Engine', 'Knowledge as Fuel', 'The Throw-away Society', 'The Paper Wedding Gown', 'The Economics of Impermanence', 'The Portable Playground', 'The Rental Revolution', 'Suicides and Hitch-Hikers', 'Monday to Friday Friends', 'Rent a Person', 'The Pre-designed Body', 'Simulated Environments', 'Life-style Factories'.

Watt on the other hand takes on the role of an empirical researcher, testing the validity of the dominant technological cultural beliefs on the basis of a futuristic planning exercise, with con-

sideration to the important premise of the resource base available for survival of mankind.

The dominant features of this modern culture could be synthesised as follows:

(a) Its requirement of high energy inputs to sustain levels of output and to achieve growth.

(b) Intensive utilization of non-renewable resources.

(c) Dominance of the producer and the dwindling importance of the basic needs of the consumer in the production decision-making process.

(d) Dehumanisation of the consumer with new techniques in marketing and advertising geared towards creating new 'needs'.

(e) Utilization of resources without much concern for recycling.

(f) Implanting of dominant cultural beliefs such as "Growth is all good", "Big is beautiful", "Use of chemical fertilizers is the answer to the world food problem", etc.

The mass-media and improved communication modes have played an important role in shaping this culture to its present state of maturity. Its influence has now spread to the most remote places in Asia, Africa and Latin America, moulding lifestyles suited to the consumerism arising from what is produced, instead of what is needed. There is however resistance from the 'new intellectuals' of the Third World to the present order of the dominant technological culture manifested mainly in the economic form. During the past decade and half the

emergence of thinking and the demand for the establishment of a New International Economic Order is an outcome of such manifestation. The emergence of new thinking in the sphere of transfer of technology, the population question, the success of the green revolution are indications of resistance against the implanted beliefs of the Dominant Technological Culture.

The conceptual treatment of environmental problems by the dominant culture, has been to consider them as the necessary outcome of the consistent trade-off that mankind is called upon to make when utilizing the limited resources to fulfil its insatiable wants. These problems therefore have to be understood and their effects minimised. Based on this premise a spurious concern for environmental conservation has arisen in recent times. While many scientific investigations, surveys and studies are conducted on environmental problems with impressive amounts of funding allocated for such purposes, the basic problems of malutilization of resources continues to receive only little attention. A rational strategy for managing and allocating the world's natural resources is urgently needed if this civilization is to survive the cycle of birth, growth, decay, decline and death that all other known civilizations have undergone.

The ability to plan its own future has been one of mankind's greatest assets. The emerging science of futuristic study seems to offer the opportunity for modern man to deviate from the stranglehold of the present dominant technological culture and plan an alternative future where the basic decision of what, how and for whom to produce will be made for the benefit of the widest possible segment of the population thus ending the Gross International Waste of resources.

Renton de Alwis



itself is seen as a closed, limited system. This is a major reason for the constant increase in value of rare minerals, fossil fuel energy etc. There is less as less is to be found and the demand is increasing constantly. The resource base is what the financial entrepreneurs would like to control and in some cases do control to a greater or lesser degree. That resource, then becomes a market commodity to be sold to the highest bidder. One unfortunate effect of an open resource base is that poorer countries can afford less and less of a resource that may be found in their own area. Another unfortunate effect is that many rare resources are not 'needed' by 'developing' countries so they sell it in order to get finances to develop, not paying much heed to the question of how and from where they (or their children and future generations) will obtain that resource when they reach the 'developed' stage in manufacturing industry. Once again a clear illustration of the danger is seen in Sri Lanka's case in the present scramble to try and export our newly discovered mineral deposits. The quantum and foreign exchange earnings from our mineral sands—Ilmenite, Rutile and Zircon—have been continuously increasing over the years and reached record levels in 1979.

Another example from this country is that of limestone for cement: though this mineral resource should have been conserved strictly for this purpose, it was found that limestone was mined for road metal, which is to say the least indeed wasteful, particularly in the light of the country's present plight for cement. Again, the mining of clay also for cement manufacture, for white-ware ceramics and making of bricks and tiles has not been carried out on a systematic scale and has been confined only to a few feet below surface even where deposits have been proved to go down deep. It is time we paid more serious attention to this aspect of our natural resources, particularly the conservation of non-renewable resources like minerals, which require rational and long-term exploitation plans together with prevention of waste through poor production and treatment techniques.

Economic and political theoreticians usually refer to goals that do not

heed the fact of mean biological base, i.e. GNP or class structure. The problem seems to stem from too narrow a perspective that can only relate to the goals or paths defined by that particular discipline. For example a high GNP cannot justify a decline in public health and nutrition: similarly a growing problem of industrial disease will pay no heed to a change in class structure.

An awareness of the environment means more sensible long-term planning. Considerations of the environment should not be limited to the currently popular "Birds, Bees or Trees" concept but rather a holistic and rational model that attempts to equate as many measurable and related processes as possible.

*"We are told that economic growth can ease the pain of poverty—of the equitable distribution of wealth but we know that the quality of physical goods, like the human population cannot grow for ever. It is not clear precisely when and in what form the collusion between the growth ethic and natural limits will occur, but there can be no doubt as to the outcome. Human values will bend or be crushed by biological and physical realities."* (Ehrlich and Holden, 1973.)

This statement contains the germ of the current development dilemma. The development dilemma can be characterised by two premises (1) Developed Countries enjoy consumer luxuries and a high standard of life attained through industrial process but have degraded their environment, and (2) Developing countries aspire to attain the standard of the Developed. The dilemma is this: Are the premises true? Will the developing countries have their environments degraded as a consequence of development? Or are the questions framed above a ruse by the developed countries so that they do not have to share the resource base with the developing. It is important to study the development dilemma carefully for it determines the value that we place on the environment.

This argument has been taken even further and put strongly in a recent paper by Samir Amin (whose influence on the 'development' debate is profound) when he stated,

*"One could also draw attention to the disturbing frequency, reminiscent of the world of fashions, with which "new", mostly*

dubious "themes" are launched, and wonder whether their purpose is not merely to divert attention from the fundamental problems of development and underdevelopment. The parade of such themes as "Population", "Environment", "Zero Growth", "Basic Needs" and "Employment Oriented Strategies," "Income Redistribution", "Intermediate and Appropriate Technologies", "Co-operation among Developing Nations", "Science and Technology at the Service of Development" takes the place of change in the real world of international relations.

What are the factors behind the clearly visible failure? Are those factors purely contingent (the economic crisis) Are they traceable to the "tactical errors" of the Third World (to its divisions and weaknesses, for example). Or do these crises and these weaknesses reflect the impossibility of auto-centred self-reliant development within the periphery of the contemporary capitalist system.?"

To understand the development dilemma more fully the problem of resources scarcity has to be appreciated. Today we are fully aware that we are part of a closed system, i.e. the Biosphere, or that the world is finite and contains a finite amount of resources. This is the fundamental reason for the energy crisis too. Many people want more energy while there is not enough to meet the growing demand (at least in the conventional forms). Notwithstanding the problems attached to 'energy addition', the current source is oil. In terms of the dilemma will the use of oil energy in development really create a less benign environment? Or is this a ruse by the 'developed' to slow the demand of the developing so that they can have access to more oil with which to maintain their own addicted systems.

If the only way of obtaining the fruits of development is seen as following the path of the developed and if the resources of this world are finite, then it holds true that the global resources base must be shared equitably to attain this goal. But from practical and worldly experience we know that while everyone would be willing to share the 'bads' (exporting polluting industries etc.) they are not so eager to share the 'goods', (subsidising essential mineral or energy export). In this scenario the environment obtains a low value for the exploitation of the scarce resources, or any endeavour that helps maximise industrial development becomes the most important function.



"If, however, development meant the maintenance of the highest quality of life for the populace of a nation, any industry or process that depressed an existing quality of life could be termed 'negative' or an impediment to development. But here, the question that was raised in the development dilemma comes into focus. Could this stance be interpreted as a ploy by the 'developed' countries to slow the consumption of resources by the 'developing countries' so that the 'developed' may not be exposed to increasing competition? Another side of this argument is stated as "The developed countries ruined their environment in order to develop themselves therefore is it right for developing countries to erode their environments too".

Man's well-being and the fact that man is a biological entity linked to his environment are facts that have been poorly considered in the development dilemma. Thus with an increase in awareness as to the interrelations of human well-being with the environment, a different development ethic may emerge. It may well be that in the future a developed country will be one that maintains the most benign environment for its people.

#### The Japanese Case

*"Environmental pollution affects children first..... Among these people who were recognized by the authorities of Yokkaichi City (in Japan) in 1971 as victims of pollution were 258 children ages ranging from 2 years to 9, and 46 boys and girls, ages ranging from 10 to 19. The total number included 304 boys and girls....."*

According to a survey conducted by the Study Group for anti-pollution measures for Japanese Primary and Secondary School Children, the ratio of primary and secondary schools that had pupils affected by pollution is reported to be 28.8 percent of all primary and secondary schools in Tokyo. This ratio is 32.8 percent in Osaka Prefecture, 18.7 percent in Kanagawa Prefecture and 24.9 percent in Aichi Prefecture.

From the statistics cited above, we can conclude that environmental disruption had become a definite reality in Japan during the period from mid 1960s to 1970s, and that it began to affect boys and girls in particular.

The more concerned a teacher is about this situation, the more seriously he feels that he has to protect his pupils from pollution, and at the same time he recognizes what little power he has in tackling a colossal reality brought about by the policies for unceasing industrial development in Japan. He is really put in a dilemma.

The education of Japan in the 1960s has stressed the ideas which glorify the policies of industrial development and modernization, which have been advocated since the Meiji era. We can find examples of this kind in the social studies curriculum.

This curriculum has an underlying assumption that Japan's rapid emergence as an advanced country in Asia can be attributed to its miraculous economic growth which was attained within an extremely short period of time. And also there was a national aspiration that Japan would become one of the most advanced industrial nations by bringing the growth of its gross national product (GNP) to a peak in the 1960s. This surprisingly high economic growth, however, was attained only at the expense of two great sufferings of many human beings, and of great damage to the environment. This fact became very clear to all of us in the late 1960s. One such example can be found in the environment pollution that took place in areas around industrial complexes, which symbolizes a high growth of GNP.

Japanese teachers in polluted areas therefore had to protect students from various kinds of pollution, and at the same time, they made efforts to criticize statements and descriptions in the textbooks which glorified the high growth of GNP and turned the children's minds to the reality as it were.

Thus environmental education in Japan started, not as a static education but as education against environmental disruption. Being victims of pollution themselves, they have learned to oppose environmental disruption, stated S. Rujioka in 1975.

#### Land, Water, Forests

The destruction of large ecosystems have their repercussions on the environment. The clearing of mountain forests is a good example. The mountain forests were cleared

for tea, coffee and now for vegetable cultivation. The loss of forest cover means rapid desiccation of the soil so that it fragments and is blown away in dry weather. It means rapid water drainage due to the loss of the spongy forest litter and the root systems; it also means rapid breaking and eroding of the soil as there are no trees to break the impact of the falling rain. Thus the top soil is eroded and washed into the sea. The result is a poor, bleached soil on which plants cannot thrive except with a heavy input of fertilizer. The immediate environmental effects stretch further and include flooding due to silted rivers and a rise in the habitats of malarial mosquitoes due to the creation of their favoured ephemeral pooling habitat. In the light of the energy crisis the destruction of the montane forests creates further problems. One of the best energy sources for the island is hydro-electricity but most rivers have their catchment areas deforested. The flow of silt as a result of deforestation cuts the effective life of a dam by 30-50 percent.

#### The Mahaweli Area

A note of warning has been sounded particularly with regard to the environmental aspects of Sri Lanka's biggest ever development project that of developing the Mahaweli Basin and lands surrounding. Basic to the whole project, for instance, is the conservation of soil and water and this could be effectively achieved only by maintaining an adequate natural forest cover. Drawing attention to the environmental aspects to be guarded against in this project the University's Professor Abeywickrama stated at a seminar that "The entire success of the project would depend on a regular supply of water. The most important tributary of the Mahaweli originates in its upper catchment area at an elevation of 4,000 to 8,000 feet. Some of these areas receive a rainfall of over 200 inches per annum. But, most of this area has steep slopes with high erosion patterns, and effective soil and water conservation in this region is an essential requirement for the development of the project area. If there is high erosion, there will be filtering of the water reservoirs leaving aside the other evils of soil erosion. The reservoirs will be filtered in no time.



