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HISTORICAL LANDMARKS IN THE ORIENTATION OF SCIENCE PLANNING IN SRI LANKA

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Abstract

The historical progress of science planning in Sri Lanka follows the general pattern in which the initial phase was institution-building to promote scientific research. The unique feature during the first two decades of this century was the assemblage of foreign scientists of exceptional qualities, who dominated the fields of agricultural and medical sciences bringing world-wide reputation to the country. This initial thrust resulted in the establishment of an exceptionally good infrastructural base for scientific research.

An event of significance just prior to independence was the formation of the Chemical Society of Ceylon, which initiated the formation of the Ceylon Association for the Advancement of Science, and also negotiated with the colonial administration to get recognition for a high level Scientific Advisory Committee.

The years that followed independence were characterized by the efforts to indigenize science and create an autonomous apex organization for promotion of research and science planning. The result was the establishment of a two-tier science planning structure in which one organization assumed ministerial ranking.

The final section traces the efforts made by governmental and non-governmental organizations to initiate the process of science planning in Sri Lanka.

The Global Scene

A policy on scientific research formulated in relation to the development objectives of the country, constitutes a major component of a policy on science. Hence the development process for institutionalization of scientific research, is a significant aspect in the history of national science planning. It is interesting to note that till about the end of the last century, when a few industrial ventures in the West set up small professional research laboratories for product development, there was hardly any national efforts to organize industrial research (1).

However, in the field of agriculture, the thrust generated by the new advances in chemistry during the early part of the last century, led to extensive outdoor experimentation in search for efficient crop production systems. Such experimentation which demanded organized effort and planned deployment of essentially private finances and land, ultimately led to formalized scientific research. This was clearly seen in the formation of some of the best known centres of research in England and France.

Thus the classical experimental work of the celebrated partnership of Lawes and Gilbert in the 1840's, in the family estate of Sir John Lawes, paved the way for the creation of the famous Rothamsted Research Station in England (2).

The present evidence therefore seems to indicate that until a high level of professionalism was reached towards the latter part of the nineteenth century, and scientific research activities were institutionalized, there was hardly any signs of either an explicit or implicit expression of science planning, even in the Western World.

Possibly the earliest efforts in national science planning was in the Soviet Union, which began collecting and publishing data on scientific and technological activities from the early 1930's(1). In the United States, it was not until 1953 that the first official survey was made of the total resources deployed on professional research and development. These were evidently the first significant and conscious efforts to initiate the science planning process at national levels. Since then both developed and less developed countries have strived with varying degrees of success to harness, transliterate and assimilate the fruits of science and technology for the benefit of their peoples through planned programmes.

In the case of less developed countries, many of which were under colonial domination till about the middle of the present century, the non-existence of a mechanism for co-ordination and planning of science was a major setback. In these countries therefore the initial thrust was for the creation of an appropriate research council for planning and co-ordination of scientific activities. Such organizations when newly created invariably passed through a period of intense activity during which time they evolved, transformed or even re-created their form and structure, until a stable state was reached.

Even in this state, research councils' functioned purely as advisory bodies, or at most operated at a lower functional level in national science planning. Realization of this problem invariably led to the creation of a cabinet-ranking organization which was either a ministry for science itself or a planning commission. In some countries the creation of a research council preceded the formation of the high level Planning Commission or Ministry, while in others it has been the reverse. It has thus been a common feature in the development history of science planning that at least two bodies should be created at different functional levels, one of which assumes cabinet ranking. Table 1 below summarizes the formation and functional levels of national science planning organizations in some Third World Countries.

Scene in Ceylon during Colonial Times

Although Ceylon had been under colonial domination for nearly 450 years, it was during the British rule that a significant endogenous basal structure for science began to appear. Possibly the earliest event of scientific importance in Ceylon (later known as Sri Lanka) was the establishment of the Royal Botanic Gardens at Peradeniya in 1822, which concentrated on the selection, introduction and acclimatization of indigenous and exotic species of flora.

TABLE 1

Establishment of National Science Planning Institutions in some Developing Countries (During 1950-1970) a. b. c.

