NATIONAL SCIENCE COUNCIL OF SRI LANKA

NATIONAL WORKSHOP

on

APPLICATION OF SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

at

B. M. I. C. H. COLOMBO

6th June 1978

NA-247-2

UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY

Documents submitted under the Subject Area of Food & Agriculture by the three Plantation Research Institutes (Tea, Rubber and Coconut)

A. INTRODUCTION:

Science and technology and its transference constitutes the basic framework of the activities of the three Research Institutes and we therefore do not propose to labour the point of its importance in relation to the activities of the three Institutes.

The three Research Institutes are financed to varying degrees by direct Government funding and their activities are controlled and regulated by Boards of Management in whose appointment the Ministry of Plantation Industries has the closest responsibility. As Institutions servicing important agricultural sectors primarily concerned with exptrtable products, the research programmes have of necessity to concern themselves both with agronomic and production factors and with matters relating to marketing and exports. The two sectors have not undergone parallel development and it is fair to state that the agronomic aspects have received more attention than those relating to marketing arrangements. All three Research Institutes have plans for rectifying this deficiency and for increased activity in the areas of product technology, marketing economies and quality improvement. At the present moment the distribution of scientific discipline and technical effort is as indicated in Table I below.

Available technical man-power at graduate level, for the implementation of the scientific programmes is also indicated in Table I. In matters of planning and the setting down of policy directions the primary responsibility rests with the Director of the respective Institution who is advised by his Board of Management and intervening authorities with eventual direction resting in the hands of the Ministry of Plantation Industries.

All three Institutions have ambitions of increasing their cadres of scientific and technical staff both by recruitment of fresh hands and by further training of existing personnel. Reasonable progress has been made in achieving both these objectives.

All three Research Institutes have limited responsibilities for training and extension in their respective crops. In addition a considerable extent of on-the-job training of recruited personnel continues.

The total budgets of the three Research Institutes at the moment stand as follows:

Tea	-	Rs. 18,000,000	
Rubber	-	Rs. 6,000,000	as from 1978 (Rs.3,000,000 before that)
Coconut	-	Rs. 7 - 10,000,000	

B. SCIENCE & TECHNOLOGY FOR DEVELOPMENT

All three Research Institutes, which have been in existance for periods of about half a century, can fairly claim to have developed a considerable degree of scientific and technological expertise and to have served their respective industries adequately as well. This fact is widely recognised and the Government makes every effort to adequately meet the finance and other needs for a continuation and strengthening of this role.

The primary obligation of the three research institutes is to evolve and transmit such technologies as will enable the plantation industries to increase their productivity, to enhance the values of their export commodity and to generally uplift the economic status of their respective crops. However, it is generally recognised that the mechanisms available for the immediate transfer and application of the evolved technologies may be deficient in certain areas, primarily in terms of man-power investment in the advisory and extension services.

The main constraints in the effective implementation of the programmes and projects are as follows:

a) Difficulties in obtaining necessary equipment and facilities for the research programmes

b) Deficiencies in the availability of trained man-power in some of the sectors of activity.

c) Failure in some instances to clearly recognise national priorities and the need to proportion available resources to tackling the most immediately relevant problems.

Meaningful steps towards resolution of these three deficient areas have been implemented or/are in the process of being planned. In terms of training needs and the provision of the necessary physical facilities, all three institutions have of necessity to depend very heavily on the advanced countries. Sufficient care is taken to ensure that developed new technologies and research activities are in terms of recognised local national needs. While the necessary technical and scientific expertise is unquestionably available and has been carefully built up through the years, there has been an acknowledged deficiency in the application of managerial and management considerations in the evaluation of the activities of the Institutions.

TABLE I - THE DISTRIBUTION OF SCIENTIFIC DISCIPLINES AND TECHNICAL REPORT AT THE THREE CROP RESEARCH INSTITUTES. THE NUMBER OF OFFICERS OF GRADUATE LEVEL and ABOVE, IN EACH SECTION, IS GIVEN IN PARENTHESIS

SCIENTIFIC DISCIPLINES	C R I	T R I	R R I
Agronomy	Agrostology (4) Botany (5) Intercropping (2)	Physiology, propogation & breeding (6) Agronomy (5)	Botany (4) Genetics & Plant Breeding (2)
Soils & Chemistry	Soils (6) Chemistry	Agricultural Chemistry (3) Biochemistry (2)	Soils Chemistry (3)
Technology	(Chemistry)	Technology (2) (Biochemistry) Instant tea (1)	Rubber Chemistry & Technology (10)
Pests & Diseases	Crop Protection (6)	Pathology (2) Entomology, Hematology (3)	Plant Pathology (2)
Others	Planting (0) Biometry (2) (Estates)	Statistics (1) Estates (2) Advisory (3) Engineering (1)	Advisory Services (5) Agricultural Economics (2)

3rd March 1978

National difficulties in regard to the provision of adequate foreign exchange has had the expected effect in severely limiting the extent to which envisaged research programmes can be implemented. Every effort has, however, been made to secure foreign assistance and to rationalise the expenditure of scarce resources in such a way as to maximise the benefits from importations of scarce equipment and materials.

While scientific information is deficient in certain areas, it can be claimed in all modesty that the three Research Institutes represent perhaps the most advanced Institutions in the world, devoted to research on the three plantation crops. As indicated above, remedial measures are being taken and have to be taken to ensure that lack of capital will not operate as a constraint to the technical developments for which the three institutions are unquestionably well equipped in terms of expertise and capabilities.

While the tea industry has largely been composed of larger units managed on strict plantation economy terms, the coconut industry has principally been in the hands of indigenous small-holders. Rubber occupies a position in between. It is therefore apparent that in the application of science and technology considerable attention is required to ensure the applicability of the proposed technologies by a plantation sector which may not always have the managerial or financial resources to implement such proposals effectively. The impact on rural employment is enormous as all three industries are relatively labour intensive in view of the limited mechanisation that has been possible or desirable.

C. INSTITUTIONAL ARRANGEMENTS

Broadly the three research institutes operate largely as autonomous and independent institutions co-ordinated through various arrangements eventually answerable to the Ministry of Plantation Industries. The present input of finances into research activities, although not always adequate, has to be conceded to relatively generous in terms of science and technology investment in other sectors of activity.

Some idea of the shortcomings in the present institutional set-up and proposals for overcoming such problems are indicated in the questionnaire forwarded herewith.

By its nature, the extent of international co-operation in the tea sector is possibly less than that in rubber and coconut. This arises largely because of the competitive nature between producing and consuming countries in relation to tea whereas the other two commodities have large and virtually untapped potentialities for local utilisation in the producing countries themselves. In relation to exchange of information and experience between Sri Lanka and other countries the picture is consequently varying. While the normal constraint of scarce foreign exchange has imposed certain limitations of the free exchange of published literature it has to be conceded that all three institutes have excellent libraries.

In relation to international contact, existing organisations such as the Asian and Pacific Coconut Community, International Rubber Research and Development Board and the Association of Natural Rubber Producing Countries ensure periodical exchanges of developments between producer interests. In the field of tea since most of the discussions centre around developing marketing and other arrangements favourable to the producers and since the Institute is primarily concerned with agronomic research, such contacts are limited in this sector.

On the other hand, in view of the pre-eminent positions occupied by all three institutes on the global scale they are benefited by constant visits by scientists, producers and trainees from other interested countries. This serves to maintain some degrees of continuous contact.

D. EXISTING, PROPOSED OR POSSIBLE MECHANISMS FOR UTILISING U.N AGENTS AND OTHER INTERNATIONAL ORGANISATIONS FOR APPLYING SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

It cannot be claimed that the three research institutes are kept up-to-date on the developments in the above sector. However, existing national agencies for transmitting information on available opportunities for collaboration in the above sectors ensure some, though inadequate, degree of information. The pressing current needs are for the provision of scarce resources and the material for research programmes, expertise necessary for certain specialised sectors and adequate training opportunities for strengthening our own national capabilities for identifying and implementing programmes of the greatest relevance in the national context.

The Government maintains an External Resources Unit whose function it is to collate and transmit available opportunities for international assistance. They are mainly under country programmes or bilateral and multilateral aid arrangements. International agencies constitute a not inconsiderable proportion of the offers of such assistance.

However, it has to be pointed out that a greater degree of collaboration and consultation in the formulation of national needs for support is desirable.

As far as the plantation sector is concerned, the Planning Unit of the Ministry presently constitutes the link between the institutions and the donor agencies who in turn operate through the External Resources Department.

It is apparent that an inordinate proportion of the aid offers presently go unutilised precisely because the mechanisms presently available are inadequate to bring together the ultimate potential users of such assistance to the

donor agencies direct. We are aware that the need for improving the existing arrangements is already the concern of the relevant authorities.

This brief introduction serves to supplement the information forwarded in the format proposed. If further clarification, expansion or supplementation is considered necessary by the National Co-ordinating agencies we remain prepared to furnish such elaboration.

DIRECTORS, TRI/CRI/RRI

3rd March 1978

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ANNEXURE

The following is the information required in the circular entitled "Science & Technology for Development", which was handed over to me on 24th February 1978, at the NSC Office, at the meeting convened by Dr. S.N. de S. Seneviratne, I am giving this information in point form, as we (D/TRI, D/CRI, and D/RRI) felt that this would be the easiest form for presentation of this subject matter, to enable the co-ordinator to prepare a coherent report. (N.B. a copy of the circular is enclosed for easy reference).

1.1 a. More effective application of available scientific knowledge. Maximising crop by using more land, getting more crop from land already in use and improving the quality of the product by:-

a) Manipulation of genetic material b) improving management standards c) identifying and overcoming limiting factors.