Secondly, the rapid run-off will make the water disappear in no time after the rains and the dry weather flow will be reduced and this has also to be guarded against.

Maintaining the natural forest cover is the most effective. Unfortunately this is not possible because the upper catchment area happens to be the most productive and economically important region in the island. Already about 80 percent of this is under cultivation or under some use. Only 8 percent is now under forest and about 10 or 20 under grassland. But the forest area is said to have been 22 percent just a little over 20 years ago in 1956 and according to the Conservator of Forests, from 22.2 in 1956 it has now come down to only about 8 percent which is regarded as a serious thing. Fortunately there is now a ban on the deforestation of this area.

Even with the most careful planning in our operations with a project of this magnitude, unforeseen changes can occur. The opening up of upto 900,000 acres for intensive cultivation and providing water round the year into an area which was seasonally dry can bring about many changes in the environment. First of all there could be changes in soils. It is not only the irrigation right through the year, but the agricultural inputs, fertilizer, pesticides and so on that will be introduced. These can bring about changes. Then there can be changes in insect and pest behaviour and these affect man. These can also result in the introduction of new pests and weeds; because with the long period of drought certain plants and animals which were not there earlier may come in there. These are some of the dangers we have to guard against. Now because of these factors it is necessary to continuously monitor the environmental conditions in all the development areas. Such monitoring can provide us with early warnings of any untoward side-effects and if we find that something is happening then it is expected that we can take remedial measures to correct them".

Another effective illustration has been given by the Conservator of Forests who cited the case of the Horton Plains where the soil level had dropped many inches as a result of potato cultivation, thereby reducing the soil

capacity to absorb and retain water mainly because adequate soil conservation measures had not been taken. He maintains that this would happen in all other catchments if such forests were to be replaced by indiscriminate cultivation. Thus both in the conservation of soil and water resources as well as the amelioration of local climatic and other natural environmental conditions forests have a vital role to play. As a deceleration at a recent World Forestry Congress summed it up "Forests counter erosion, protect agriculture, reduce floods, assure clean water, provide amenity and recreation, shelter, wildlife, reduce pollution, generally constituting a defence against environmental deterioration, provide timber, wood-based industrial products and forest products which enter into every sphere of man's activities, and also provide employment. In short, forests make a decisive contribution to environmental, social and economic progress".

There is absolutely no doubt therefore about the protective and aesthetic roles that forests could play, but when we find that within the last two decades the forest cover of Sri Lanka has been reduced from 44 per cent of the land area to 25 per cent the picture is indeed depressing.

In 1956 forests covered around 7.2 million acres. Now it stands at 4.1 million acres. It is estimated that only 9 per cent of the total land area of the West Zone, which is the catchment area of the major rivers feeding the major irrigation schemes consists of a forest cover. And this would be further reduced with around 0.4 to 0.7 million acres here being deforested for the Mahaweli programme. The authorities have awoken to the precariousness of the situation and there are now moves to evolve a Forestry Master Plan. But, as far back as 1973 a Committee appointed to draft a plan for 'Environmental Management in Sri Lanka' reported pointedly on our forests and forestry policies that "it would be inadvisable to deviate from the accepted policies for the purpose of short-term gain. Unmanaged and un-planned exploitation of our forest reserves would be detrimental to Sri Lanka; the damage done thereby to our environment would be irre-

parable." Unfortunately like many committee reports this one too ended on the shelf. With the dramatically changed energy, construction and land settlement situation however, the position appears far more urgent now.

### Urgency for Environment Management Measures

In retrospect we observe that the impact of living conditions makes a change in natural environment necessary, but in the past such changes have been made without sufficient understanding or consideration of their long term impact on the environment's implications for human health and welfare. Results of such errors in planning have resulted in forest covering being indiscriminately razed in excess of their regenerative capacity; the protection we enjoy from our coastal reefs is diminishing with their breaching for industry; inland and ocean waters, dumps for various forms of effluents, with an ominous drop in the fish life they had before; the atmosphere is used to mask the discharge of smoke, gases and other pollutants reducing its capacity to support life. Some diseases thought to be well under control have erupted in epidemic form like malaria, filariasis, hepatitis, dengue fever and bowel ailments. The image Sri Lanka enjoyed as a model of public health by various international authorities may be blurred.

With the present demands of a vigorous development programme it is inevitable that Sri Lanka's natural resources would have to be exploited to the fullest extent, but it is patently clear now that an unplanned exploitation of these resources can be most damaging in the long-run or in the interests of future generations. Priority would have to be given to the problems we face in preventing any further degrading of the environment through the various development projects now being planned and implemented. There is a considerable amount of legislation connected with environmental management already on the statute books. But this has not proved sufficient; it appears that the machinery to enforce such legislation has not been clearly laid down. At least, though the existing machinery in various departments and institutions seemed capable of handling these problems of the environment there has been a lack of interest or urgency in taking effective measures. Any steps taken now to manage our environment will be cheaper in economic and social terms than action taken much later is the stark lesson we have learnt from most countries in the developed world and even from our own case.



## Inflation in 1979

The price situation has been a matter of serious concern in 1979 with fears that it could be aggravated by further increases in oil prices and unstable conditions in certain areas on the international scene. Furthermore, the relatively poor Yala harvest this year, and the wage increase granted in September were expected to add to inflationary pressures. Commencement of the Government's larger development projects such as the Accelerated Mahaweli Project, which has a long gestation period will also contribute to further pressure on the price level in the short-run.

All indications are that the rise in consumer prices in Sri Lanka towards the end of 1979 was of the order of a rate of 20 to 30 per cent which was of an unprecedented magnitude. By comparison, the consumer price rise recorded during 1978 was less than 13 per cent. Available information suggests that the bulk of the consumer price increases took place in food items and in the fuel and light category. Moreover, the price increases were sharper in the second half of the year compared to the first half.

### Containing Pressures

The Government had been able to contain inflationary pressures in the economy in the earlier part of 1979, when compared to the situation in several other countries, despite adverse world conditions. The Colombo Consumers Price Index showed a very moderate increase of 2.1 per cent in the first half of this year as compared with the recorded increase of 10.9 per cent during the first half of 1978. The Central Bank Wholesale Price Index on the other hand declined by 5.3 per cent compared to an increase of 2.4 per cent in the first half of 1978. This was due primarily to a sharp decline in tea prices, which have a high weightage in the index, and a drop in the price of rice.

The inflationary trend in the latter half of the year was a result of a

combination of factors originating in the supply on the cost side as well as in the demand side. It appears, however, that the supply or cost factors played a more important role in putting pressures on the price level. In the context of liberalised imports, the demand pressures led to a higher import volume and this was a factor offsetting the inflationary impact. On the supply or cost side the following were the important factors which led to a sharp upward movement in consumer prices:

- \* the secondary effects of the increase in the prices of petroleum products effected in June 1979.
- \* the withdrawal of price subsidies on kerosene, milk powder and rice in September along with the introduction of the food stamp scheme.
- \* the upward revision of the prices of wheat, flour and bread in October.
- \* sharp rise in the price of coconuts (reflecting the drop in the coconut crop during the second half of the year) and the higher price of rice (reflecting the poor Yala harvest).
- \* the sharp rise in the prices of several other food items such as onions, chillies and vegetables, particularly during the November-December period due to seasonal factors.

In summary the important supply factors (causing inflationary pressures) relate to the rise in fuel costs (reflecting higher import costs) withdrawal or reduction of price subsidies, and supply shortages of some domestically produced food items due to production shortfalls or seasonal factors.

On the demand side, the important factors which put pressure on the price level can be identified as follows:

- \* The money supply which rose by nearly 11 per cent in 1978 rose by a very much higher percentage during 1979. By October 1979 the increase in the money supply (over December 1978) was

as much as 21 per cent. During the twelve-month period ending October, the increase was 23 per cent. During January-October 1979, a sum of over Rs. 1,200 million had been added to the money supply.

- \* The large scale remittances from migrants, particularly from the Middle-Eastern countries (roughly estimated to be Rs. 40 to 50 million per month.) A substantial portion of these remittances would have gone into consumption that is for the purchase of both durable and non-durable consumption goods.
- \* About 350,000 unemployed persons received payment (Rs. 50 per month) under the Income Support Scheme, and the money pumped into the economy through this scheme amounted to about Rs. 300 million during 1979. There is no doubt that the bulk of this money went directly into consumption.
- \* New incomes generated through the higher level of activity particularly in the construction and service (mainly commerce sectors) was a further important sector in creating demand pressures in the economy.

It is important to note, in the context of liberalised imports, these demand pressures led to a higher flow of imports which helped to offset (at least partially) the inflationary impact on the domestic price level.

### Wage Increases

The effects of the rise in consumer prices on the living standards was cushioned to some extent by an increase in wages. A salary increase of 10 per cent was granted to public sector employees in January 1979 and a further increase of Rs. 55 per month was granted in September to compensate for the withdrawal of price subsidies. Similar wage adjustments took place in the private sector, at least in the organised businesses of the private sector.

The sharp rise in consumer prices during 1979 and the possibility of further price increases in the coming months, and the reduction of the number of leave days for public sector



### Gold passes the \$800 an ounce mark

employees from January 1980, are factors which are expected to lead to a further round of wage increases in the early half of 1980. The recent fuel price increases announced by some OPEC countries should lead to a further upward adjustment in the local fuel prices and this should lead to widespread secondary effects on prices and costs in practically all sectors of the economy. In this context, it may become necessary to adjust rail and bus fares in order to avoid a sharp rise in the losses (which are already very high) suffered by the public transport system. Another important item, presently subsidised, which is likely to experience further upward price adjustment is wheat flour and bread, where the government policy appears to be to eliminate the subsidy in gradual stages. The immediate prospects thus appear to be a further round of wage increases and upward movements in consumer prices. Price stability remains a problem the authorities would have to battle with.

There is hardly any developing capitalist country that is not seriously affected with inflation at home and has been compelled in recent months to face up to the situation of world recessionary tendencies. The London *Financial Times* of January 21 reported that in Turkey inflation is unchecked with prices rising at an annual rate of 70 percent. The *Economist* of January 18 reported that in Brazil the 1979 inflation rate was 77.2 percent. Again, the *Economist* of January 26 reported that the increase in the rate of inflation in Argentina was as high as 170 percent in 1979 and has been at this level over the last few years. Reports from many Asian capitals indicate that the inflation rates in 1979 ranged between 20 & 30 percent in Asian countries such as the Philippines, South Korea and India.

International bankers were expecting 1979 to surpass the record lending in Asia and the Pacific during 1978; while in 1980 it is expected to go even higher. With the struggle against inflation and anticipated world recession most Asian nations were trying to control their appetite for large international loans. An *Asian Wall Street Journal* report states that this was causing bankers who make syndicated loans "to cringe as they watch profit margins narrow in a strong borrowers market."

In South Korea, for example, to slow development's pace and inflation the government has repeatedly delayed several large industrial and petrochemical projects. "Asian nations are adopting tight money and credit policies at home. Most have raised interest rates, while central banks have enacted restrictions to reduce money supply growth. In several countries, this has hobbled local capital investment and kept stock markets sluggish."

The price of gold soared well beyond the \$800 an ounce mark to reach a dramatic new record of \$825.50 an ounce in a price setting session on the London Bullion market. On Friday January 18. Gold prices had burst through the \$700 an ounce mark in New York only on Tuesday January 15, closing at \$711.50 an ounce. The final price on Tuesday was a staggering 42 dollars an ounce up on the closing price on Monday January 14, and 20.50 dollars up in the key London Bullion market. Trading in world markets appeared frenzied as anxiety spread over the Afghanistan and Iranian crises. The January gold surge, which began late on Monday, gained momentum on unconfirmed reports that the Soviet Union had massed troops on the Afghan-Iranian border. The rise was further boosted in New York when on Tuesday the US Treasury Secretary said that the Treasury had no plans for gold auctions at this time. This appeared to rule out the possibility that the Carter administration would move to stabilise the price of gold through sales of the precious metal.