Maximum use of indigenously available material, eg. production of oil from tea and rubber seed, tannin from cassia.

b. I. Maintenance of Research Institutes for the 3 major plantation crops;
II. Subsidised replanting programmes;
III. Subsidies for factory modernisation;
IV. Plans for improved marketing.

1.2 Agricultural know-how is avilable; but application is lacking or not optimum.

Industrial know-how the technology is lacking and we are dependant on the developed countries.

Lack of trained personnel at the top and at shop floor level

Inadequacy of extension services

Logistics of getting necessary imports lacking.

1.3 Appropriate technology is lacking. We cannot use very high value equipment to turn out low value product eg. tea

1.4 Lack of knowledge of the product preferences of ultimate users - i.e. market intelligence

Competition from more developed western technology - consumer and tarriff barriers.

1.5 The establishment of a Ministry of Plantation Industries has helped to rationalise and co-ordinate imports eg. machinery, transport vehicles.

1.6 The proposed "Plantation Crops Journal" to supplement the existing Journals of the three Institutes.

2.1 Internationally:

a) The Asian & Pacific Coconut Community; Association of Natural Rubber Producing Countries; International Rubber Research & Development Board;

b) Exchange of Journals. These are very effective in certain areas;

c) Participation at Conferences eg. International Rubber Conference;

d) Limited exchange of personnel.

2.2 As stated at 2.1, there is some interchange in ideas, but this can be improved.

2.3 In the non-competitive sectors, the scope and willingness for exchange exists (between LDCs) but between the Developed and Developing countries the relationship often being that between producer and user, this relationship is not possible and impediments to co-operation may arise.

2.4 A. Co-ordinated information for areas of co-operative participation, to be transmitted expeditiously to the peripheral organisation directly involved.

B. Forgoing of direct links between extra-national S & T organizations.

3.1 a) Limited assistance in the form of funds and experts from organisations such as the UNDP/FAO.

b) Intensification of activity in the areas indicated in 3.2

3.2 A. Increase in funds and material to strengthen S & T programmes;

B. Introduction of S & T strategies of proven implementations value elsewhere in other SA;

C. Organisation of forums for discussion of current S & T developments.

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SCIENCE & TECHNOLOGY FOR DEVELOPMENT

1.1 What are the development objectives in the S.A.*? What are the national plans and priorities in the S.A.?

1.2 What is the state of technological dependency in the S.A.? What are the factors which affect this dependency?

1.3 What are the difficulties in the choice of technology for the S.A.?

1.4 What are the difficulties in the transfer of technology for the S.A.?

1.5 What measures have been taken to rationalise the import of capital goods for the S.A.?

1.6 What measures have been taken to promote S & T information systems for the S.A.?

1.7 What measures have been taken to develop extension service capabilities for the S.A.?

1.8 Is there appreciation of the role of S & T for the S.A.?

1.9 What is the infrastructure for S & T relevant to the S.A.?

1.10 What is the contact between R & D institutions and users in the S.A.?

1.11 Is the education & training for the S.A. adequate and suitable?

1.12 What is the extent of "brain drain" relevant to the S.A., and how does this "brain drain" affect the S.A.?

1.13 Is there planning for the S.A.?

1.14 What are the criteria for the choice of technology in the S.A.?

1.15 Are enterpreneurs and managerial skills available for the S.A.?

1.16 Are the national and international S & T systems relevant to the S.A. suitable?

1.17 Are the financial resources for the S.A. sufficient?

1.18 What is the new science and technology required for the S.A.?

1.19 What are the main recommendations for the S.A.?

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* Subject Area

1.7 The Tea Smallholders Authority, the Coconut Cultivations Board, and the proposed Rubber Smallholders Development Authority.

1.8 Yes

1.9 See 1.7 above

1.10 I. Promotion of contact between growers and Research Institutes

II. The Estates and Experimental Committee of each Research Institute, where growers discuss their problems with the research staff.

1.11 Not at present, but the proposed "National Institute for Plantation Management" will rectify this deficiency.

1.12 Serious in some sectors eg. the TRI. Everything possible is being done to remedy the situation and overcome the ill-effects of the "brain drain".

There has been a temporary set back to certain areas of research.

1.13 Yes, centrally co-ordinated by a Director of Planning at the Ministry of Plantation Industries.

1.14 a) Feasibility, b) measure of likely benefits, c) Impact on the national situation

1.15 Yes.

1.16 National systems are suitable, but there is insufficient information about relevant international systems.

1.17 Local finances are sufficient; but there is a deficiency in availability of foreign resources

1.18 Widening of the application of available technology

1.19 a) Expansion of resources available and extension to new areas of S & T eg. management skills;

b) Training at all levels;

c) Improvement of communication facilities internationally;

d) Easing of arrangements for procurement of facilities requiring foreign funds.

2. *INSTITUTIONAL ARRANGEMENTS & NEW FORMS OF INTERNATIONAL COOPERATION IN THE APPLICATION OF SCIENCE & TECHNOLOGY*

2.1 *What are the present mechanisms for the exchange of S & T information and national, regional, inter-regional and global levels for the S.A.? What is the effectiveness of such schemes?*

2.2 *What is the present status of S & T cooperation at sub-regional, regional, inter-regional, global levels for the S.A.?*

2.3 *What should be the role of cooperation between developing countries and between developed and developing countries for the S.A.?*

2.4 *What are the main recommendations for the S.A.?*

3. *UTILIZATION OF EXISTING UN SYSTEM & OTHER INTERNATIONAL ORGANISATIONS*

3.1 *What is, and what should be the role of UN or other international organisations for the S.A.?*

3.2 *What are the main recommendations for the S.A.*

NA-247-3

DECLARATION ON THE ESTABLISHMENT OF A NEW INTERNATIONAL ECONOMIC ORDER

We, the Members of the United Nations,

Having convened a special session of the General Assembly to study for the first time the problems of raw materials and development, devoted to the consideration of the most important economic problems facing the world community.

Bearing in mind the spirit, purposes and principles of the Charter of the United Nations to promote the economic advancement and social progress of all peoples,

Solemnly proclaim our united determination to work urgently for THE ESTABLISHMENT OF A NEW INTERNATIONAL ECONOMIC ORDER based on equity, sovereign equality, interdependence, common interest and co-operation among all States, irrespective of their economic and social systems which shall correct inequalities and redress existing injustices, make it possible to eliminate the widening gap between the developed and the developing countries and ensure steadily accelerating economic and social development and peace and justice for present and future generations, and, to that end, declare:

1. The greatest and most significant achievement during the last decades has been the independence from colonial and alien domination of a large number of peoples and nations which has enabled them to become members of the community of free peoples. Technological progress has also been made in all spheres of economic activities in the last three decades, thus providing a solid potential for improving the well-being of all peoples. However, the remaining vestiges of alien and colonial domination, foreign occupation, racial discrimination, apartheid and neo-colonialism in all its forms continue to be among the greatest obstacles to the full emancipation and progress of the developing countries and all the peoples involved. The benefits of technological progress are not shared equitably by all members of the international community. The developing countries, which constitute 70 per cent of the world's population, account for only 30 percent of the world's income. It has proved impossible to achieve an even and balanced development of the international community under the existing international economic order. The gap between the developed and the developing countries continues to widen in a system which was established at a time when most of the developing countries did not even exist as independent States and which perpetuates inequality.

2. The present international economic order is in direct conflict with current developments in international political and economic relations. Since 1970, the world economy has experienced a series of grave crises which have had severe repercussions, especially on the developing countries because of their generally greater vulnerability to external economic impulses. The developing world has become a powerful factor that makes its influence felt in all fields of international activity. These irreversible changes in the relationship of forces in the world necessitate the active, full and equal participation of the developing countries in the formulation and application of all decisions that concern the international community.

3. All these changes have thrust into prominence the reality of interdependence of all the members of the world community. Current events have brought into sharp focus the realization that the interests of the developed countries and those of the developing countries can no longer be isolated from each other, that there is a close interrelationship between the prosperity of the developed countries and the growth and development of the developing countries, and that the prosperity of the international community as a whole depends upon the prosperity of its constituent parts. International co-operation for development is the shared goal and common duty of all countries. Thus the

political, economic and social well-being of present and future generations depends more than ever on co-operation between all the members of the international community on the basis of sovereign equality and the removal of the disequilibrium that exists between them.