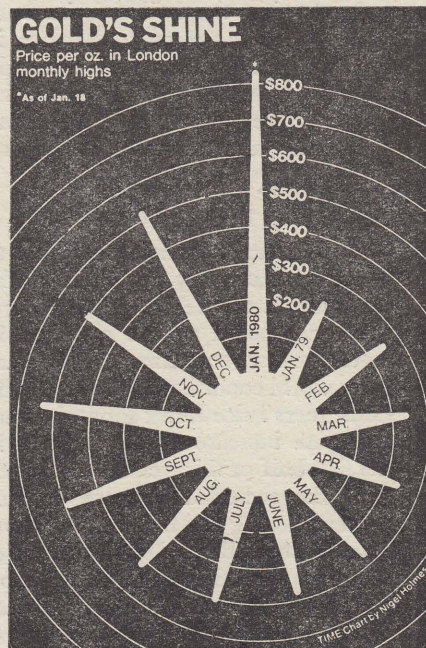
Gold reached its new peak for the first time just three months after topping \$400 and only six months after passing the \$300 an ounce mark. Only a few months back no speculator would have dreamt of the kind of frantic buying of precious metals that has gone on in the world markets recently, rewarding the big holders so handsomely during the first two weeks of January 1980. On a single day gold climbed \$74.50 an ounce, or more than twice its value as late as 1971. During this week it also climbed an incredible \$148, to peak \$660 per ounce before falling back drastically to almost the \$600 an ounce mark. As we showed in our last issue crossing such psychologically important boundaries used to take years, not months. Not until 1973 did gold's price reach \$100 an ounce, although the metal had been traded for centuries, and five years elapsed before that price was doubled.

What has caused this frenzied activity we have already discussed at length. The question is—who are the buyers of gold? Broker dealers in New York generally ascribe market action to large buyers; generally those who favour the standard 400 ounce bars; not bullion coins and small bars. Analysts state that much of the demand is coming from European markets, from dealers and brokers who appear to be acting as agents for ultimate buyers who can afford to buy large amounts of precious metals at current prices. Not all of them, however, are from West Asia, although the most avid gold buyers right now are the Arabs. According to professionals in the market the Arab buyers are the third of three distinct blocks of purchasers who have dominated the gold market at various times in the recent past. Before them, dealers say, the buying came from Americans, whose new found fascination with the metal in 1978 and early in 1979 pushed its price above \$300 an ounce in

July. Earlier, Europeans dominated the gold market, with trading limited to a handful of bullion dealers and a few select banks.

It is not only in countries like India and Sri Lanka that gold has its special significance for small buyers and families. For instance a report from Hong Kong states that many of the fishermen there who are non-Cantonese and have traditionally lived on their boats, have another tradition: "They don't like banks and consequently keep their entire savings in gold which is hidden in the holds of their junks."

Their hoarding of gold rings, bracelets and hairpins used to be laughed at but this does not happen any more. Watching the spiralling price of gold, sophisticated and small investors alike now wish they had shared these same gold-loving instincts. Gold buying is now spreading rapidly ashore, attracting large funds away from bank savings accounts and the Colony's stock market. Some people in Hong Kong are rushing to buy gold ingots from jewellery shops. Others are buying and selling gold contracts on margin accounts through dealers on the Chinese Gold and Silver Exchange or Kam Ngan, the Colony's only gold market. They are going after gold because its price seems to point only one way up", says one investment banker.



When gold prices broke the \$800 barrier all leading publications illustrated the recent trend diagrammatically. Our choice of the most illustrative was this 'Time Chart' reproduced here by courtesy of TIME, the weekly news-magazine.



## GOLD DIARY

Dec. '79

- 11 Gold rose \$16 to close at a record high of \$447.5 a troy ounce in London as the dollar came under further pressure on foreign exchange markets. Heavy buying, which took the price to just above the previous record of \$446 established on October 2, was set off by continuing anxieties in the bullion market over Middle East political tension.
- 12 Gold rose above \$450 for the first time in London on Middle East uncertainty, but eased later to close  $\frac{3}{4}$  down at \$447. Silver also reached record levels. The London spot quotation rose 38p to 915p a troy ounce.
- 17 Gold and Silver rose to new peaks in London in further hectic buying sparked off by fears of large oil price rises emerging from the Organisation of Petroleum Exporting Countries meeting in Caracas. Gold closed at \$470 per ounce, up \$12.75 from the 14th Friday's close, after touching a high of \$474.50.
- 18 Gold rose  $\frac{1}{2}$  in London in very active trading to close at a record \$479 $\frac{1}{2}$ .
- 19 Gold approached the \$500 per ounce level in London touching a record of \$496.75 in hectic trading before subsiding later in the day to close at \$489. The rise of \$9.50 since Monday the 17th took the price increase to 16 percent over the last 10 days. The gold price has now doubled in just over seven months.
- 27 Gold hit a new peak of almost \$520 per ounce on the international bullion market, as the dollar came under further pressure and sterling rose 3 $\frac{1}{2}$  cents to its highest level since September. The renewed price surge, following on from gold's advance to beyond the \$500 level in New York on the 26th Wednesday, was accompanied by further speculative buying of other precious metals.
- 31 The prices of both gold and silver jumped sharply to new peaks on Monday December 31 ending a year of record gains for both metals. The price of gold on the London bullion market rose by \$16 $\frac{1}{2}$  an ounce to

close at \$526 $\frac{1}{2}$ . This was almost exactly \$300 higher than at the beginning of 1979. Later in New York the price rose to \$530.

Jan'80

- 2 Gold soared \$41 to a record closing price of \$567.5 in London as tension over Afghanistan triggered heavy demand for metals and mining shares on international commodity and stock markets.
- 3 Gold soared \$62.5 to close at a record \$630 per ounce in London as speculative fever gripped world commodity markets. Major central banks mounted substantial intervention to support the dollar on the foreign exchanges. Gold prices touched a phenomenal high of \$658 an ounce on the Hong Kong market.
- 5 Gold prices reached new peaks with the metal closing in the Hong Kong market at \$630 and in the New York market at \$615 an ounce.
- 7 The price of gold reached a world record of \$680 an ounce on the Hong Kong bullion market is what dealers described as panic buying.
- 9 Gold dropped in value and its price fell temporarily below \$600 an ounce in London for the first time since the peak of the recent gold fever, when prices soared more than \$100 an ounce in the first week of 1980. It was fixed at the regular morning price-setting session on the London Bullion market at \$599.25 an ounce.
- 11 Gold prices jumped sharply in jittery pre-weekend trading, climbing more than \$20 an ounce in Europe — an \$40 an ounce in New York.
- 15 The price of gold in the London market reached a record \$682 an ounce.
- 16 The price of gold soared to a stunning new record price of \$765 an ounce on hectic European bullion markets before easing back as speculators took profits.
- 18 The price of gold was fixed on the London Bullion Market of \$825.50 an ounce, a dramatic new record for the regular price setting session on this key market.

In fact, what distinguished the second week of January's gold rush in leading markets was the enormous influx of small investors. Suddenly, the offices of gold dealers in cities around the world were mobbed by ordinary people who wanted to cash in on the boom. Many wanted to put their money in gold and jewellery as a secure investment; while several others thought that the price would soon drop and hoped to

sell what they had at 'boom' prices. The speculative fever hit other precious metals too.

Experts were convinced that the price of gold would push well beyond the boom levels at the end of 1979. Trading in January has proved that prices were fast rising and this latest gold surge prompted one New York dealer to exclaim "The Sky's the limit now".

## Local Industries....

(Continued from page 21)

in 1977 to 44,293 by the end of 1978—an increase of 14 percent. Employment in the organised private industrial sector, coming under the Ministry, is estimated to have increased 12.5 percent—from 84,768 in 1977 to 95,345 in 1978.

- \* The number of unemployed persons in the labour force is estimated at approximately 800,000 while approximately 125,000 new entrants will be joining the labour force in the period 1980-83. A total of 1.3 million new jobs will have to be created in all sectors over the next 4 years with the industrial manufacturing sector contributing at least 125,000 of these new jobs.

The future growth and development of the manufacturing industry in this country will be guided towards the following broad objectives: Establishment of industries which will maximise the local value added content of our primary export products, establishment of import substitution industries which will be viable with reasonable marginal levels of protection and the surplus production of which, if available, could be exported, and establishment of industries to produce for export, items in respect of which this country has a comparative advantage.

## Industrial Products from . . . .

(Continued from page 20)

to replace oil as the chief raw material with atmospheric nitrogen, and use microbiological techniques for fixation of atmospheric nitrogen. A short-term move in this direction would be to return to crop rotation and grow exotic legumes, grasses and woody plants that have a high nitrogen symbiosis. A medium-term plan would be to invest more on plant breeding and genetic manipulation of the appropriate bacteria to increase the nitrogen uptake. It is necessary to find a more effective long-term solution to the problem. This long-term solution, which could also, in the long run, probably be the only solution, will be for scientists to devise more imaginative methods of manipulating plant genomes to fix nitrogen independently.



## Industrial Products from Natural or Waste Materials

We often hear of warnings coming from various quarters that a world energy crisis would develop over the next ten years. A considerable amount of scientific and technological research is being directed towards finding a solution to this problem. The attention of eminent scientists and scientific organisations has been drawn to investigate the possibility of using solar energy, wind power, nuclear energy, geo-thermal energy and energy in oceans, as substitutes for conventional petroleum fuels. A large group of scientists, engineers and businessmen met recently at the Royal Society in London to examine the opportunities for making substitute fuels, chemicals, pharmaceuticals and food stuffs by the application of industrial microbiology or biotechnology. While reviewing the present position of biotechnology, the speakers at the Royal Society meeting have made valuable suggestions concerning the activities which should be given priority in research and development work in this field.

Biotechnology is the technique of obtaining valuable materials needed by man using cheap and readily available raw materials which have hitherto been considered as waste materials and readily renewable natural raw materials. The raw materials in biotechnology are certain waste products which are normally discarded as garbage, renewable plant materials such as starch, sugar and cellulose, and discarded hydrocarbon residues of oil refineries. The agents that convert these materials into useful products are micro-organisms found in nature. For example, it is well known that the sweet toddy tapped from palm trees in this country are converted into useful products like alcohol, treacle, jaggery, sugar and vinegar by the action of micro-organisms. Starch and sugar are further subjected to the action of micro-organisms to obtain alcohol which is now coming into vogue as a fuel. Bio-gas has come

into prominence recently as a fuel in a product obtained from cowdung and garbage or organic waste materials through biotechnology.

Biotechnology has several advantages over traditional technology. The raw materials are cheap and are readily available. They are also renewable in a relatively short period of time. The agents required for this technology can be bred rapidly and easily. Another special advantage is that, unlike as in other technologies, biotechnology causes the least amount of environmental pollution.

### Ethyl Alcohol and Single Cell Protein

Two examples may be cited to illustrate the success already achieved by the application of biotechnology in the production of materials useful to man and which hold out greater promises for the future. One is the bulk manufacture of ethyl alcohol by a fermentation process for achieving self-reliance in fuel. Brazil has already launched a massive programme to substitute alcohol for petroleum in motor vehicles. While making a big saving in foreign exchange needed for importing petroleum fuels, such a scheme could also boost rural development and make the best possible use of the crops like sugar cane and manioc that provide the carbohydrates for conversion. Thus, biotechnology indirectly contributes in some measure to rural transformation too in developing countries. Another successful product of biotechnology is the single cell protein. According to a technique developed by a British firm, the starting material for this product is methanol or methyl alcohol which is converted to a bacteria which is then harvested as a single cell protein (called PRUTEEN) used for animal feed.

A major problem faced in the application of biotechnology on a large industrial scale is that even though the raw materials are cheap,

the cost of production is very high. For instance, the production of alcohol (to be used as a fuel) in the U.K. from sugar cane is estimated to cost about Rs. 10,300 per ton. (It was recently reported in the local press that it costs about Rs. 50.00 to produce a gallon of alcohol in our own sugar factory.) Attempts are now being made to find ways and means of reducing the present high cost of production in biotechnology.

A considerable amount of energy is needed to produce premium fuels such as alcohol. Biotechnology hopes to provide the answer to this problem by using low grade sources of energy such as garbage and hydrocarbon residues to convert agricultural products into a premium energy resource.

The key to the economic success of biotechnology lies in the capacity to obtain high yields of the bacteria, fungi, and yeasts that are responsible for the biochemical processes. While micro-organisms have been harnessed for fermentation for generations in traditional micro-biological industries such as brewing and baking, recent advances in enzyme engineering and genetic manipulation are transforming the way bacteria, fungi and yeast can be used to make more complex and newer products. There is considerable scope in the future for improving the production yields by modifying operating conditions and developing novel strains of micro-organisms by genetic manipulation.

An important goal for biotechnology is to increase the growth of crops and yields. This can be achieved by raising the efficiency of biological nitrogen fixation. Today, agriculture depends very heavily on synthetic fertilizers for its nitrogen. The ammonia based fertilizer industry has grown so rapidly during the past that it now consumes about two million barrels of oil a day. It is expected that the agricultural nitrogen input will have to double by 2,000 A.D. and the demand for oil as a raw material for fertilizer production will also increase proportionately. In such a situation, the use of oil for fertilizer production will not be economically feasible and alternative sources of raw materials and techniques will have to be found. Today, the need has arisen

(Continued on page 19)



## LOCAL INDUSTRIES AND IMPORT LIBERALISATION

A survey on the impact of liberalisation of imports on local industries conducted by us in mid 1978 showed that immediately after liberalisation most industrialists were making use of the relaxation of controls either to step up production heavily or move into direct trade where returns seemed to come in quicker. Our survey showed that capacity utilisation and raw material consumption had gone up in major industrial sectors particularly in the textiles and chemical sectors where over 100 percent increases were recorded. New machinery and spare parts were also freely flowing in to meet a long pent up demand. There were also beneficial effects with regard to employment. There were signs however that certain sectors, particularly the small and medium-scale industrialists in these sectors, were adversely affected. Our survey, however, covered only the first half year period of 1978 when the full impact of the liberalisation had probably not been felt as yet and industrialists were still adjusting to the various fiscal and policy changes.

The Minister of Industries presenting his Ministry's viewpoint on this situation, when the Ministry votes were discussed during the Committee stage of the Budget, in November, also drew conclusions which showed that after over one year of operation of the liberalised imports scheme that there were both beneficial and adverse effects on our industries. He said liberal policies implemented from November 1977 freed the industrial sector from the stifling constraints which had seriously affected them in the past. But the performance of some of the bigger private industrialists, particularly with regard to exports, has proved to be disappointing. The Minister remarked in this connection "with the greatly increased flexibility of operation and the ability to maximise capacity utilisation an achievement of only 4 percent overall growth rate of exports in 1978 was below expectations. It is unfortunate that some firms have in 1978 showed a quantitywise reduction of their ex-

ports in comparison to their achievements in 1977 and previous years".

It appears that with the freeplay of market forces being encouraged the bigger industrialists were taking advantage of the situation at the expense of the smaller producer. The Ministry has also followed the concept that adequate protection should be afforded to industrialists to enable the local product to be competitive both in price and quality with imported goods. In several cases, however, there were complaints from industrialists either with regard to imported products or duty rates and a special Tariff Review Committee appointed for this purpose went into all appeals and made the necessary recommendations in the interest of the economy, the local manufacturers and consumers.

The Ministry while taking account of the eroding effects of inflation on the pricing of products of local manufacturers, has warned that care must be taken that inflation accounting does not ultimately result in over-protection of investments and unreasonably high prices of goods to consumers.

The Minister has also emphasised the need for a degree of statutory control covering matters of industrial development. He has pointed out that unlike in many neighbouring developing countries and also developed countries, there are yet no laws in Sri Lanka governing the establishment and operation of industries, or laws for the regulation of monopolies in the field of industrial production, or to prevent dumping of goods by foreign exporters to the detriment of local industries. The development of a statutory base for industrial development he says appears to be "an urgent need".

There was also room for improvement in many directions with regard to capacity utilisation in our industrial sector. Despite the increased availability of raw materials after the liberalisation of November, 1977 capa-

city utilisation in the manufacturing sector was only 70 percent in 1978. This was a significant improvement from the level of 61 percent in 1977, but there was still room for major improvement, states the Minister. He adds that there has been a tendency towards creation of excess capacities in the local manufacturing sector as a result of many industrialists trying to achieve almost complete vertical integration within each factory. He suggests that the time has now come "for greater efforts towards horizontal integration of industries so that capacities already established could be utilised to the maximum. It is very important, he emphasises, that the larger industrial units should not seek to manufacture all the numerous components required, but should sub-contract out to smaller units the manufacture of various components subject to conformity with prescribed specifications.

Among the other observations the Minister makes on liberalisation are the following:

- \* the heavy dependence of local manufacturing industries on imported raw materials is a serious defect in our industrial development.
- \* The response of entrepreneurs has been satisfactory and in 1978 the Ministry approved the establishment of 1,070 new industrial units involving a total investment of Rs. 606 million and with a potential of generating 23,191 new jobs, when in full operation.
- \* There has also been a substantial flow of foreign investment into the country, even in areas outside the GCEC, and several public sector corporations were conducting negotiations with foreign firms.
- \* Most of the public sector institutions under the Ministry achieved, in 1978, significant improvements in their levels of utilisation of installed capacity; the most noteworthy achievement being that of cement production which went up from 333,463 metric tons in 1977 to 554,654 metric tons in 1978.
- \* Employment in public sector institutions increased from 38,821

(Continued on page 19)



# COMMODITIES

## TEA

### Drop in World Production

The year 1979 was a better year than the previous one for tea production in Sri Lanka, though world crop output appears to have dropped by about 19 m. kgs. Estimates of Sri Lanka's tea output in 1979 are placed at about 207 m. kgs. as compared with 199 m. kgs., in 1978. This production level although an improvement over the last two years when compared with the output of the year 1971, 1972 and 1975 when output was in the region of 280 m. kgs. for the year is not as impressive.

World production of tea in 1979 was trailing that of the previous year mainly because of the estimated drop in the North Indian crop due to acute drought conditions in these regions. Upto the end of December crop figures for North India were

that aggregate exports in 1979-80 may increase by 40 million kg. to about 203 million kg.

With an upward trend in prices and shipments of about 105 million kg. in October-March it is estimated that India's aggregate foreign exchange earnings may be in the region of Rs. 340-350 crores in 1979-80. It is however, feared that there may be a decline in the unit value of exports if the shortages in packing materials are not eliminated. Difficulties in securing aluminium foil have been handicapping the despatch of tea against export contracts. The availability from indigenous sources has been badly affected by interruption to production at the large-sized plant in Calcutta. But, with a reduction in stocks and the brisk demand, India's tea estates are likely to get over fully the adverse effects of the depression in 1978-79.

countries. In Sri Lanka too the first half of 1979 therefore recorded unremunerative prices especially when considered against the rising cost of production. The existing export duty and cess and Ad-Valorem Sales Tax levy that were in force took still more of the producer's margin. The result was that by the end of June nett sale averages were extremely depressing when compared with those of 1978 and the cost of production had reached around Rs. 12/50 per kilo. But the with reduction in export duty and Cess from Rs. 16/20 to Rs. 11/40 a kilo and the revision of the Ad Valorem Sales Tax, together with a greater interest in buying during the second half of 1979, producers enjoyed a better return than in the first half.

A significant feature that was apparent throughout the year was that the demand for Sri Lanka's best available teas, particularly during the two Quality Seasons, was exceptional and the top prices established during the year surpassed previous performances convincingly. This aspect clearly endorses the fact that good teas, even during a year of comparatively low prices, continue to be sought after.

The trade warned, however, that whilst forecasting a generally stronger market in 1980, particularly better than in the first Quarter of 1979, there is no real shortage of very poor tea and an abundant supply of inferior teas could well mean depressed prices for these varieties.

The annual average prices fetched by Sri Lanka's teas at the Colombo Auctions are shown in the table below.

The continuous fall in the average price per kilo over the last three years is seen in the table below, particularly in the gross average prices which fell from Rs. 16/05 per kilo in 1977 to Rs. 12/19 per kilo in 1979.

CROP FIGURES OF MAJOR PRODUCING COUNTRIES  
(in million kg.)

Country			1978	1979
Sri Lanka	...	upto Dec.	198.9	206.4
Bangladesh	...	upto "	36.5	35.9*
South India	...	upto "	130.4	139.0*
North India	...	upto "	440.9	407.7*
Malawi	...	upto "	31.7	32.6*
Kenya	...	upto "	93.4	99.3
Tanzania	...	upto "	17.2	18.0*
Indonesia	...	upto Oct.	59.0	59.8*
Uganda	...	upto Dec.	10.9	1.6*
<b>Total</b>			<b>1018.9</b>	<b>1000.3*</b>

\* Estimated

estimated at 408 m. kgs. as against 441 m. kgs. for the same period in 1978. In Bangladesh too there was a slight fall in production up to the end of December, while in Uganda with the unsettled political conditions crop figures had dropped drastically. (See table above).

In India however, tea estates were busy stepping up exports and also increasing sales in the domestic market with larger buying by overseas consumers and a sharp increase in internal consumption. On the basis of the trends in shipments in April-September 1979 and bidding at the auctions in subsequent weeks it is expected

With the increase in the world crop in 1978 and a general slackening throughout the year following the panic buying experienced during the price boom in 1977 there was a substantial rate of carrying over of stocks of unconsumed tea into 1979 both in the producing and importing

ANNUAL AVERAGE PRICES

	Gross			Nett		
	1977	1978	1979	1977	1978	1979
High	16.51	13.64	13.35	13.66	11.41	11.74
Medium	14.80	10.69	10.42	12.18	9.58	9.97
Low	16.80	17.41	12.54	13.58	13.36	11.56
Total	16.05	14.09	12.19	13.15	11.55	11.14



The trade saw optimistic signs in the tea market during 1980, at least during the first quarter. The reasons for this was that globally the large carry over stocks of unconsumed tea, that were in evidence at the beginning of 1979, had been wiped out by the end of the year. The demand situation was therefore expected to be tighter in, world markets. Locally, with the Western Quality season about to set in the quality of offerings was improving and seasonal quality teas were expected to be on offer throughout the Colombo sales in February and March 1980.

## RUBBER

### Agreement on Natural Rubber

In our last issue we made a brief reference to the international price stabilization agreement on natural rubber which was formally concluded on October 6, 1979, after nearly three years of negotiations under UNCTAD auspices. This agreement will enter into force on October 1, 1980 once it is signed and ratified by a sufficient number of countries. The particular significance of this agreement is that it is the first of 18 commodities under UNCTAD's Integrated Programme for Commodities (IPC) for which a new agreement has been concluded. This agreement foresees a close link to the proposed Common Fund, as it specifies that when the Fund becomes operational and the International Rubber Council, to be established by this Agreement, will take full advantage of its facilities. Conclusion of the agreement thus represents a major step ahead in the implementation of the IPC and is expected to have a stimulating effect on the negotiations on the other commodities being conducted under that Programme.

Natural rubber is a key commodity, in terms of value, taking second place after cotton among all agricultural raw materials traded on world markets. It is vital to the economies of the producing countries, all of which are developing countries, providing a major source of government revenue, foreign exchange and employment. The bulk of natural rubber is exported to the developed countries where nearly two-thirds are used in the transportation industry.

Historically international trade in natural rubber has been characterized by short-term price instability, long-term declining price trends and competition from synthetic rubber. The agreement's main objective is to stabilize rubber prices at remunerative levels. This is to be done by means of an international buffer stock which will be the sole instrument for price stabilization.

The buffer stock has a total size of up to 550,000 tons and consists of two parts: a normal buffer stock of 400,000 tons and a contingency stock of 150,000 tons.

Costs of the buffer stock will be shared equally between producer and consumer countries.