4. The new international economic order should be founded on full respect for the following principles:

(a) Sovereign equality of States, self-determination of all peoples, inadmissibility of the acquisition of territories by force, territorial integrity and non-interference in the internal affairs of other States;

(b) The broadest co-operation of all the States members of the international community, based on equity, whereby the prevailing disparities in the world may be banished and prosperity secured for all;

(c) Full and effective participation on the basis of equality of all countries in the solving of world economic problems in the common interest of all countries, bearing in mind the necessity to ensure the accelerated development of all the developing countries, while devoting particular attention to the adoption of special measures in favour of the least developed, land-locked and island developing countries as well as those developing countries most seriously affected by economic crises and natural calamities, without losing sight of the interests of other developing countries;

(d) The right of every country to adopt the economic and social system that it deems the most appropriate for its own development and not to be subjected to discrimination of any kind as a result;

(e) Full permanent sovereignty of every State over its natural resources and all economic activities. In order to safeguard these resources, each State is entitled to exercise effective control over them and their exploitation with means suitable to its own situation, including the right to nationalization or transfer of ownership to its nationals, this right being an expression of the full permanent sovereignty of the State. No State may be subjected to economic, political or any other type of coercion to prevent the free and full exercise of this inalienable right;

(f) The right of all States, territories and peoples under foreign occupation, alien and colonial domination or apartheid to restitution and full compensation for the exploitation and depletion of, and damages to, the natural resources and all other resources of those States, territories and peoples;

(g) Regulation and supervision of the activities of transnational corporations by taking measures in the interest of the national economies of the countries where such transnational corporations operate on the basis of the full sovereignty of those countries;

(h) The right of the developing countries and the peoples of territories under colonial and racial domination and foreign occupation to achieve their liberation and to regain effective control over their natural resources and economic activities;

(i) The extending of assistance to developing countries, peoples and territories which are under colonial and alien domination, foreign occupation, racial discrimination or apartheid or are subjected to economic, political or any other type of coercive measures to obtain from them the subordination of the exercise of their sovereign rights and to secure from them advantages of any kind, and to neo-colonialism in all its forms, and which have established or are endeavouring to establish effective control over their natural resources and economic activities that have been or are still under foreign control;

(j) Just and equitable relationship between the prices of raw materials, primary commodities, manufactured and semi-manufactured goods exported by developing countries and the prices of raw material, primary commodities, manufactures, capital goods and equipment imported by them with the aim of bringing about sustained improvement in their unsatisfactory terms of trade and the expansion of the world economy;

(k) Extension of active assistance to developing countries by the whole international community, free of any political or military conditions;

(l) Ensuring that one of the main aims of the reformed international monetary system shall be the promotion of the development of the developing countries and the adequate flow of real resources to them;

(m) Improving the competitiveness of natural materials facing competition from synthetic substitutes;

(n) Preferential and non-reciprocal treatment for developing countries, wherever feasible, in all fields of international economic co-operation whenever possible;

(o) Securing favourable conditions for the transfer of financial resources to developing countries;

(p) Giving to the developing countries access to the achievements of modern science and technology, and promoting the transfer of technology and the creation of indigenous technology for the benefit of the developing countries in forms and in accordance with procedures which are suited to their economies;

(q) The need for all States to put an end to the waste of natural resources, including food products;

(r) The need for developing countries to concentrate all their resources for the cause of development;

(s) The strengthening, through individual and collective actions, of mutual economic, trade, financial and technical co-operation among the developing countries, mainly on a preferential basis;

(t) Facilitating the role which producers' associations may play within the framework of international co-operation and, in pursuance of their aims, inter alia assisting in the promotion of sustained growth of the world economy and accelerating the development of developing countries.

5. The unanimous adoption of the International Development Strategy for the Second United Nations Development Decade [5] was an important step in the promotion of international economic co-operation on a just and equitable basis. The accelerated implementation of obligations and commitments assumed by the international community within the framework of the Strategy, particularly those concerning imperative development needs of developing countries, would contribute significantly to the fulfilment of the aims and objectives of the present Declaration.

6. The United Nations as a universal organization should be capable of dealing with problems of international economic co-operation in a comprehensive manner and ensuring equally the interests of all countries. It must have an even greater role in the establishment of a new international economic order. The Charter of Economic Rights and Duties of States, for the preparation of which the present Declaration will provide an additional source of inspiration, will constitute a significant contribution in this respect. All the States Members of the United Nations are therefore called upon to exert maximum efforts with a view to securing the implementation of the present Declaration, which is one of the principal guarantees for the creation of better conditions for all peoples to reach a life worthy of human dignity.

7. The present Declaration on the Establishment of a New International Economic Order shall be one of the most important bases of economic relations between all peoples and all nations.

2229th plenary meeting
1 May 1974

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5 Resolution 2626 (XXV)

NA-247-4

IRRIGATION

Extracted from a Report prepared by
Mr. S. Sivasubramaniam of Irrigation Department

Section 1 INTRODUCTION

Sri Lanka's economy has been based on agriculture from ancient times, and agriculture will perhaps continue to be primary source of the nation's economic activity for many more years to come. The bulk of the agricultural production in Sri Lanka is represented by the four principal agricultural crops, tea, rubber, coconut and rice. Paddy is grown for domestic consumption and is supplemented by imports from abroad (342,000 metric tons in 1975). About 40% of the coconut output is exported; tea, rubber and coconut together account for about 75% of the country's export earnings. The proceeds of their sale abroad pays for the import of food stuffs, other consumer goods and equipment for agricultural and industrial development. The economy of the island thus depends primarily upon the production of four commodities and the export of three of them.

Paddy and subsidiary food crops are grown at present on a total area of 1,950,000 Acs. Of this 580,000 acs. are rainfed while 1,370,000 acs are under irrigation. The rainfall is unevenly distributed over the island, and is confined to two main Monsoon Seasons. Irrigation water is thus essential for agricultural production. Dependent as it is on the vagaries of the weather, paddy production fluctuates from year to year. Almost all irrigation reservoir systems have been designed in the past to meet the annual requirements of crops cultivated under them and do not have carry-over storage to meet a short fall in the following year.

The country has a long established tradition in irrigation starting from ancient times, when magnificient engineering works of reservoirs and canal systems had been constructed, operated and maintained. These ancient works which had gone into, disuse have all been gradually brought back into service except for a few smaller reservoirs. Apart from restoration of ancient reservoirs a number of new irrigation works have been constructed during the last four decades. Prominent amongst these are Gal Oya Scheme (to benefit 123,000 Acs), Rajangane Scheme (13,000 Acs), and Udawalawe Scheme (60,000 Acs). Mahaweli Project involving the construction of the largest reservoirs and longest canals to benefit 900,000 acres is currently under construction.

Section 2 WATER RESOURCES

2.1 Climate & Precipitation

2.1.1 Climate -

On account of its situation close to the equator Sri Lanka has a tropical climate characterised by high temperatures throughout the year. However, due to the fact that the island is not more than 140 miles (226 km) wide, the oceanic affect mitigates extreme rises of atmospheric temperature throughout the country. The mean temperature ranges from 80 to 82°F in most of the low country areas and falls off at a steady rate of about 1°F for every 300 ft. (92 m) increase in altitude (0.006°C per km). Wind velocities only occassionally exceed 50 miles/h (80 km/h) and rarely exceed 60 miles/h (95 km/h).

Relative humidity varies from about 70%, during the day to about 90% at night as temperature decreases. In the drier parts of the island, these values are lower by about 5% while in the direst areas, the day humidity falls to about 60%.

Evaporation varies from slightly over 36 inches (910 mm) per year in the high elevation wet zone areas to nearly 72 inches (1,820 mm) in dry zone. Representative annual total and its monthly distribution for the Dry Zone are shown in Table I.

Table I - Average Evaporation from Water Surface in the Dry Zone

Month	Evaporation mm	Evaporation inches	% of total
January	119	4.70	6.53
February	121	4.76	6.61
March	159	6.28	8.72
April	170	6.70	9.30
May	177	6.94	9.64
June	175	6.90	9.58
July	179	7.05	9.79
August	184	7.23	10.04
September	183	7.22	10.04
October	143	5.65	7.85
November	154	6.05	8.40
December	107	4.21	5.75
Total	1,871	72.00	100.00

Source: Mahaweli Ganga Irrigation & Hydropower Survey No. II FAO, Colombo 1968.

2.1.2 Precipitation

Rainfall is unevenly distributed over the island and is the only form of precipitation. Its distribution over the island is governed by the effects of two Monsoons of each year, as well as the orographic influence of the central mountainous region.

South-Western quadrant of the island the (Wet Zone) receives the maximum amount of precipitation composed of rainfall from both monsoons ranging from 100 to 200 inches (2,540 to 5,080 mm) or even more per year, with peaks in May and October. In the rest of island comprising the "Dry Zone", where bulk of the land suitable for paddy and other food crops is located, only about 50 to 75 inches (1,270 to 1,910 mm) of rainfall occurs in an average year. This is chiefly during the North-East Monsoon period of October - March. Practically no rainfall occurs during the rest of the year.

The long-term mean monthly distribution of average rainfall over the Wet and Dry Zones as well as the entire island is depicted in Table 2. There are two marked dry periods each year in February - March and August - September.

Table 2 - Monthly Distribution of average rainfall

Month	Wet Zone		Dry Zone		Sri Lanka	
	Ins.	mm	Ins.	mm	Ins.	mm
January	4.2	107	7.5	191	5.9	150
February	2.6	66	3.7	94	2.7	69
March	5.7	145	3.3	84	4.5	115
April	8.8	224	4.0	102	6.4	163
May	11.7	298	7.9	202	7.3	186
June	9.3	236	0.9	23	5.1	130
July	7.8	198	1.1	28	4.5	115
August	5.8	148	1.8	46	3.8	97
September	7.7	196	2.7	69	5.2	132
October	14.1	358	7.7	196	10.9	277
November	11.5	293	12.0	305	11.8	300
December	6.1	155	10.6	270	8.4	214
	95.3	2,424	57.2	1,610	76.3	1,948

Source: Department of Meteorology.

2.1.3 Run-off

There are 103 river basins in Sri Lanka the largest being Mahaweli Ganga with a water shed area of 4000 square miles (10,450 km^2). All rivers and streams emanate from the central highlands and flow radically towards the sea all round the island. The total mean annual escape to the sea from the 103 river basins has been estimated in 1959 as 27.7 million acre feet (34,200 million m^3).

2.1.4 Water Resources

For the purpose of water balance studies the island has been divided into four regions based on topography, climate and administrative district boundaries. These are :-

1. Mahaweli Project Region.
2. South-East Dry Zone Region.
3. Western Wet Zone Region.
4. North-West Dry Zone Region.

The regions are shown in the Map annexed.