The agreement has seven prices: the reference price which is at midpoint of the price range, and three prices above and below it. They are the upper and lower intervention prices, the upper and lower trigger action prices and the upper and lower indicative prices. The latter indicates the limits of the price range. Upper and lower intervention prices are 15 percent above or below the reference price; the region between them being the zone of non-intervention. The trigger action prices are 20 percent above or below the reference price respectively and when prices keep within the range delimited by intervention and trigger prices, it is up to the buffer stock manager to decide if he should buy or sell rubber. At or beyond this price range the buffer stock manager must act by either buying or selling rubber using the resources available for the normal buffer stock.

When the buffer stock reaches the level of 400,000 tons, the Council will meet to decide at what price to bring the contingency stock into operation in order to defend the limits of the price range. Unless the Council decides otherwise, the contingency stock will come into action midway between the trigger and indicative prices.

The reference price upon entry into force of the agreement was set at 210 Malaysian/Singapore cents per kilogramme. Upper and lower indicative prices were set at 270 and 150 Malaysian/Singapore respectively; both prices will be reviewed and if necessary revised every 30 months.

At the time of negotiating, the Rubber Agreement, the price of natural rubber was 285 Malaysian-Singapore cents. If the price should still be outside the range specified in the agreement when it comes into force, the International Rubber Council would be empowered to adjust the price range.

The agreement has two unique features: it is the first time that governments of consumer countries commit themselves to share equally the costs of buffer stocking through

direct contributions, and it is the first time that a price range has been tied so closely to the market and that an automatic system for price revision has been incorporated, thus precluding lengthy discussions on this which has been a very difficult issue.

One of the major reasons for successful conclusion is regarded as effective producer association, in which producers were well-organized and co-ordinating their positions throughout the negotiations. An even more apparent factor appears to be the realisation of consumer countries that according to all present indications there will be a substantial shortage of natural rubber by the 1980s, while petroleum shortages will further aggravate the situation. Consumers therefore appeared keen to conclude the agreement with the hope of assuring reasonable and steady prices which would encourage producers to step up replanting and also to undertake new plantings of rubber.

An additional reason for the consumer countries interest in the agreement was the fact that natural rubber is recommendable from the ecological and energy-saving point of view, since all the feed stocks for the production of synthetic rubber are derived from petroleum or natural gas. These feed stocks, for which all indicators point to a steady price rise, could be used for producing other essentials. Volatile prices, however, tend to minimize the usage of natural rubber vis-a-vis synthetic rubber. At times of high prices consumers are encouraged to switch to synthetic rubber, whereas in times of low prices they may not make the parallel switch out of fear of another upswing in prices of natural rubber. On the other hand stability of rubber prices could make advance planning on the part of consumers as well as producers possible and can encourage demand and supply of natural rubber grow in a more balanced way.



## Use of Pesticides and Insecticides — An Organic Agricultural Point of View

Richards D. Karunairajan

In this paper, which is particularly relevant to our Special Section on the 'Environment', the writer maintains that as each nation analyzes its future food-producing potential, and takes into account long-range environmental and energy factors, more attention must be given to recycling nutrients through the composting of wastes, and other physical and cultural systems within the discipline of biological agriculture. The Less Developed Countries in particular, he emphasises, must address themselves more to the realism and practicability of integrated pest management systems in which ecological conditions would be the primary determining factors. Karunairajan serves on the Co-ordinating Committee of International Federation of Organic Agriculture Movements (IFOAM) which is an organisation of groups and individuals from around the world, "united in their work to develop and encourage an agriculture that is ecologically, economically and socially sustainable."

The FAO defines a pest as an insect, mite, tick, nematode, fungus, bacteria, weed, rodent, bird, mollusc, crustacea or virus that hurts or damages the animals and plants that human beings use for their food and fibres. These are known to destroy and damage huge quantities of food and farming land. Any natural method or synthetic chemical substance that can get rid of these pests would be called a pesticide, and this term incorporates insecticides, herbicides, and other similar combatants.

Every organism, given the food and space, has an unlimited capacity for reproduction, and could multiply without restraint. But on this crowded planet plant species compete among themselves for water, light and soil nutrients; animal species for food and territory and both are beset by predators and parasites. Besides these competitive and combative relationships, there are also many co-operative ones. Bacteria aid plants by converting nitrogen from air into nutrient salts; animals and insects pollinate many plants and enrich the soil with their excretions and subsequently with their bodies; and many predators are kept in check by predation.

During the last two centuries there has been a wide dispersal of plants throughout the world. They have been taken from their natural homes and introduced into new areas. The United States Office of Plant Intro-

duction alone has imported nearly 200,000 varieties of plants, and along with these about half the major insect enemies found in that country today. Such pests often cause more havoc in a new territory, having been freed from their natural enemies in their native lands. The long migration of the Colorado Beetle, almost unknown before 1850 and now found all over the North American continent is a classic example. It has even established itself in Western Europe. The spread of the cultivated potato gave this beetle not only an abundant supply of food but a means of transport as well, from its small beginnings in the Rocky Mountains.

### Cash Crops

Modern agriculture has also intensified its own pest problems by the simplification of diversified natural communities to a dangerous extreme by opting for single-crop farming. This is not only true of the American prairies where millions of acres are devoted to wheat, and California with its vast citrus plantations, but also of Less Developed Countries (LDCs) where Multinational Corporations (MNCs) in general have successfully appropriated the plantation sectors for the production of cash crops. These crops are either non-edible industrial raw materials such as cotton and rubber, or edible (with or without food value) foodcrops such as sugar, bananas, peanuts, pineapples, and

wheat. Tea and coffee too belong to this category.

It will be seen that the people of these LDCs are as a matter of fact subsidizing the food, garments, automobiles, tyres etc., of the people of the affluent nations with their cheap labour, while at the same time subjecting their lands to environmental disorders and destruction in the process. This so-called cash-cropping not only demands much time, space, effort and energy in the poorer countries but is also done at the expense of meeting their own basic food needs. It appears that the economic systems of the LDCs have been adapted to the 'vampirical' needs of the Developed Countries (DCs).

Cash crops occupy enormous areas of the best available lands. About 55% of the cropland in the Philippines and over 80% in Mauritius used for cash-crops are two good examples in this respect. Even worse, such export-oriented crops also take priority for irrigation, fertilizers, pesticides, and machinery. Cash crops are what the LDCs mainly produce and they need massive doses of chemical fertilizers and pesticides, which they can hardly afford.

### ... and Pests

Cash crops no doubt encourage the multiplication of pests caused by the reduction of various organisms, insects, and animals beneficial to farming communities. The pests that remain suffer less competition, have fewer natural enemies, a lavish supply of food, and are therefore liable to build up their population to catastrophic levels, than they would be on uncultivated territory or multi-crop plantations.

The farmer's main weapon against pests and weeds during the last three or four decades has so far been chemistry. The modern pesticide industry began during the Second World War with the discovery of the insecticidal properties of DDT (*Dichloro-diphenyltrichloroethane*) and BHC (*Benzene Hexachloride*). Since then, chemical



laboratories have provided farmers with a stream of powerful insect poisons, most of them either organochlorophines like DDT and BHC, or organophosphates which are toxic compounds related to the nerve gases. Various herbicides are also being marketed but they have been shown to have alarming side-effects. These laboratory creations are so unlike any natural molecules of life, and they escape attack by soil bacteria resulting in their accumulation in the soil. Their effects on plant, animal life, water resources, and the environment are indiscriminate and unpredictable. Another problem is the eventual production of a completely resistant stock of the pests through natural selection. In 1958, the World Health Organization listed 26 resistant insect species of importance to public health, including carriers of malaria, yellow fever, plague and filariasis. This list had grown to nearly 100 by 1968.

The increasing interest amongst agriculturalists in biological control has no doubt been caused by the consequences of the accidental transport of pests, the simplification of environments by modern agriculture, and the short comings of chemical pest control. Biological principles of pest control are implicit in such ancient farming practices as crop rotation, cover cropping, green manuring, applying composted manure and the cultivation of mixed forests and crops.

In the past 30 years, it often seems that the only consistent interest in biological control of insects was expressed by organic farmers. The attention of scientists has been and continues even today to be lethargic in the field of chemical compounds, and research is not exactly leaping ahead in the domains of biological control. The reasons for this is obviously economic, since success in biological alternatives to chemical pesticides would seriously affect the future of the chemical industry. After all, it would be seen in mere economic terms, that the pesticide industry is geared to a monetary market demand, and not to the needs of the human beings.

The United States, generally credited with having one of the world's

most efficient food production machines, is also the world's number-one dealer in pesticides. It is also evident that it is attempting to generalize its own agricultural systems in other countries, particularly in the LDCs. These may be efficient when it comes to food production in terms of quantity, but cost-wise beyond the reach of most of the nations of the world, environmentally destructive, and its social consequences could be disastrous.

If the entire world were suddenly to adopt American farming and food processing methods, increasing the diets of all four billion people to the American level, the energy consumed would exhaust the world's known petroleum reserves in 13 years, according to Dr. David Pimental, an Ecologist attached to Cornell University in the USA. It would therefore naturally follow that the hope of being able to feed everyone adequately and to keep up with the expanding human numbers is to adopt food production systems unlike those in the USA.

Furthermore, US-based Multinational Agribusiness wants to grow cheap, usually in the LDCs, and sell dear mainly in the Western markets that can afford to pay. The needs of the poor in the LDCs, who cannot become consumers of their own products, are of no concern to them.

The increasing interest amongst agriculturalists in biological control has no doubt been caused by the consequences of the accidental transportation of pests, the simplification of environments by modern agriculture and the shortcomings of chemical pest control.

Even the pesticide industry is related to this kind of exploitive agricultural production. If the uses of pesticides and fertilizers in the LDCs are examined in the context of their respective economic systems, it will be seen that most of the meagre supply that is available to them is appropriated by the export-oriented cash-croppers. Strictly on the basis of availability in the LDCs, the situation for fertilizers is bad, and for pesticides it is disastrous. In 1970 the LDCs were able to obtain only 7% of all chemical compounds available, even though the poorer nations are

planting more and more crops which need increasing applications of pesticides in order to prosper, and the economies of many LDCs are very much aligned to this kind of plantation industry.

Furthermore pesticides, like fertilizers, depend largely on petroleum products for their basic feedstocks and the current market situation is very tight in this respect. However increased petroleum prices are only a fraction of the story. Agri-chemicals are produced by perhaps the most research-intensive industry on earth. It has been pointed out by the industry's spokesmen that they now have to screen up to 10,000 compounds for every one that eventually reaches the market, and it will not reach the market before an average of eight years had elapsed.

Most LDCs do not have on hand sufficient supplies of the basic chemical products to make even the simplest compounds, and the more sophisticated products necessitating up to five different syntheses lie totally beyond their manufacturing reach.

In the entire world, there are only 30 to 35 research centres for the development of new pesticides, and this figure may well decrease in the future, since costs are increasing drastically. There are about 10 in the USA, 5 in West Germany and about 10 in the

rest of Western Europe, and 5 in Japan. There are a few in Eastern Europe but their products are not marketed outside the area.

Agricultural research did not exist as such before the 19th century. It only got underway during the colonial period because settlers introducing cash crops into newly colonized areas found their plants being attacked by various diseases and pests in the new environments. Research stations sprang up throughout the colonial world, but predictably paid no attention whatever to local



foodcrops. This research lag between cash and food crops is, alas still with us.

In recent years the LDCs have been bombarded with the spirit and hopes of the Green Revolution Technology Package (GRTP). The public relations job to propagate this has been admirable. Technically speaking this means breeding plants that will bear more edible grains and thus increase yields without increasing cultivated crop areas. Traditional grains for reasons of natural selection tend to be tall on the stalk so that they can get more sunlight, grow higher than the surrounding weeds, and resist flooding when heavy rains come. And effort to produce increased grains meant that the plants had to be short and have tougher stalks. Certain dwarf varieties capable of producing spectacular yields under ideal conditions were bred and they are called the High Yielding Varieties (HYVs). The High Yielders present problems of not being disease-resistant, and they will not bear full fruit unless heavy doses of fertilizers are applied. They need plenty of chemical protection—pesticides and fungicides against disease and pests, and herbicides against weeds that also thrive on fertilizers.

If the High Yielders are denied of any one element needed for their cultivation, their production can sometimes be less than that of the traditional varieties. Furthermore repeated application of chemicals to control weeds has adverse effects on soil structure, leading to reduced water infiltration and increased risk of erosion.

### Tragedy of Western Models

It is indeed a tragedy that the LDCs have been exposed to western models of farming techniques without having been provided with the kind of research needed to create a sound basis for the expansion of chemical weed and pest control and other applications of chemical substances for agricultural production, if these are necessary at all. LDCs also generally lack skilled personnel, and their educational systems still remain to a large extent oriented to the needs of a subject nation within a colonial set-up.

In the first place there is a need for basic research on the ecology and biochemistry of weeds, and clearly, the more that is known about the conditions that favour the growth of various species in different types of agriculture, the greater will be the possibility of designing cheaper and more effective methods for their control.

Secondly there is also a need for much more investigation into the practical aspects of the use of herbicides and other chemical compounds. Dr. Pimental has uncovered significant data in his entomology studies which relate to organic farming. In a paper written along with an Indonesian expert, Dr. I. N. Oka, titled "Herbicides (2, 4-D) Increases Insect and Pathogen Pests on Corn", a finding has been made that Corn Leaf Aphids, European Corn Borers, and Southern Corn Leaf Blight were more abundant on corn exposed to the 2,4-D herbicide than they were on unexposed corn. They also concluded that the results of their investigation demonstrated that increased risks of attacks by insects and diseases on corn may have resulted from herbicide treatment. Studies on other crop plants on which herbicides are used, on the basis of their findings, are likely to provide disturbing evidence of consequences as a result of herbicidal plant protection programmes.

Recent studies also indicate that the activity of micro-organisms in the vicinity of roots of food crops can lead to changes in structures associated with the selective uptake of mineral nutrients by the plants. Such changes in the pattern of nutrient uptake might be associated with differences in the nutritional quality of the product. It naturally follows that cultivation techniques are bound to affect or modify the chemical composition of plants.

### Gone Chemically Overboard

Japan is a good example of a country that could be regarded as having gone chemically overboard. No doubt by trying desperately to sustain itself by directing its people's industriousness towards economic ends, it has achieved material wealth, but at what price! Daily foods full of

additives, rivers in which fish cannot live, air which irritates the eyes and throat are the costs that have accompanied their material wealth. Certain experiments carried out in Japan by feeding monkeys on food commonly eaten by the humans have shown physical deformities caused no doubt by the chemically grown food.

The strictest factor, however, that confronts modern agriculture and threatens to limit the activity of the humankind to feed itself is of course the ever tightening situation as regards the availability of non-renewable energy sources:

Many of the pesticides and fertilizers on which successful agriculture in industrialized nations traditionally depends, are derived from fossil fuel energy sources. The search is now for more sensitive and less energy demanding agricultural technologies, than those usually practised in industrialized countries. The farming methods that have to be developed should therefore be designed to harmonize rather than conflict with the natural systems.

As each nation analyzes its future food-producing potential, and takes into account long-range environmental and energy factors, more attention must be given to recycling nutrients through the composting of wastes, and other physical and cultural systems within the discipline of biological agriculture.

### Biological Agriculture

Biological agriculture develops 80% of its energy requirements right on the farm. In comparison modern agriculture develops only 5 to 7% of its requirements only. Biological agriculture can profit from the fertilization value of working the soil because of better texture, higher humus content, more bacterial action (e.g. nitrogen fixation) which modern farming tends to cancel out, necessitating energy intensive machinery and equipment instead. The fact is constantly repeated that after two or three years of biological farming the soils open themselves and become lighter.

It could be stated that on the basis of fertilizers and pesticides, biological agriculture consumes three to



four times less energy than modern agriculture.

Dr. Richard L. Ridgway, an entomologist with the US Department of Agriculture predicted not so long ago that natural biological controls in insect pest management will expand significantly, and the expansion rate would depend on any society's willingness to make financial and organizational adjustments favouring the use of biological controls. One approach is augmentation whereby sufficient numbers of beneficial insects are mass-reared and released. In the Soviet Union, a Leningrad factory is producing 50 million helpful insects a day, and biological insect control is now used on 9 million hectares as opposed to 120 million still treated chemically in that country. This emphasis on inhibition of mating, release of sterile insects and the like can be done, and on a considerable scale too.

According to a recent report from Israel, a farmer working on biological methods has had remarkable success in controlling the Leopard Moths that were attacking his olive plantations. This insect is also known to be highly destructive in apple and pear orchards. The same farmer also reported that other Israeli farmers have also indicated much success in controlling Leaf Aphids with fungi, as well as scales and other insects by natural methods.

Perhaps one of the best known examples was how the US Department of Agriculture controlled an insect called the Cottony Cushion Scale which was introduced into California from Australia via imported citrus plants. In Australia it was not an important pest, but unchecked by its natural enemies in the USA, it multiplied with such speed that within two decades (1868 to 1886) it became a major threat to the entire citrus industry of the Pacific coast. The citrus industry in this respect was saved by the introduction of a beetle called *Rodolia Cardinalis*, also from Australia. It not only quickly brought the Cottony Cushion Scale under control in the USA but has had equal success in many citrus-growing areas of the world as well. The factors behind the

success of this beetle are probably its high rate of reproduction, its lack of hyper-parasites, and its great activity both as larva and adult.

Insects have also had some spectacular successes in controlling weeds. A little over a hundred years ago, a thorny shrub called lantana introduced into Hawaii as an ornamental plant from Mexico began to spread rapidly and was soon menacing the pasture lands. The introduction of several insects that fed on this plant from Mexico, quickly brought this under control.

In Australia within a period of 13 years nearly half of the 60 million acres of grazing lands infested with an American variety of prickly pear was reclaimed to agriculture by the effective use of several species of cactus-preying insect. Another plant that has yielded remarkably to insect predation is St. John's Wort, a hardy perennial from Eurasia.

However, there is no denying of the fact that the major task ahead for research is to develop less expensive methods to distribute parasites and predators. Already in the USA some 20 different beneficial insects are available commercially from about

"The widespread belief that it is not possible to hold pests in check by natural predators on an ecologically well-managed farm is no more valid. It is also an ecologically compatible alternative to the use of chemical pesticides to breed crop plants for genetic resistance to insect pests."

25 firms. There is experimental evidence that a number of these beneficial insects can, when reared and released in large numbers, provide the desired level of pest control. Using of Green Lace Wings to control Mealy Bugs on pears, Bollworms on cotton, Aphid on greenhouse flowers and the egg parasite *Trichogramma* to control caterpillars on a number of crops with great success are just a few examples.

Plants can also combat diseases just as much as animals and humans can. The compounds called phytoalexins (from phyto—plant, and alexin—to ward off), either kill or inhibit further growth of the invading fungus or bacterium. A number of the more

important phytoalexins include *Ipo-meamarone* produced in sweet potatoes, *pisatin* produced by peas, and *phaseolin* produced by tomatoes and potatoes. The speculation that phytoalexins have potential as natural fungicides is supported increasingly by plant pathologists.

At Cornell University in the USA two scientists have made conclusive studies on certain dry bean plants that fend off some pests by arming themselves with sharp resilient, hooked hair-like structures that entangle, puncture and tear insect enemies. The microscopic outgrowths, known as *tsichome*, are effective in limiting insect attacks on beans as thorns and spines are in discouraging larger herbivores from devouring cacti and rose bushes.

Furthermore many organic farmers increasingly reported that the health, fertility and longevity of their animals improved and that veterinary bills decreased, after they introduced biological methods and grew their own feed.

Today, even the basic premise that large-scale farming with all its capital and energy-intensive inputs is more efficient than small-scale farming since it is said to produce less expensive goods is also being challenged. It could be seen in evaluating the costs of large farms such items as research, energy, consumption and environmental damage in determining efficiency are often overlooked, as well as the costs of welfare, unemployment, crime and urban decay resulting from displaced population.

Small farmers lack machinery for this kind of operation. If efforts are made to develop more suitable



machinery for their needs then they could become as technically efficient if not more, as the large farmers.

It is therefore vital that any public or private non-industry funds that can be found for research should go to the areas of biological, microbial, physical, cultural pest control systems, and appropriate technology development. Insects and weeds, soil, cultural practices, and manure are four fields that need much study and research in the LDCs. LDCs must also become conscious of the fact that many commonly used pesticides clearly can be categorized as capable of causing death or disease in alarming proportions apart from the havoc they cause to the environment. It takes extensive knowledge to deal with pests using insecticides. But what is unfortunate is the fact that agricultural extension personnel in the LDCs have not been oriented to biological agriculture, let alone their adequacy to understand the serious consequences of using chemical compounds as fertilizers and for pest control programmes.

### Complex Considerations Must Be Thoroughly Understood

The complex considerations such as susceptibility of both crops and weeds to many insecticides, weather at and shortly after spraying, soil types, and contents of clay and humus in the soil need to be thoroughly understood. Infact, the action of herbicides is so much affected by plant species and environment, that sound recommendations for their use in any locality can usually be made on the basis of experimentation in that particular area only.

The LDCs in particular must address themselves more to the realism and practicability of integrated pest management (IPM) systems in which ecological conditions would be the primary determining factors. Insecticides then would be applied only in minimal amounts and only when needed and not according to pre-determined spray schedules. This is already a growing concept in the USA, and agronomists, ecologists, economists, entomologists, plant

pathologists and systems analysts are increasingly engaging themselves in this pursuit.

Methods of IPM would also include the release of natural enemies, crop rotations, and the use of disease organisms lethal to the pest, genetic manipulation of the pest population, and companion planting.

The only deterrent today to ecological management of pests is the small number of scientists working in this area as compared to the large numbers of globe-trotting chemical salesmen, mostly in the garbs of experts and volunteers.

Another new development in the field of agriculture is the application of computer technology and systems analysis to build models of crop ecosystems that can provide farmers with reliable information on controlling insect pests and other aspects of crop management.

In the field of soil biology, fertilizing of plants by by-passing the soil promotes the one-sided development of some soil organisms that propagate quickly and become pests. Similar reactions occur overground with nutrient supply that can lead to sickness and pest attacks of plants. For instance adding compost promotes a differentiated organism population with a species diversity, and hence an ecological equilibrium is possible. The soil organisms also loosen and mix the humus with minerals from deeper soil layers and therefore the soil need only be cultivated on the surface thereby making tremendous saving on energy a possibility.

The task before us is to seek out simpler and better ways to improve the soil and the quality of food grown by using manure and wasted organic matter as fertilizers, and by finding natural substitutes for chemical pesticides. There is no doubt that in most cases biological agricultural methods can maintain yields while cutting down expenses for chemicals.

The hungriest countries in particular must aim to reduce their depen-

dency on the west, and engage themselves more in the production of food crops and distribute them more equitably. Self-reliance must begin at the grassroots of these societies. This could be achieved by organizing small community co-operatives and credit unions and involving in joint educational and farming activities.

The role of organic matter in providing a supply of available plant nutrients was the foundation upon which agriculture developed for many thousands of years. It is, however, only in this century that we have been able to identify and tried to quantify the importance of some of the many complex mechanisms involved, and the sum of our knowledge is still an infinitesimal fraction of our ignorance particularly of the role of organic matter in its influence on the composition of soil populations with all that implies for soil fertility.

We are already several leagues behind, battling with the chemical and toxic by-products of the Second World War, while the genuine path towards peace in our time is in the direction of biological systems and in the pursuit of sustainable agriculture which is in harmony with the environment and the well-being of humanity.

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# Looking into Interdependence

Ignacy Sachs

Those who consume the bulk of potentially scarce non-renewable resources must think about a measure of self-restraint. An international development strategy cannot assume away the mal-development crises of the North (Western industrialised world) and their often devastating economic, environmental, social and cultural effects in the South (developing world) argues Ignacy Sachs, Professor at France's Ecole des hautes études en sciences sociales and Director of the Centre for International Research on Environment and Development. In this paper for the IFDA, of which he is an executive committee member, Sachs maintains that the word "Interdependence" arouses suspicion, particularly after the UNCTAD V at Manila and the hardening of attitudes of the developed countries towards the New International Economic Order. He points out that the dismal record of international development cooperation is due to the fact that piecemeal positive measures (such as concessional finance) are more than offset by the working of institutional obstacles, discriminatory policies and obsolete rules of the game. Hence, collective self-reliance should become the centre-piece of the international development strategy.