Section 3 WATER RESOURCES DEVELOPMENT REGIONS

3.1 Mahaweli Project Region

This region comprises of the administrative districts of Anuradhapura, Polonnaruwa, Matale, Trincomalee, Vavunia, Kandy, Nuwara Eliya and Badulla, and has a gross area of 25,500 km^2 (9,830 sq. miles) which is 39 percent of the whole Island. Over 27% of the Island's population is in this region. This region covers the area of the largest water resources development project, (the Mahaweli Development Project) undertaken in Sri Lanka. This project is centred on the resources of the Mahaweli Ganga, the largest and longest river of the island and encompasses the water sheds of the adjacent Maduru Oya river basin and other smaller river basins in the North-Central part of the Island.

A Mahaweli basin is estimated to discharge about 7,650 million m^3 (6.5 million acre feet) of water to the sea from its water shed area of 10,450 km^2 (4,000 square miles). This volume represents approximately 1/5th of the total discharge of all the Island's rivers into the sea. This is a replenishable natural resource to be harnessed for development. The Mahaweli Ganga rises in the hill country at elevations of over 1,830 m (6,000 ft.) above sea level. There is therefore significant hydropower potential in the basin which can be exploited.

A UNDP/FAO team in collaboration with specialists of Sri Lanka prepared the Master Plan for the development of the water resources of the Mahaweli Basin and adjacent areas during the period 1965 - 1968. This plan proposes to utilise 5,800 million m^3 (4.7 million acre feet) of the flow of the Mahaweli Ganga for agricultural development in an area of 364,000 hectares (900,000 acres) lying in the dry zone of the Island. In this programme 1,110 million m^3 (09 million acredfeet) of water available in the areas to be developed will also be utilised. Of the 364,000 hectares (900,000 acres) referred to above, roughly 100,000 hectares (246,000 acres) are presently irrigated, but are deficient in water supplies, and 265,000 hectares (654,000 acres) will be new lands, some of it being at present under rainfed cropping. The plan also envisages the installation of hydro-power plants with a total capacity of over 500 MW or the production of some 2,600 Kwh of energy annually.

The creation of reservoir storages on the Mahaweli Ganga and its tributaries, Victoria and Randenigala on the main river, Kotmale on the Kotmale Oya and Moragahakanda on the Ambanganga will provide for a substantial measure of flood control in the Gampola-Peradeniya region in the upper reaches of the river and the Manampitiya-Kandakadu area in the lower reaches of the river.

The plan includes the construction of several large dams on the main river and its major tributaries, as well as on streams flowing through the areas selected for agricultural development. The recently restored ancient reservoirs in the service areas will store the waters from their own catchments, and will further regulate the flows diverted from the Mahaweli. Several major canal systems are planned to deliver water to the service areas.

The estimated total cost of the scheme was Rs. 6,700 million (U.S. $ 1,415 million) (1968) and the implementation period was to be 30 years. In view of the large extent of land involved and the large investment cost of the proposals, the overall plan was divided into three phases, each phase consisting of several projects each of which was considered economically viable individually.

3.1.1 Phase I

This irrigates 133,000 hectares (328,000 acres) located in the Kala Oya, Minneriya, Minipe and Kantalai regions. Out of this acreage, existing irrigation system receives improved supply to 58,500 hectares (144,000 acres) and 74,000 hectares (184,000 acres) will be new lands under irrigation. The total installed electrical generating capacity will be 200 MW which will produce a firm energy of 820 million Kwh/year.

3.1.2 Phase II

This phase includes construction of dams at the Maduru Oya and Taldena sites and irrigation systems required to provide water for 8,500 hectares (21,000 acres) for presently cultivated lands, 84,500 hectares (209,000 acres) of new lands located in the lower reaches of the Mahaweli Ganga and the Maduru Oya valley. The hydro-power in this phase will be developed by 14.5 MW plant at Taldena generating 48 million Kwh of firm energy/year.

3.1.3 Phase III

Includes construction of all remaining proposed facilities such as the multipurpose Randenigala and Kotmale reservoirs and the long left bank (LB) and North-Central Province (NC) trans-basin canals. This phase would irrigate 139,060 hectares (342,000 acres) of which 33,000 hectares (81,000 acres) are existing lands and 106,000 hectares (261,000 acres) are new lands. The bulk of these lands are located on R.B. of Mahaweli Ganga and in the Yan Oya, La Oya, Pali Aru, Kantarayan Aru and Paranki Aru basins in the North-Central and Northern regions. A total of 293 MW of electric capacity would be installed which would produce 1,169 million Kwh of firm energy/year.

Table 3

Summary of the Master Plan

for the Mahaweli Ganga Development

	Irrigation Area						Firm Energy Million Kwh/ year.
	Existing Acreage		New Area		Total		
	ha. 1000	Ac. 1000	ha. 1000	Ac. 1000	ha. 1000	Ac. 1000	
Phase I	58.5	144	74.5	184	133	328	820
Phase II	8.5	21	84.5	209	93	230	48
Phase III	33.0	81	106.0	261	139	342	1169
Total	100.0	246	265.0	654	365	900	2,037

Phase I of the Master Plan has been divided into three projects. Execution of Project 1, Phase I was commenced in 1970 and is scheduled for completion in 1978.

It has now been decided by the government to accelarate the pace of development with a view to complete all works envisaged in the Master Plan in five years. For this purpose all works, other than Project 1 which is nearing completion, are grouped as 12 Projects. The revised cost of these projects is estimated at about Rs. 22,000 million.

3.2 South-East Dry Zone Region

This region comprises of the revenue districts of Hambantota, Monaragala, Amparai and Batticaloa with a total extent of about 15,500 Km^2 (6,000 square miles). This region supports 8 percent of the population of the Island. A large extent in the South-East sector of this region forms the Yala Wild Life Santuary and forest reserves. The major river basins in this region are the Walawe Ganga, Kirindi Oya, Menik Ganga, Kumbukkan Oya, Heda Oya, Gal Oya and Mundeni Aru. The total yield of all the rivers in this region is 3,490 million m^3 (2.83 million ac.ft.). Of all these basins substantial development has already taken place in the Walawe and Gal Oya basins.

The major reservoirs in the Walawe basin are Udawalawe reservoir and the proposed Samanalawewa reservoir. Udawalawe reservoir has been constructed with a capacity of about 268 million m^3 (217,000 ac.ft.) together with power plant of installed capacity of 6 MW. A total extent of about 20,000 ha. (50,000 acres) in the basin have been already developed, while in an extent of about 12,000 ha. (30,000 acres) development is in progress. Final designs are complete for Samanalawewa multipurpose project to develop hydropower with a plant of installed capacity 120 MW and for the development of 8,090 hectares (20,000 acres) of new lands under irrigation.

Substantial development has also taken place in the Gal Oya basin. This basin is developed with the multipurpose reservoir (Senanayake Samudra) of capacity 950 million m^3 (770,000 acre feet) with the total development of 48,000 hectares (120,000 acres) and with a power plant of installed capacity 10 MW.

In the rest of the basins of this region only about 12,000 hectares (30,000 acres) have been developed. The water resources available at selected sites suitable for reservoirs is around 1,230 million m^3 (1 million ac.ft.) whereas arable lands of over 100,000 ha. (250,000 acres) are available in this region. According to the water utilisation for crops suitable for growing in the soils in this region, more water would be required than which are available basin-wise. Therefore, proposals for diverting surplus resources of the Kalu Ganga a river in the Wet Zone to meet the deficiency have been suggested.

3.3 Western Wet Zone Region

This region comprises of the revenue districts of Matara, Galle, Kalutara, Ratnapura, Kegalle and Colombo. The total extent of this region is about 11,600 km^2 (4,500 sq.miles). Of the four regions this region is the most heavily populated with as much as 47 percent of the total population. The major river basins in this region are Nilwala Ganga, Gin Ganga, Kalu Ganga and Kelani Ganga.

3.3.1 Nilwala Ganga Basin

The Nilwala Ganga Basin includes 850 km^2 (325 sq. miles) of drainage area at its mouth and is located entirely in the wet zone of Sri Lanka. This river has an annual average run off of 1600 million m^3 (1,3000,000 ac.ft.). An estimated area of 60% of the Nilwala Ganga Basin is cultivated predominantly with tea, rubber, coconut and rice. Rice covers an estimated 16,190 hectares (40,000 acres) of which 8,090 hectares (20,000 acres) in the lower basin are subject to recurring flood damage. The problem in this basin is frequent flooding. A scheme for the protection of lands from minor floods, of frequently of once in 3 years, is in existence.

3.3.2 Gin Ganga Basin

This basin is also located entirely within the wet zone and the annual average run off is about 2,590 million m^3 (2.1 million acre feet).

Approximately one half of the basin area is cultivated primarily with rice, tea and rubber. The total paddy area in the basin is estimated to be 14,000 hectares (35,000 acres) of which about one half in the lower reaches of the basin is subject to frequent flood damage. Here too, a scheme for the protection from minor floods of frequency one in 3 years is in existence. It is expected to commence shortly a flood protection scheme with levees and pumping is under construction to protect about 5,600 hectares (14,000 acres) of low lying lands from floods of 20 years frequency.

3.3.3 Kalu Ganga Basin

Kalu Ganga is one of the largest rivers in Sri Lanka and drains about 2,600 km^2 (1000 sq.miles) at its mouth and is also located entirely within the wet zone. The annual average run off of this river at the Pattipola gauging station is 7640 million m^3 (6.2 million ac.ft.). Agricultural development in this basin is made up primarily of paddy, rubber, tea and coconut and it covers 100,000 hectares (250,000 acres). Of the estimated 25,000 hectares (63,000 acres) of paddy in the basin, more than 50% of the extent is located in the area affected by floods.

Preliminary proposals have been framed for the construction of a detention reservoir in the upper reaches together with levees for the protection of low lying lands. Preliminary studies have also been carried out for the diversion of about 1230 million m^3 (a million acre feet) from the upper reaches of the Kalu Ganga (Kukule Reservoir) towards the deficient south east dry zone sector.

3.3.4 Kelani Ganga

Kelani Ganga another wet zone river has a drainage area of 2200 Km^2 (820 sq.miles). The annual average run off is estimated at 4930 million m^3 (4 million ac.ft.). This river has two major tributaries viz. Maskeliya Oya, and Kehelgamuwa Oya. The hydro-power potential in this river basin up to the confluence of these two tributaries have been completely exploited by Maskeli Oya Project Stage I and 2, Norton, Old Laxapana power projects. The total installed capacity is 275 MW.

Preliminary proposals for further development in this basin have been framed, for detention reservoirs, together with levees system and transbasin canals. These development proposals envisage flood protection, development of hydro-power and transbasin diversion of surplus resources to the north western sector to command about 62,600 hectares (154,000 acres) of lands.

3.4 North West Dry Zone Region

This region comprises of the revenue districts of Kurunegala, Puttalam, Mannar and Jaffna. The total extent is 13,000 km^2 (5000 sq.miles). About 18 percent of the island's population is in this region. The major rivers in this region are the Deduru Oya and the Mee Oya. The average annual run off of Deduru Oya at the outfall is about 1085 million m^3 (880,000 ac.ft.) while Mee Oya at Tabbowa, records an annual average yield of 136 million m^3 (110,000 ac.ft.). Although more than 41,000 hectares (100,000 acres) of lands are available for development in this region, yet due to water deficiency, much progress has not been made. Preliminary proposals have been formulated for the transfer of the surplus waters of Kelani Ganga towards this region.

A notable feature of this region is the thin coastal strip of myocene limestone, running from Puttalam northwards towards Mannar, Poonari, Paranthan up to the Peninsula area in which ground water is found to occur. The ground water potential according to the preliminary investigations is estimated at about 493 million (400,000 acre feet). Exploitation of ground water for irrigation development has commenced in this area.

4.0 Section 4. SUPPLY AND DEMAND FOR WATER

The predominant demand for water is from the agricultural sector. The three crops coconut, tea and rubber are rainfed crops and do not compete for the utilisation of the surface water resources. The food crops utilise and will continue to utilise the greater portion of the available water, the rest of the demand in the agricultural sector being from fibre crops such as cotton. Domestic and industrial demands are comparatively small. Water balance studies for the agricultural sector served mainly by irrigation is given in tables 1 to 5 for the four regions.

5.0 Section 5. SUMMARY

Summarising, considering the agricultural demand alone while the Mahaweli Project region is self-sufficient, the South-East dry zone and North-West dry zone regions are deficient in water (Table 6). The deficit in the South-East dry zone region of 737,000 ac.ft. (916, million m^3) can be met from the diversion from the proposed Kukule Reservoir in the Kalu Ganga Basin. The North-West Dry Zone will have a dificit of 1,100,000 ac.ft. (1,377 million m^3). It is proposed to meet this deficit from diversion from Kelani Ganga in the Western Wet Zone which has a surplus of 1,350,000 ac.ft.

TABLE I

WATER MANAGEMENT

1. Mahaweli Project Region

	Net Area irrigated		Water Requirement**		Net Local Yield of Storage Reservoirs		Drainage Water		Canal Losses		Net Deficit		From Mahaweli Ganga and its tributaries	
	m^3 Millions	Ac.ft. 1000	m^3 Millions	Ac.ft. 1000	m^3 Millions	Ac.ft. 1000	m^3 Millions	Ac.ft. 1000	m^3 Millions	Ac.ft. 1000	m^3 Millions	Ac.ft. 1000	m^3 Million	Ac.ft. 1000
Kandakadu-Allai	46.5	114.0	1,030	838	–	–	230	187	–	–	800	651	800	651
Madura Oya	50.5	124.9	960	780	288	185	78	62	–	–	654	533	830	675*
R.B. Minipe	31.2	76.9	493	401	17	14	–	–	19.7	16	495.7	403	495.7	403
Elehara-Kantalai	42.5	100.5	945	766	92	75	–	–	60.5	49	913	740	910	740
Parakrama	11.1	27.3	285	232	12	10	28	23	–	–	245	199	268	219
Minipe Yoda Ela	8.3	20.4	165	134	–	–	–	–	–	–	165	134	165	134
Kalu Gange	3.5	8.7	62	50	–	–	3.7	3.7	8.6	7.0	66.9	54	66.5	54*
Kala Oya	41.6	103.1	840	680	240	195	31	25	18.5	15	587.5	475	585	475
Malwatu Oya	56.7	140.0	1,110	901	192	156	91	74	74	60	901	731	900	731
Parangi Aru & Palai Aru	13.0	31.9	210	171	53	43	26	21	12.3	10	143.3	117	144	117
Kanakarayan Aru	8.1	20.0	123	100	2.5	2.0	7.4	6.0	22	18	135.1	110	135	110
Ma Oya	39.1	96.4	670	545	63	51	50	40	2.5	2.0	559.5	456	560	456
Yan Oya	14.6	35.9	290	236	149	220	25	20	5.0	4.0	121	100	123	100
	366.7	900.0	7,183	5,834	1,048.5	851	570.1	461	223.1	181	5,787.0	4,703	5,982.2	4,865

* Include 175 million m^3 (142,000 ac.ft.) from Maduru Oya Reservoir.
** Multiple cropping.

Source: Mahaweli Ganga Irrigation & Hydro-power Survey, Volume V – Water Management Studies, FAO and Irrigation Department, Sri Lanka, Colombo 1968.

TABLE 2

MAHAWELI GANGA BASIN - LAND USE SUMMARY

LAND USE	Wet Zone		Intermediate Zone		Dry Zone		Total	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Urban	4,060	0.6	1,230	0.2	2,230	0.2	7,520	0.3
Homestead Garden	79,920	10.8	55,080	10.0	37,580	2.9	172,580	6.7
Rubber	23,290	3.2	9,090	1.7	-	-	32,380	1.3
Tea	329,450	44.7	28,270	5.1	-	-	357,720	13.9
Paddy	53,880	7.3	53,460	9.7	70,090	5.4	177,430	6.9
Shifting cultivation	17,690	2.4	214,950	39.0	132,060	10.3	364,700	14.2
Other Permanent cultivation	17,880	2.4	29,170	5.3	37,400	2.9	84,450	3.3
Grass land & shrub	68,010	9.2	45,610	8.3	67,140	5.2	180,760	7.0
Forest	138,180	18.8	111,550	20.0	881,460	68.5	1131,190	43.9
Unused Land	1,410	0.2	910	0.2	13,210	1.0	15,530	0.6
Water and Marsh	2,770	0.4	1,880	0.3	45,800	3.6	50,450	1.9
T o t a l	736,540	100.0	551,200	100.0	1286,970	100.0	2574,710	100.0

Source:- Report on a Survey of the Resources of the Mahaweli Ganga Basin - Part I - 1962.

GROUND WATER POTENTIAL

Ground Water Basin	Approx-Areal Extent		Average depth of aquifer		Average Yield		Average transmissibility	Observation wells	Approximate estimate of present utilisation	Estimate of available annual supply to meet future demands	
	km^2	sq.mls.	ft.	m.	gp.ml/s		g/day/ft.		Ac.ft.per day	Ac. ft.	m^3 (Million)
Vanathavillu	56	22	50	15	300	22	5.5×10^4	15*	1.0	20,000	25
Mannar-Murunkan	160	63	65	20	200	15	-	120*	50	80,000	99
Silvathurai	100	39	40	12	200	15	5.01×10^4	5*	0.25	15,000	19
Mulankavil	70	27	60	18	200	15	5.3×10^5	16*	0.50	50,000	62
Madurankuli	60	24	-	-	150	11	-	15	-	60,000	74
Puthukuddiyirippu	120	47	50	15	-	-	-	3	-	90,000	37
Paranthan	70	27	60	18	-	-	-	-	-	40,000	50
Jaffna	1100	430	15	4.5	50	4	-	400	125	-**	-

* Production Wells.
** Not estimated.

TABLE 3

Water Management Balance

2. South-East Dry Zone Region

Basin/Reservoir	Average Annual Yield		Existing Development				Proposed Development				Remarks
			Extent		Water Requirement		Extent		Water Requirement		
	m^3 Million	Ac.ft. Thousand	ha. Thousand	Acs. Thousand	m^3 Million	Ac.ft. Thousand	ha. Thousand	Ac. Thousand	m^3 Million	Ac.ft. Thousand	
Walawe Ganga	1050	855									
1. Samanala Wewa	-	-	-	-	-	-	8.0	20	246	200	
2. Uda Walawe	-	-	11	27	332	270	12.0	30	370	300	
3. Ridiyagama	-	-	2.5	6.2	77	62.1	-	-	-	-	
4. Chandrika Wewa	-	-	2	5.1	63	51	-	-	-	-	
Karindi Oya	340	277									
1. Kuda Oya	-	-	-	-	-	-	5.5	13.5	166	135	
2. Lunugamwehera	-	-	-	-	-	-	8.0	20	246	200	
3. Ellagala Anicut	-	-	4	8.7	107	87	-	-	-	-	
Menik Ganga											
1. Menik Ganga Reservoir	184	149.1	-	-	-	-	3.2	8	99	80	
Kumbukkan Oya											
1. Kumbukan Oya 2. Hulandawa Oya 3. Namban Oya 4. Alakola Oya	-	-	-	-	-	-	7.4	18	222	180	

Contd...