The meaning of words is loaded with past uses, misuses and co-options. The term "interdependence" entered into the diplomatic vocabulary as a misnomer for asymmetric and irreversible relations between an imperial power and some dependent countries belonging to its sphere of influence. It then resurfaced after 1973, this time denoting the anxiety of the oil importing industrialised countries to set up a privileged commercial and financial relationship with OPEC countries, OPEC oil could be traded against Northern technology, industrial hardware and weaponry; moreover, Northern banks would gladly engage their expertise in recycling petrodollars.

Two corollaries of this call for an exclusive "interdependence" (between a handful of oil importers and exporters) are the hardening of Northern attitudes towards the New International Economic Order (NIEO) and repeated attempts at disrupting the common front of the Third World countries (hence the recent preoccupation with their "differentiation"). No wonder that the word "interdependence" arouses suspicion mostly after UNCTAD V at Manila.

Yet, an international development strategy must address itself not only to the problematic of linkages between North and South, but at a more fundamental level consider the two-way relationship between the local and national development, on the one hand, and the international environ-

ment resulting from the national developments of all countries, on the other. We are thus faced by the twin problems of responsibility for the international implications of national development (or maldevelopment) and of international obstacles to the national development efforts.

## International Accountability

We live, for good and for evil, on "only one earth". This is not to say that poor countries and poor people all over the world should stop growing in order to offset the negative environmental impacts of our wasteful life-styles and energy-intensive technologies. On the contrary, those who consume the bulk of potentially scarce non-renewable resources, use directly and indirectly a disproportionately high fraction of arable land and biological resources of the sea, while producing most of the world pollution and heat dissipation must, at last, think about a measure of self-restraint. Unless this happens, the sustainability of economic life on the planet may become endangered. At any rate, an accelerated development of the Third World countries will remain highly problematical if they will have to compete with industrialised countries for scarce resources, while struggling at the same time against the pervasive demonstration effects of Northern life-styles and labour-displacing technologies.

An international development strategy cannot assume away the mal-development crises of the North and

their often devastating economic, environmental, social and cultural effects in the South. How to address them is essentially a national question although consultations, exchanges of experiences and concrete forms of international cooperation might be required. But the impacts are bound to be worldwide and, in this sense, the international accountability for national development should be recognized as a tenet of development ethics. Furthermore, all countries from North and South should be accountable to some UN forum and, of course, the Third System as far as the international impacts of their national strategies are concerned, which is not at all contradictory with the principle of national sovereignty.

The UN Secretariat might also envisage, in collaboration with the Third System, to monitor these impacts through special studies aimed at advancing our knowledge about the access to economic and environmental resources, the mechanisms of distribution of economic, social and environmental costs and gains, the progressing depletion of the stock of the capital of nature, the role of communications in fostering imitative growth, etc.

The larger and the richer a country, the bigger are the economic and environmental impacts of its national development (maldevelopment) on the world scene and, therefore, its responsibility for exercising self-restraint as far as the use of scarce resources is concerned. At the same time, national strategies of industrialised countries should strive to create a far larger and more remunerative niche for Third World exports, devising for this purpose more or less demanding adjustment policies. It is only natural that their cost, if any, should be borne by the industrialised countries. In most cases, the moral imperative will coincide with self-enlightened long-term interest.

The principle of international accountability for national development, when applied to Third World countries, should focus on the way in which they foster genuine, socially responsive and environmentally sound development as contrasted



with maldevelopment. In the special case of oil exporters with high per capita revenues, an important criterion might be the degree to which their resources contribute to the strengthening of collective self-reliance and, in this way, to the development of the Third World at large.

### Changing the Rules of the Game

However, even far-reaching adjustments at the national strategy level may prove ineffective, or self-defeating for the South, so long as it must rely in its dealings with the North on the present linkage mechanisms in finance, trade, science and technology and communications. The dismal record of international development cooperation is due to the fact that piecemeal positive measures such as concessional finance are more than offset by the working of institutional obstacles, discriminatory policies and obsolete rules of the game. For most Third World countries which are "import-sensitive" and constantly exposed to the perverse demonstration effect of Northern maldevelopment the international environment has been a stumbling block on the way to development if not as a propelling agent of maldevelopment.

That is why the new international development strategy cannot harbour any more the illusion and the wishful thinking so conspicuously present in the first two development decades. In order to be meaningful, it must address itself in depth to all the institutions (in the broadest sense of the term) which act as linkages between the South and the North and, more generally, jointly constitute the international environment for each developing (or maldeveloping) country.

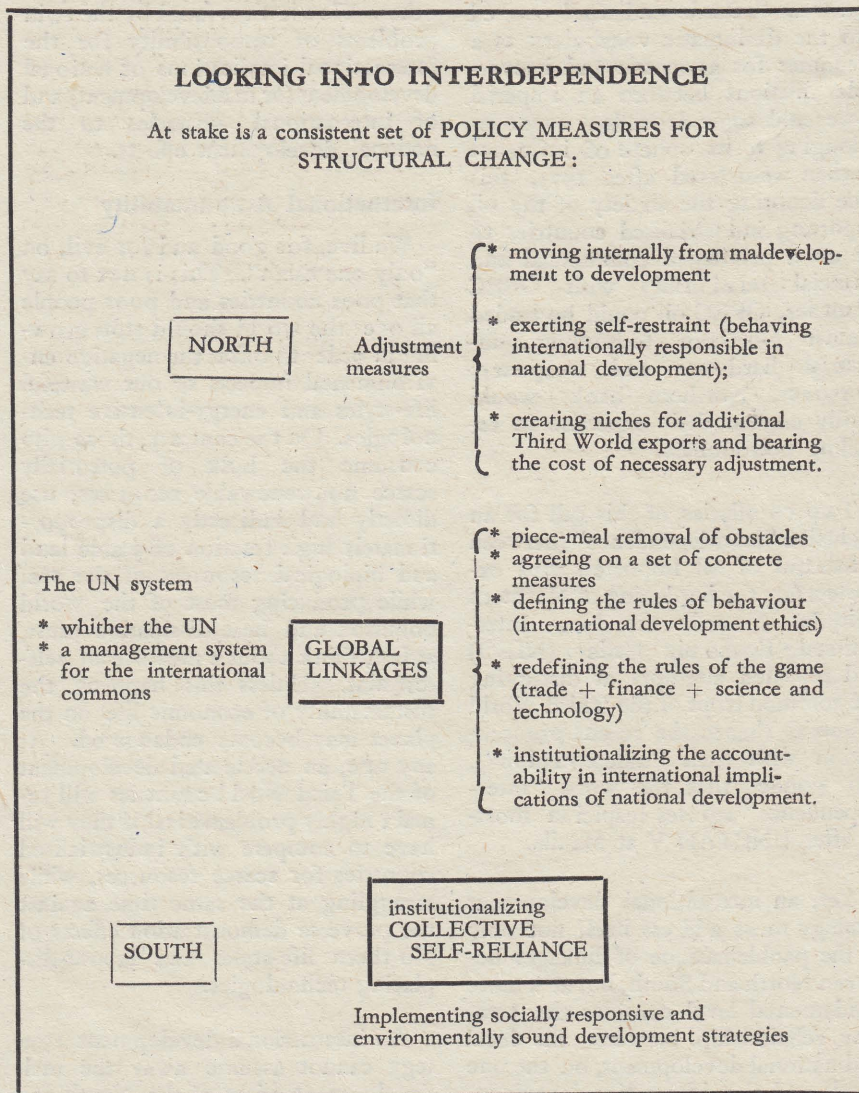
The task is urgent, enormous and the interests involved are highly conflicting. Hence, the only sensible thing to do is to agree on an agenda setting and a timetable for a negotiation package that would address itself to ways of removing existing obstacles, setting up new rules of the game in trade, finance, industrial technical and scientific co-operation and communications, as well as establishing a system for the management of the international commons. We

need Bretton Woods II, Havana II, Stockholm II, Lima II and Vienna II combined in one.

To the extent to which development is a process, an international strategy might well address itself, as a first priority, to ways and means of smoothing this process by improving the institutional linkages between individual countries, groups of countries and the world at large, while realistically recognizing that this task can only be achieved through painful negotiations aimed at resolving the conflicts of interest at present separating the North and the South. It may well be that the North-South

confrontation will only enter into a more constructive phase when the South will demonstrate in deeds the ability to go ahead by itself. That is why collective self-reliance should become the center-piece of the international development strategy.

Mutatis mutandis we are again confronted with the problematique of linkages, institutions and rules of the game. Hopefully, the conflicts of interest among Third World countries will prove weaker, and the political will to succeed stronger, so that collective self-reliance will become a reality in the eighties, changing the whole picture drastically.





## Aid to Bangladesh: For Better or Worse?

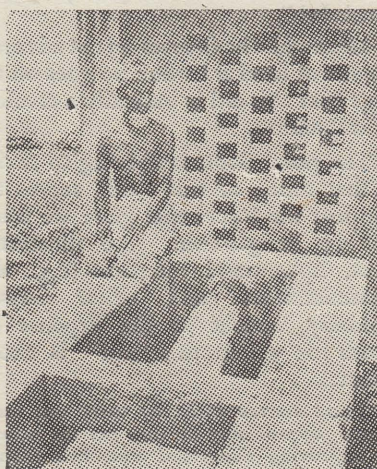
An Interview by Michael Scott.  
Oxfam America, The Institute for  
Food and Development Policy,  
Impact Series, No. 1 Sept. 1979.

The problems of Third World debt and the debate on 'Foreign Aid' have become a crucial component of current rethinking on development issues and engaged the attention of many an important forum and academic over the last decade. Many stimulating assessments on this subject have emanated from the aid-giving countries in the western world. Generally, the assessments of those who have been disillusioned regarding the use to which this "aid" is being put and the ultimate impact it would have on the recipient countries has roused most of the debate.

Several of the more noted published studies on Western Aid by Western analysts have characterised this "aid" as "imperialism" in a new garb. For instance, Teresa Hayter—*"Aid as Imperialism"*, 1971, Michael Barratt Brown—*"The Economics of Imperialism"* 1974, C. R. Ninsman—*"Rich against Poor: The Reality of Aid"*, 1974, Cheryl Payne—*"The Debt Trap; The IMF and the Third World"*, 1974, W. G. Zeylstra—*"Aid or Development: The Relevance of Development Aid to Problems of Developing Countries"*, 1975, and Frances Moore Lappe and Joseph Collins—*"Food First, Beyond the Myth of Scarcity"*, 1978, have all roused heated controversy on this issue. Michael Scott's contribution is yet another addition to this genre and in fact attempts to give more concrete form to some of the issues raised by Lappe and Collins in *"Food First"*. (Readers may recall our interview with Joseph Collins, in the *Economic Review* of January 1978 in which he argued strongly that there is no such thing as an absolute scarcity of food in this world. He was then in Sri Lanka researching for his book *"Food First"*).

The Institute for Food and Development Policy (IFDP) has been a relentless campaigner against the star-

vation and malnutrition that the majority of mankind in the 'poor' world has to face in what the IFDP has described as "a world of plenty". It has fervently maintained in its earlier publications too (e.g. *Food First*), that the bogey of scarcity and too many people is being waved like a wand to conceal the real issues in the world food situation and only to endanger fear and guilt, and even despair, among both givers and recipients of aid.



A typical example of this approach of gloom are those of the Washington based International Food Policy Research Institute (IFPRI) estimates of the projected food deficits in three of the most populous nations of South Asia. In the case of Bangladesh these projections foresee the present 7 percent deficit rising upto 35 percent of consumption requirements by 1990—a bleak picture indeed.