TABLE 3 (Contd.)

Basin/Reservoir	Average Annual Yield		Existing Development				Proposed Development				
			Extent		Water Requirement		Extent		Water Requirement		
	m^3 million	Ac.ft. Thousand	ha. Thousand	m^3 Thousand	Ac.ft. Million	ha Thousand	Ac.ft Thousand	m^3 Thousand	m^3 Million	Ac.ft. Thousand	
Heda Oya	256	208.1	-	-	-	-	-	-	-	-	
1. Heda Oya	-	-	2	4.5	56	45	5.0	12.5	154	125	
2. Muthukandiya	-	-	-	-	-	-	1.0	2.5	31	25	
Gal Oya	890	723.4									
1. Senanayake Samudra	-	-	50	124	1530	1240	-	-	-	-	
Total	2783	2263.3	71.5	175.5	2165	1755.1	50.1	124.5	1534	1245	
			Net deficit 916 million m^3 (736,800 ac.ft)								
Mundeni Aru	949	564.2	7.1	17.4	213	174	11	27	333	270	Basin self-sufficient. Excess cannot be diverted

Source : Irrigation Department

TABLE 4

WATER MANAGEMENT BALANCE

3. Western Wet Zone Region

1. Water Resources available for diversion to South-East Dry Zone (Technically feasible).

Basin	Site	Watershed sq. mls.	Area km^2	Estimated Ac.ft./Year	Watershed Yield m^3 (Million per year)
Gin Ganga	Watugala	57.5	153	320,000	390
Kalu Ganga	Kukule	124.5	326	740,000	910
				1,060,000	1,300

Source : Feasibility Report on Multipurpose Development of the Nilwala Ganga, Gin Ganga and Kalu Ganga Basins Vol. 1 Engineering Consultants Inc. Colombo 1968.

2. Water Resources available for diversion to North-West Dry Zone (Technically feasible)

Basin	Site	Estimated Watershed Yield Ac.ft./Year	m^3 (million)/year
Kelani	Nawata, Parusella & Holumbuwa Reservoir	1,350,000	1,660

Source : The Kelani Ganga Basin Scheme : Technopromexport, Moscow 1961.

TABLE 5

WATER MANAGEMENT BALANCE

4. North-West Dry Zone Region

	Average Yield		Extent Developed		Water Requirement		Proposed Devp.		Water Requirement	
	Ac.ft.	m^3 million	Extent Acs.	Thousand ha	Ac.ft.	m^3 million	Extent Acs.	Thousand	Ac.ft.	m^3 million
1. Deduru Oya	588,000	720								
(a) Batalagoda Tank			5,054	2	50,540	52				
(b) Hakwatuna Oya Tank			4,400	2	44,000	54				
(c) Kimbulwana Oya tank			1,200	0.5	12,000	15				
(d) Magalle Wewa			4,154	2	41,540	51				
(e) Deduru Oya region and lands adjoining Deduru Oya							65,000	27	650,000	800
2. Mi Oya	94,000	115								
(a) Palukadawela tank			1,700	0.7	17,000	21				
(b) Attaragalle Wewa			1,024	0.4	10,240	13				
(c) Inginimitiya Res.							7,000	3	70,000	86
(d) Mi Oya Basin & Lands adjoining Mi oya							90,000	37	900,000	1,110
	682,000	835	17,532	7.6	175,320	216	162,000	67	1,620,000	1,996

Net deficit of 1,377 million m^3 (1,113,000 Ac.ft.) to be met from Western Wet Zone Region.

Source : Irrigation Department.

TABLE 6

Summary of Water Management Balance

Million m^3 (1000 ac.ft.)

Supply/Demand	Mahaweli Project Region	South East Dry Zone Region	Western Wet Zone Region	North West Dry Zone Region
Total average	7375 (5996)	2783 (2263)	16,760 (13,600)	835 (682)
Current requirements	1049 (851)	2165 (1755)	-	216 (175)
Future demand for agriculture upto year 2000	6134 (4983)	1534[b] (1245)	-	1996[b] (1620)
Excess/Deficit	+195 (+162)	-916 (-737)	+2960[c] (+2410)	-1377 (-1113)

a. Excludes Mundeni Aru Basin which is self sufficient.

b. Water requirements have been assessed at an average, duty of water of 30,480 m^3/ha (10 Ac.ft./Ac.). This has to be adjusted according to cropping patterns for each scheme during detailed design stage.

c. Possible diversion.

THE SRI LANKA ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE - A VOLUNTARY SCIENCE ORGANISATION AS AN INSTRUMENT FOR SCIENCE, TECHNOLOGY AND DEVELOPMENT IN SRI LANKA

The organisation of Science and Technology in Sri Lanka for accelerated industrial development is very much of recent origin. The experience is that in this task much has been achieved through the efforts of voluntary science associations in Sri Lanka.

As a pattern for study in this connection, the Sri Lanka Association for the Advancement of Science (SLAAS) is especially illustrative. It was formed by a small band of scientists in 1944 as the Ceylon Association of Science. As an association, its objectives have been to promote the application of science in two broad ways. 1. by promoting scientific research, 2. by dissemination of scientific knowledge. In promoting science through research, all that the association achieved in its formative years was to make available a forum for local scientists to present and discuss their researches through the holding seminars and annual sessions. It was soon realised that this alone was not adequate to provide a favourable climate for scientific activity. It was also recognized that the Association should bring into its fold all disciplines of science and encourage in them, discussion among themselves as well as among scientists from other disciplines. The Association was named the Ceylon Association for Advancement of Science which is now to become the Sri Lanka Association for the Advancement of Science (SLAAS). It provides at present for sections in Medical Sciences, Agricultural Sciences, Engineering Science, Natural Science, Physical Science and the Social Sciences. Science is thus reflected in all its forms.

The association in its early years focussed attention on the need for a research institute as an instrument for scientific and industrial development. The establishment of the Ceylon Institute for Scientific and Industrial Research (CISIR) in 1951 as an autonomous Corporation is a result of the active interest of the SLAAS. The association also gave much emphasis to the organisation of scientific activity as a whole and persistently campaigned for the creation of a National Research Council for overall coordination of scientific activity and to define a NATIONAL SCIENCE POLICY. Successive governments in Sri Lanka were urged to give this matter their urgent consideration. It took over 15 years to realise this long felt need. In the ensuing years, a shadow committee referred to as the General Research Commitee (GRC) was formed by the association to promote scientific research by the award of research grants and the undertaking of documentation. The resources were severely limited to provide assistance in this way. However, a directory of scientific personnel and a Union List of scientific periodicals in Sri Lanka was produced by this Committee. The GRC undertook the task of obtaining information on the scientific problems facing industry. It visited industrial corporations to identify scientific problems with a view to bringing to bear scientific know-how among the members on these problems. The Committee also urged the setting up of a separate advisory unit in the CISIR for the purpose of providing scientific direction and advise to small scale production units.

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Such activities did serve as an essential factor to nourish the increasing application of science to development. The compilation of the directory of scientific personnel was certainly an aspect of development strategy in assessment of the human resources and their exploitation. The identification of scientific problems facing industry focussed attention of members of the association on such problems as 'deterioration of motor gasolines in storage tanks' due to what was considered as action of sulphate reducing bacteria, 'problems of prolonging shell life in packaging of wheat germ and uses of wheat bran' were identified at the State Flour Milling Corporation, 'utilisation of leather waste as animal food' as a problem of the Ceylon Leather Products Corporation. The GRC also undertook to collate information on the import of raw materials utilized by the industry in an attempt to rationalise the procedure with scientific knowhow. A recent activity of the GRC is a consumer protection project to assist consumer education of the population.

The activities of the GRC have necessearily been limited by finance. In 1968, the government instituted a NATIONAL SCIENCE COUNCIL to promote and coordinate scientific research and science based activities. Shortly afterwards a separate MINISTRY for scientific affairs was set up for the first time. It is to the credit of the SLAAS that government recognition at its highest level has been given to the status of science and science development in Sri Lanka.

The association has taken meaningful steps to achieve its second objective of dissemination of scientific knowledge. The general image of scientists that they are far from the understanding of the common people working in some sort of ivory tower needed to be erased, if this live contact with the people had to be established. As science and technology affects lives of ordinary men and women, it is essentisl for scientists to put across to the people what they are doing and also to get to know the thinking and view point of the people. This, the association realised as one of its primary functions. It set up a committee for the popularisation of science pledged to raise the level of science consciousness among the entire population. One major problem has been, to try to bring home to the laymen the close relationship between science and its environment. In order to promote the pupil's attention to their environment, every school was encouraged to form its own science club. The region was organised into Junior Sri Lanka Associations for the Advancement of Science. School science exhibitions were sponsored leading to inter-school competition. Pupils have generated data on local mineral resources, agricultural practices, scientific explanations for rural beliefs, superstitions and crafts. Students were encouraged to keep nature diaries and their enthusiasm sustained through competitions. Leaflets and science magazines were put out, science films, popular science lectures, science quizes were organised on an all island scale. The mass media was exploited to its full. A new venture is a programme to assist members to enhance their ability to communicate scientific thought to the people. Another important activity has been to take science to the village. The main objectives have been to create in the

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people of a selected project village, a sufficiently strong interest in science, and to develop a local leadership sufficiently interested to carry on, on their own initiative. Lectures and films on subjects as nutrition, agricultural development, family health are conducted in this village. This is an active programme which is begining to show results and has had increased patronage from international development oriented organisations. Other areas have been selected for this activity. The membership has been successful in introducing themselves to the farming communities in newly opened up areas of these villages.

The villages have shown much interest in scientific methods and know-how. The association gives much priority to the work of this committee. It has recognised that science should be taken to where it is most needed. The committee has urged the SLAAS to mobilise scientific man-power potential to take science and its innovations to the farmers of the dry zone of Sri Lanka. Probably no single feature has been more responsible for the SLAAS's record of useful service than that of the POPULARISATION OF SCIENCE PROGRAMME.

Another project initiated by the association was a School biology project financed by the Asia Foundation. A biology curriculum for Sri Lanka schools was its primary aim and it had the collaboration of School Science teachers. Teaching materials were produced and tested - a valuable contribution has been a continuous flow of useful guide line information on important aspects of the syllabus and experiments with teaching material of more relevance to the local environment. This was really an impetus for the Ministry of Education to later establish a CURRICULUM DEVELOPMENT CENTRE for all subjects at secondary school level. This is yet another instance where the SLAAS- a voluntary science organisation has provided the leadership for the government machinery to emulate.

The SLAAS also assists in INTERNATIONAL PROGRAMMES as the International Biological Programme (IBP). The association has also focussed attention of the government on the conservation and utilisation of forest and mineral resources.

The SLAAS has thus contributed in ample measure as a key instrument for the national efforts in the effective utilisation of SCIENCE AND TECHNOLOGY IN DEVELOPMENT. Much remains to be done but the infrastructure hopefully has now been firmly established.

PROF. R.S. RAMAKRISHNA

PROF. S. WIJESUNDERA

16.03.1978

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English

2. (I). Guidelines for the preparation of national papers a/

The Preparatory Committee for the United Nations Conference on Science and Technology for Development decides to adopt the following guidelines for the preparation of national papers :

INTRODUCTION

1. The United Nations Conference on Science and Technology for Development is to be convened in August 1979. National papers, to which these guidelines apply, should reflect comprehensive points of view regarding each item and sub-item of the Conference agenda, b/ except for those specific points where a broader view may be appropriate in the light of economic co-operation/ integration agreements entered into by countries. Such papers should provide the basic material for formulating the joint documents during the preparatory period for the Conference.c/

2. The process of their preparation is to be the essential instrument of the Conference in bringing about the strengthening of national capabilities for the application of science and technology to achieve the degree of national self-reliance called for in the new international economic order. The Conference secretariat will be ready on request and assist in this process.

I. OUTLINES FOR NATIONAL PAPERS

A. Contents

3. The contents of the national papers should be in accordance with the topics listed in the Conference agenda, namely:

"1. Science and technology for development :

(a) The choice and transfer of technology for development;
(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries;
(c) Methods of integrating science and technology in economic and social development;
(d) New Science and Technology for overcoming obstacles to development;

2. Institutional arrangements and new forms of international co-operation in the application of science and technology:

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a/ Adopted by the Preparatory Committee at its 12th meeting (86th meeting of the Committee on Science and Technology for Development) on 14 February, 1977.

b/ See Economic and Social Council resolution 2028 (LXI), para 3, Sect.I.

c/ See Economic and Social Council resolutions 2028 (LXI), para 3, Sect.II. 3, and 2035 (LXI).

(a) The building up and expansion of institutional systems in developing countries for science and technology;
(b) Research and development in the industrialized countries in regard to problems of importance to developing countries;
(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development;
(d) The strengthening of international co-operation among all countries and the design of concrete new forms of international co-operation in the fields of science and technology for development;
(e) The promotion of co-operation among developing countries and the role of developed countries in such co-operation.

3. Utilization of the existing United Nations system and other international organizations :

Utilization of the existing United Nations system and other international organizations to implement the objectives set out above in a co-ordinated and integrated manner".

B. Basic guidelines

4. The introduction of the national papers should contain a statement on the scope and objectives of the paper, very consise sketches of the contents of each section of the paper and specifications of any major contentions or hypotheses put forth in the paper. The key institutions involved in writing the paper could be included.

5. The above items and sub-items should be dealt with in such a manner that the identification and diagnosis of problems and pertinent recommendations for concrete solutions should form an integral part of the national papers. To this end, it is recommended that each sub-item should be dealt with as far as possible in accordance with the following framework :

(a) The country's understanding of, and commitment to, the application of science and technology for development;
(b) The country's perceived and actual strategy of integrating science and technology with economic and social development;
(c) The obstacles experienced by the country in carrying out (a) and (b) above;
(d) Illustrations of any new scientific and technological developments which, if properly applied, hold promise for development;

As far as possible, these recommendations should be based on considerations of a national and regional nature which ultimately call for co-ordinated action among developing countries at the inter-regional level. In addition, adequate emphasis should be placed on the co-operation required of the developed countries for

concrete action at the world level.

6. In their analysis, the documents should reflect the totality of the scientific-technological experience of the respective countries, using a sectoral approach when necessary for the purpose of illustration.

7. These analyses should take into consideration such aspects as :

(a) The role of modern science and technology in the socio-economic development of a particular country;
(b) The main principles of scientific policy of a particular country and the basic directions of science and technology for development;
(c) Building up and strengthening scientific and technological potential, improving infrastructure and administering science as an organizational system.

8. In addition to the general description provided for each sub-item "subject areas" should be chosen to illustrate in detail the nature, the consequences, the scientific and technological implications and the possible solutions to the problems identified therein. The subject areas developed in accordance with Economic and Social Council resolution 2028 (LXI) should not be regarded as constituting regional or inter-regional priorities and not necessarily even as national priorities.

C. Specific guidelines for approaching sub-items of agenda items 1, 2 and 3

9. The guidelines to be followed in approaching sub-items of agenda items 1, 2 and 3 are shown below :

1. Science and technology for development :

(a) The choice and transfer of technology for development;
(b) Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for the development of all countries, particularly for their use in developing countries.

Sub-items (a) and (b) should be considered individually and together in terms of the following points, including the linkages between national development plans and programmes and international technological relations, as well as the factors which create technological dependency :

(i) The state of technological dependency and analysis of the factors which increase or decrease such dependency and of the various degrees of technological dependency. Analysis of the difficulties encountered in the processes of transfer and selection of technology, and of the determining factors in the transfer of technological capacity and the importation of technology. The analysis should take into consideration the need to strengthen the capabilities of developing countries

to choose and adapt technologies in accordance with their national policies and priorities, particularly considering various relevant factors, for example, the practices of transnational corporations, technological monopolies, the barriers to the flow of advanced and proprietary technology, limited technological infrastructures and so on;

(ii) Assessment of national measures taken in the context of (a) and (b), particularly measures taken to rationalize imports of capital goods, to promote scientific and technological information systems, to develop extension services capabilities on the part of research institutes, consulting firms and technology development enterprises, including those necessary for the adoption of integrated national policies for technology transfer and development and those necessary for co-ordinating the evaluation and negotiation of technologies;

(iii) From the country's experience, analysis is to be presented with regard to the following (and other) obstacles which have impeded the formation and/or attainment of the country's intension to apply science and technology to development:

a. Lack of appreciation of the role of science and technology in development;
b. Lack or inadequacy of a scientific and technological infra-structure;
c. Lack of access to scientific and technological information;
d. Inadequate contact between endogenous research and development and technology users;
e. Inadequate or unsuitable education and training;
f. Emigration of scientific and technical manpower ("brain drain");
g. Lack or inadequacy of planning;
h. Lack of adequate criteria for the choice of technologies that are appropriate to the development objectives of the country;
i. Shortage of entrepreneurs and managerial skills;
j. Unsuitable national or international institutional systems for science and technology;
k. Insufficient financing resources (domestic or foreign exchange) for investment;

(iv) The formulation of appropriate recommendations to solve the stated problems through actions at the national, regional, inter-regional or global level.

(c) Methods of integrating science and technology in economic and social development;
(d) New science and technology for over-coming obstacles to development.

Sub-items (c) and (d) should be considered individually and together putting emphasis on the following :

(i) A detailed analysis of the present state of technological capability, the application of technology to all sectors of the economy, in particular to the production sectors, and science and technology policy as an integral part of the over-all national planning process;

(ii) An analysis of the national measures adopted and envisaged by each country in order to :

a. Enhance the capabilities of technological supply from both internal and foreign origin;
b. Promote the application of science and technology for rural development;
c. Stimulate the demand for local scientific and technological output (technology plus personnel) within all sectors of the national economy, so as to make optimum use of local scientific and technological capacity;
d. Foster, the role of basic science, applied science, engineering, social science, experimental development and technological services and the balance between the resources devoted to them;
e. Foster the role of extension services;
f. Foster approaches to overcoming economic, social and environmental problems created by newly introduced technologies;
g. Promote the interaction between the scientific and technological systems and other systems, particularly the sectors of production;
h. Popularize science and technology with emphasis on bringing about a change in attitudes towards the use of science and technology in the development process;

(iii) A discussion on new science and technology for promoting development with specific examples of new and longer-range scientific and technological developments, which, if properly applied, hold promise for development;

(iv) Recommendations to facilitate the short-range and long-range solutions of concrete problems as they are detected, paying particular attention, inter alia, to:

a. Those measures directed at ensuring a faster substitution of foreign technologies by those that may be generated by local scientific and technological capacity;
b. Mechanisms for the control and selection of technology;
c. Mechanisms to regulate and canalize foreign investment as devices for the transfer of technology;

d. Measures to facilitate the unpackaging of technology;

e. Measures to regulate industrial property.