*"Aid to Bangladesh"* the IFDP's most recent publication which deals with the biggest food aid recipient

in the developing world, is a vivid illustration of the point that the cries of scarcity help to conceal the real issues. More important is the publication's timing which comes at a moment when the annual quantum of aid to Bangladesh has over-shot the US dollar 1 billion mark (aid commitments are projected to reach \$ 1.6 billion in 1979) and the number of international organizations, including missionary societies, stepping up their activities here have reached, nearly 150. Overall foreign assistance to Bangladesh accounts for nearly one-half the government's budget, four-fifths of its development budget and almost 10 percent of the country's Gross National Product. These figures make it evident that aid has become a major determinant of development in Bangladesh. Despite the growing aid commitments the standard of living in everyone of the 68,000 villages in Bangladesh is reported to have fallen year after year since the early 60s. Reports reveal that the real daily agricultural wage has dropped from 2 taka to 1½ in the decade upto the mid 70s. An evaluation by the country's Planning Commission has shown that rural unemployment, landlessness and other overall hardships have gone from bad to worse... Nearly ¼ the families in the countryside are landless or near landless (owning less than 1/5 of a hectare), is the grim record quoted in an editorial of the *Madras Hindu* of Nov. 2, 1979.

For many, Bangladesh is synonymous with poverty says Scott in his introductory comments and then adds a "But...."

"Bangladesh is the fourth largest agricultural society in the world; 90 percent of its 83 million people are rural and 80 percent depend directly upon agriculture as a livelihood. Only China, India and Indonesia have more peasants. Although Bangladesh has 63 million peasant farmers, at least 40 percent are landless. This stark fact helps explain the elemental paradox of why, in a rich land inhabited largely by farmers, 60 percent of the people are malnourished in good years and many starved in bad years."

Food Deficits in the South Asian Area

	Actual (1975)		(Projected (1990)	
	Million tons	% of consumption	Million tons	% of consumption
India ... ..	1.4	1	17.6—21.9	10—12
Bangladesh ... ..	1.0	7	6.4—8.0	30—35
Indonesia ... ..	2.1	8	6.0—7.7	14—17

Source: IFPRI (Quoted in *Far Eastern Economic Review*, Oct. 26, 1979, p. 90)



The fault lies not with the unfortunate peasants of Bangladesh. Scott insists that the media-generated public images, fostered by crisis-oriented interests through appalling statistics, are only part of the picture. Projected almost daily through the World media is this pitiful picture. Most recently we had such a sketch by Kevin Rafferty, writing in a supplement on Bangladesh in the London *Financial Times* of December 14, 1979.

"By any token Bangladesh has a sickly economy. An overwhelming 90 percent of the population is rural. It is pitifully poor—with total gross domestic product of less than \$10 bn., and this for the eight most populous country on earth with 88 m. people."

"Its industry is small and basic—about 10 percent of GDP. Its exports are paltry—just over \$600 m. a year, with imports of two and a half times as much... The rice is not enough to feed the present population, per capita income might be put at about \$100, but that is really only an index of a widely-varied form of deprivation."

A less known fact, however, maintains Scott, is that "Bangladesh has the human and natural resources to meet its basic needs.....with a people very energetic, engaging and attractive, a far cry from the way they are presented to the West".

Why then do people starve, asks Scott. To him the answer lies simply in social causes not in the technological or resource problems: "Those who starve are the poor who do not have access to the country's resources".

The question Scott seems to ask in this 28 page publication, is "Are we in the rich world helping or hindering progress of the poor". His rhetorical answer is that "the first step towards helping the poor is to stop hurting them".

This publication is written in the form of an interview conducted by Michael Scott of Oxfam—America with a development expert in Bangladesh. Scott, who no doubt is well acquainted with conditions in Bangladesh, gives the development worker the fictitious name of Pamela Harrison in order to protect her; but it is apparent that she has had close contact with the people in Bangladesh and a first hand experience of living and working at the grassroots level in both rural and urban areas of the country.

Though a comparatively brief treatment of a complex issue, the author's

force of argument comes out clearly in his treatment of the subject of "Food Aid". To the question of how the massive amounts of food aid from the U.S. and other countries helped the rural poor of Bangladesh this 'Food and Development' worker states categorically:

"Very little food aid finds its way through the ration system out to the countryside. And not very much of it finds its way downwards, although some of the skilled working class may have access to ration cards. It's largely an instrument for generating a lot of revenue and for providing cheap subsidized food to the urban middle class, particularly the army, police and civil servants. All the food the army eats comes through food aid. Food aid is not intended for poor people. It's designed as a revenue earner and as a means of insuring political stability... The volume of food aid and the way it is distributed don't seem to have very much to do with the food situation of poor people in Bangladesh".

Meanwhile he focuses on the adverse impact of food aid when he goes on to urge that this aid is basically a creator of stagnation.

The point Scott is striving to make is that much of this "aid" serves to support the forces that generate hunger in Bangladesh. He illustrates thus, how these interests (e.g. aid administrators and other power holders) benefit at the expense of those for whom this "aid" is most meant.

"Food arrives and they carry out their plans. So not only do they get the benefit of improving their land and their friends land, but also there's tremendous scope of using the power of patronage that it gives them. And also, of course, there's the possibility of diverting some of the resources without doing any work at all, which also happens to a large extent..."

"... So food aid is a very important part of lubricating the system and of maintaining this strong relationship between the central government and the local level power holders. If the government wasn't able to deliver these kinds of things there would be much less incentive for these people to support it".

He makes it clear that it is the farmer in the donor country and the urban consumer in the recipient country who benefit most and at the expense of the rural peasant and farmer in the recipient country. The fact emerges that though food aid coming in, in this manner, may provide immediate relief to at least sections in the recipient countries, it certainly is not in the interests of these developing countries to rely on food aid on a continuing basis.

Scott also emphasises that this form of "aid" only deepens the dependency relationship of the recipient on the donor. To cite one instance, he states:

"The degree of dependence is such that the situation frequently arises where institutions like the World Bank and Asian Development Bank, claiming to respond to requests, actually send missions here to find things to fund. They write the project applications and take them to the relevant ministry. If the proposal is not accepted, serious pressure is applied... unfortunately for Bangladesh it has grown so dependent upon foreign aid that it is even more vulnerable than most underdeveloped countries to the dictates of donor countries and their agencies."

## LOSP

As part of the Food Aid effort for Bangladesh, donors have also displayed their intentions to help in stepping up of local food production through assistance in the form of machinery and equipment. But here once again Scott is convinced that it is meant to serve the objectives of the donor and at the expense of the recipient. He says: "There are the most naked economic reasons for this. In some cases it's actually profitable for the country to donate the initial equipment, such as large rice mills or pumps, which have high spare parts requirements and high spare parts costs. Assuming the machinery runs at all, costs are recovered within a short time by supplying spares. The machinery probably won't run for long because of a terrible disease which attacks machinery in developing countries "LOSP"—lack of spare parts.

"Foreign aid is usually a subsidy from the people of Japan or United States or Germany to the companies in their own countries which make the milling equipment or the pumps. The aid enables the companies to provide very cheap or free equipment to Bangladesh and then make very big profits on the spare parts. It's basically a transfer of funds from tax-payers in the developed countries to private companies in the developed countries, passing through, Bangladesh as it were. Bangladesh is almost incidental to the process. It doesn't really matter what happens here. There has to be some kind of rationale for this aid, but it's really a side issue. The people who do this kind of thing fly in for two weeks, have a quick look around, and get enough to write the report and go. All decisions are made elsewhere".

The tragedy appears to be more in the situation of dependency than anything caused by droughts or famines



or malnutrition. Scott thus goes on to argue "such a huge amount of money in such a small undeveloped economy really dominates the whole scene. The government is looking much more over its shoulder towards London and New York than towards what happens in Bangladesh. It can control what happens here fairly well, upto a point, but if anybody pulls the plug on food aid then it is finished tomorrow. So it really is a very dependent situation..... At the moment, I think it's important to try to limit aid as much as possible. I don't think it's feasible to stop it, for two reasons. One is that there are too many vested interests involved. A lot of companies make a lot of money out of this and it creates a lot of employment in Europe, the United States, Japan, and for all I know, in the United Arab Emirates. As well as foreign vested interests, there are vested interests within Bangladesh. For example, most of the people you see owning houses around here make money in the import-export business which is all tied in with aid. That's the way to make a lot of money fast. The second reason is that most people in the donor countries really believe that aid is helping poor people".

His conclusion is pithy and clear.

"It's really essential to have a very deep understanding of how the whole system is functioning because it's not as simple as a photograph of suffering people or of a claim that by providing something you help someone to grow more food. It really isn't like that at all.

... Bangladeshis live and work in a monetary economy. They live and work in a rural power structure which makes them relate to each other in certain ways and means that some people benefit disproportionately. That structure relates to a national government, which in turn relates directly to other national governments who are much more powerful and who manipulate the situation. I think that it's really very important to try and grasp the nature of the way the whole system is operating because without knowing that, by tinkering with one little bit of it, you may even make things worse than they were before".

The final impression Scott intends to convey is that through such "aid" programmes, the "aid givers" are supporting a social order which condemns millions to needless hunger and are keeping these people away from the day that they could end their dependence.

In his sketch of Bangladesh, Scott also portrays many situations paralleling those that exist in other Asian urban centres. For instance, conditions where the heavy foreign resources coming in are creating a climate which certain sections are using to their advantage.

"You can see the building going on here—it's really fantastic. People buy land at knock-down prices before the new housing area is declared. They get very low interest loans from the government housing corporation to build and they then rent it out at huge profits to foreign aid organizations. And that's the way a lot of the country's resources are being used. There's a construction boom in Dacca. At the moment a group I know is working in this slum with very poor people and can't get any labour to do the levelling work on the site because there is so much building going on".

There is an acute shortage of technicians of all kinds, especially fitters, welders and mechanics. He says they have all gone to the Middle East. A visit to any major industry will show how much of their skilled manpower is now lacking. Many people don't seem to realise that this "aid" situation is not in their best long-term interests. As Scott explains. "Maybe, in certain circumstances, aid is useful to people who get it. Financial arrangements can be beneficial to both parties, but they are not beneficial in situations of unequal power. Aid is a financial transaction and it has political and economic objectives. The way it is at the moment I don't see that humanitarian issues come into it at all. I don't know if they ever will... The problem here is that the imbalance of power is so great that very few people can see what's happening."

Had Scott recounted more directly the experiences of the affected people themselves or documented their views he certainly would have added greater credibility and strength to the basic contention in his book. Perhaps his format of a dialogue has restricted his scope or is this aspect being left for treatment in the IFDP's forthcoming publication "*Voices from a Bangladesh Village*". The subject in itself is so vital to the developing economies and debatable that it is deserving of a far greater in-depth treatment than a mere twenty-eight pages as the argument

tends at times towards generalisations and broad opinion.

Scott confesses in his foreword that it wasn't possible to be "exhaustive or definitive" since he was exploring a wide-ranging set of issues, which in this publication are divided into broad sections such as Food Aid; Appropriate and Inappropriate Technology; Road Construction; Military Aid and Disaster Preparedness; Migration from Bangladesh; and Why Bangladesh? The treatment inevitably revolves round Food Aid and the food situation while he merely skims the surface of the other issues listed here. But even on the food situation the concern appears to be more with the urban elites and other power holders who enjoy the spoils of this international charity and rarely does he go down to the impact on the simple rural folk who could possibly be taking their deprivation and underdeveloped state very much for granted. The concern is evident, however, that the incentive to pull themselves out of the mire does not seem to be coming their way with 'aid' as the major obstacle.

There is little controversy now on the need for enhanced transfers of foreign exchange resources to finance the development efforts of Third World countries, the issue lies in how much and how best in their interest these recipient nations can absorb such foreign resources. The fact remains that Bangladesh will continue for quite some time to be heavily dependent on foreign resources in the form of both commodities and finances for projects and much of this will have to come in the form of "aid". The value in a book such as this is that it will at this juncture give the authorities and its other readers in Bangladesh, or those in any other aid receiving country for that matter, the incentive to assess the quality and impact of foreign aid on the long-term objectives of their development effort.

—Chrys Guneratne



# ECONOMIC REVIEW

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