2. Institutional arrangements and new forms of international co-operation in the application of science and technology :

(a) The building up and expansion of institutional systems in developing countries for science and technology.

Sub-item (a) should be considered individually, placing emphasis on :

(i) The national conceptualization of the scientific and technological systems of each country;

(ii) The diagnosis of the current national situation with regard to the specific sub-item involved. Assessment of the scientific and technological infrastructure capacity as typified by economic and social research areas;

(iii) The measures adopted by each country to solve the problems thus described;

(iv) The role played by international co-operation in the solution of problems faced by the external sector in the developing countries' economies that limit development of national systems of science and technology, describing possible actions that should be taken in the short term, medium term and long term in order to use to the maximum the benefits of such co-operation;

(v) The elaboration of measures taken to ensure the optimal use of human resources; promotion of the training and continued improvement of the technical experts needed for the development of the national scientific and technological system; and formulation of policies directed at curbing the exodus from the developing countries of trained personnel;

(b) Research and development in the industrialized countries in regard to problems of importance to developing countries.

Sub-item (b) should be considered individually, placing emphasis on the following :

(i) The national papers prepared by industrialized countries should include a description of the current status of their respective scientific and technological potentials with particular emphasis on quantitative data wherever feasible about :

a. The direction given to such potential in the context of national socio-economic development objectives;

b. The identification and wherever possible the classification of these scientific and technological activities of benefit to the developing countries;

c. The trends in levels and kinds of resources applicable in various ways to solving national, regional and world-wide problems, and particularly those of developing countries;

d. The distribution of such potential by economic sectors;

e. Investments in scientific and technological activities applicable to development problems in relation to and/or in terms of gross domestic product;

(ii) As a result of this general description, measures taken by each developed country to facilitate access of developing countries to the research and development programmes that are relevant to the solution of their development problems should be listed; new measures to improve the existing situation should also be specified;

(iii) Special reference should be made to the role that international co-operation could play in enhancing the participation of developing countries in the scientific and technological development efforts carried out in industrialized countries, including the role in this respect of international financial co-operation.

(iv) Developed countries should analyse the relative success or failure of their respective policies of international development co-operation as they affect efforts of developing countries to build endogenous science and technology capabilities;

(v) In the context of their national papers the developing countries should submit comments on this sub-item. The comments should provide analytical explanations on encouraging research and development in and by industrialized countries to be oriented in new, more effective and practical ways towards the solution of concrete development problems in the developing countries.

(c) Mechanisms for the exchange of scientific and technological information and experiences significant to development;

(d) The strengthening of international co-operation among all countries and the design of concrete new forms of international co-operation in the fields of science and technology for development;

(e) The promotion of co-operation among developing countries and the role of developed countries in such co-operation.

In the discussion of the above sub-items, the following should be achieved :

(i) A general description of current mechanisms for exchanging scientific and technological information on a national regional, inter-regional and world-wide basis should be given ;

(ii) A general review should be prepared of current technical scientific and technological co-operation schemes on a subregional, regional, inter-regional and world-wide basis;

(iii) As a result of the above descriptions, a diagnosis from a national perspective of the effectiveness of such schemes as tools to strengthen and develop technological capabilities in developing countries should be prepared;

(iv) Special reference should be made to the role that co-operation among the developing countries could play through the establishment of joint action schemes that make possible:

a. The establishment of joint programmes in the field of scientific and technological activity to solve specific problems of three or more countries;

b. The introduction, and the joint use, of the established infra-structures with a view to making maximum use of them;

c. The organization of the exchange of information and experience, particularly as regards the scientific and technological capacity of each country;

d. The organization of systematic information programmes;

e. The formation of systematic training programmes for specialized personnel;

f. The strengthening of the negotiating capacity of developing countries regarding the acquisition of technology, including the designing of a joint negotiating model;

(v) National points of view on the role of developed countries in support of collaborative programmes and projects among developing countries should be defined, including those activities regarding the encouragement of imports of technology from developing countries, financial co-operation for the technological development programmes arising from the co-operation schemes among developing countries; training programmes for scientific and technical personnel in developing countries; and access to their scientific and technological information systems;

(vi) Recommendation should also be made concerning the ways and means to strengthen international co-operation

among all countries, especially between developed and developing countries, including if appropriate proposals for new schemes and mechanisms.

3. Utilization of the existing United Nations system and other international organizations.

Utilization of the existing United Nations system and other international organizations to implement the objectives set out in Economic and Social Council resolution 2028 (LXI), paragraph 3, Section I, in a co-ordinated and integrated manner.

Recommendations should also include measures that should be adopted to strengthen co-ordination, increase efficiency of existing mechanisms, or establish new action mechanisms, or to restructure international organizations in the field of scientific and technological co-operation for the benefit of all countries and in particular, developing countries.

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PROBLEMS OF NATIONAL IMPORTANCE

1.	Name of Country	:	Sri Lanka
2.	Population	:	13.180 m. (1973 mid year estimate)
3.	Area	:	25,332 sq. miles
4.	Rural Population	:	77.6%(1971 Census)

5 and 6

Sri Lanka's most immediate problems are unemployment and economic stagnation. Government emphasis has recently been placed on the regeneration of the rural society and the development effort as envisaged will be geared to the expansion of employment opportunities in the rural economy. It aims to bridge the gap in disparities in income and living standards between the higher and lower income groups.

The government's main objective is the achievement of a growth in the gross domestic product of about 6% per year on the average. This rate of growth is considered feasible, within the resources likely to be available for development.

The development programmes of the country are thus geared to

- the maximum use of labour - a resource available in abundance reduction in food imports by the immediate development and diversion of agriculture.
- the full and efficient utilization of existing Industrial Plant
- the expansion of selected industries and investment in industrial projects on the basis of national priorities.
- the development of an investment policy, which makes the best use of the limited foreign exchange which is available.
- the development of a new export sector
- the involvement of the people in the formulation and execution of development projects at the local levels.

Agriculture: Measures to strengthen the agricultural sectors have also recently been considered. The priority given to agricultural development is based on the fact that the agricultural sector contains a very large potential for increase in output from existing capacities, with marginal capital input.

Further, in this sector, there is scope for increasing the export of both traditional and new export crops. It is envisaged that this development in agriculture will result in substantial increases in rural incomes and contribute significantly to the income distribution objective of the government.

Industry : Emphasis has also been placed on the development of the small-scale industries. Industrialization will be based on the development of the labour-intensive technology. The Industrial Research Programme is based on :

- the utilization of the country's resources, mineral and vegetable
- the improvement of existing technology in specific areas, and the development of new technologies
- the utilization of agricultural and industrial wastes and by-products.

Export Strategy: Sri Lanka's export strategy includes, the development of a number of new export oriented crops, while traditional exports will be the base for a new export drive. Two other facets of the export strategy will be the creation of an export processing zone and a concentrated effort at the expansion of tourism.

7. A Lack of trained personnel is one of the major constraints to achieving the development goals of the country. Organizations like ICSU and COSTED could help by the provision of facilities for younger scientists and technologists to -

(i) participate in short term seminars, workshops, symposia etc., at which current research in different subject areas is discussed

(ii) the COSTED Travel Grant Programme has already provided some younger scientists with the opportunity to attend such meetings. Expansion of this programme could minimise the problem of the 'Brain-Drain' - a problem of considerable importance to these countries.

8. Sri Lanka is mainly agriculture and her chief resources are cash crops. eg. Tea, Rubber & Coconut. Mineral resources have also gained considerable importance in recent times. The fisheries of the country, both coastal and inland, are another major resources.

GUIDELINES FOR THE PREPARATION OF NATIONAL PAPERS

(By the UN Preparatory Committee for UNCSTD)

The National Papers are expected to follow the 3 Agenda Items which are as follows -

Agenda Item 1 - Science and technology for Development.

(This corresponds to Chapter II of the Draft National Paper, pages 4 - 23)

Agenda Item 2 - Institutional arrangements and new forms of international co-operation in the application of science and technology.

(This corresponds to Chapter III of the Draft National Paper, pages 24 - 30)

Agenda Item 3 - Utilization of the existing United Nations system and other international organizations.

(This corresponds to Chapter IV of the Draft National Paper, pages 30 - 34)

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To Heads of Departments & Corporations in the
Ministry of Industries and Scientific Affairs

UN CONFERENCE ON SCIENCE & TECHNOLOGY FOR DEVELOPMENT

Your attention is requested to the Circular ECN.A/01/470 of 20th October 1977 on the abovesubject addressed to all Secretaries to Ministries by the Secretary, Ministry of Planning & Economic Affairs, and which was forwarded to you for necessary action.

It has now been decided to hold a few conferences, each representing a group of related areas, on the application of Science & Technology for Development. The objectives of these meetings would be as follows:

1. to identify the main areas where Science & Technology have a vital role to play in achieving national development goals (see annexed list for possible subject areas)
2. to identify and discuss the major constraints (trained and manpower, finance, physical resources etc.) that hamper the application of Science & Technology in achieving the desired goals of development
3. to map out the broad strategy for the application of Science and Technology for Development in the light of the observed constraints and bottlenecks

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4. to appoint a Co-ordinating Committee for monitoring the preparation of the national paper

5. to appoint panels for the preparation of the national paper on the different subject areas that are finally decided on.

A conference will be held at the Board Room of the National Science Council* on to discuss the application of Science & Technology in relation to

I shall thank you if you could either be personally present or send a representative to attend this conference.

Secretary
Ministry of Industries & Scientific Affairs

LCAdeSW/ms. 5/228

*National Science Council of Sri Lanka
47/5, Maitland Place,
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