<i>Country</i>	<i>Science Planning Organizations (a) First (High) Functional Level (b) Second (Low) Functional Level</i>	<i>Date of Establishment</i>	<i>Reporting Authority</i>
Burma	(a) Ministry for National Planning (b) Research Policy Direction Board	— 1965	Chairman, Revolutionary Govt. Ministry for National Planning
Cameroon	(a) Ministère, du Plan et du Développement	1966	Président de la République fédérale Ministère du Plan et du Développement
	(b) Office National de la recherche scientifique et technique	1966	
Ghana	(a) Ministry of Economic Planning	—	—
	(b) Ghana Academy of Sciences	1963	
India	(a) Scientific Advisory Committee to the Cabinet	1956	Cabinet of Ministers
	(b) Department of Science and Technology	—	Cabinet of Ministers
Indonesia	(a) —	—	—
	(b) Indonesian Institute of Sciences	1967	
Jamaica	(a) Ministry of Finance and Planning	—	Cabinet of Ministers Ministry of Finance and Planning
	(b) Scientific Research Council	1960	
Kenya	(a) Ministry of Economic Planning and Development	—	—
	(b) —	—	
S. Korea	(a) Ministry of Science & Technology	1967	President President
	(b) Economic and Scientific Council	1963	
Madagascar	(a) Commissariat général au Plan	1960	Présidence de la République Vice-Présidence du gouvernement
	(b) Comité national de la recherche scientifique et technique	1961 (re-organized 1963)	
Nigeria	(a) —	—	—
	(b) Nigerian Council for Scientific and Industrial Research	1966	
Pakistan	(a) Scientific and Technological Research Division	1964	Presidential Secretariat
	(b) National Science Council	1961	Scientific and Technological Research Division

TABLE 1 (Continued)

**Establishment of National Science Planning Institutions in some
Developing Countries (During 1950—1970) a, b, c.**

<i>Country</i>	<i>Science Planning Organizations (a) First (High) Functional Level (b) Second (Low) Functional Level</i>	<i>Date of Establish- ment</i>	<i>Reporting Authority</i>
Philippines	(a) National Science Development (b) —	1958 —	President —
Sri Lanka	(a) Ministry of Scientific Research and Housing (b) National Science Council	January 1968 November 1968	Cabinet of Ministers Ministry of Scientific Research & Housing
Turkey	(a) Scientific and Technical Research Council (b) —	1963 —	Prime Minister —
Zambia	(a) Office of National Development and Planning (b) National Council for Scientific Research	1965 1967	Government Autonomous

- (a) *World Directory of National Science Policy Making Bodies.* (1968). Vol. 2 Asia and Oceania, UNESCO, Paris.
- (b) *World Directory of National Science Policy Making Bodies.* (1968). Vol. 3 Latin America, UNESCO, Paris.
- (c) *The Promotion of Scientific Activity in Tropical Africa* (1969). Transactions of the Symposium on Science Policy and Research Administration in Africa, Cameroon 1967, 38-39 UNESCO, Paris.

During this early British period, Ceylon was not an economically useful acquisition until the commercially viable plantation sector was established in the 1830's. It was first coffee, rubber and coconut, and later when the coffee plantations were destroyed by a fungal disease in the 1860's tea took its place. The progressively increasing stress on an export-oriented plantation sector, naturally led to the decline of the traditional rural agricultural systems for food and subsidiary crops. This is clearly seen in the reports and papers published in the '*Tropical Agriculturist*' during the latter part of the last century. Incidentally, the '*Tropical Agriculturist*' founded in June 1881 (and published by A. W. and J. Ferguson), is said to be the oldest agricultural journal in the East, and certainly it is the oldest journal in the world devoted to *tropical* agriculture (3). Its earlier volumes traced the progress and setbacks in agricultural development in Ceylon, and later began to record the scientific work of the Royal Botanic Gardens, the Agricultural Society (founded in 1905) and the Agricultural Department (established in 1912).

Previously the establishment of the Colombo Museum in 1876 with separate sections in biology and entomology, followed by a section on geology, mineral science and petrological science in 1877, set the stage for a new scientific orientation in Ceylon (4).

In 1880, with the appointment of Henry Trimen as Director of the Royal Botanic Gardens, work of high scientific merit were carried out. His treatise on the "Flora of Ceylon", the first volume of which appeared in 1893, remains a masterpiece in taxonomic botany. In 1896 after T. C. Willis succeeded Trimen as Director of the Royal Botanic Gardens, some of the pioneering experiments on rubber tapping were carried out (5). In 1901, Willis established the experimental station at Peradeniya, and in 1903 the Dry Zone Research Station at Maha Illuppallama was inaugurated.

These were indeed the first attempts to institutionalize research in Ceylon, although still without clear policy guidelines or a research orientation.

The formation of the Ceylon Agricultural Society in 1905 was an important event, because it was destined to be the nucleus of the future Department of Agriculture. One of its first tasks was to take over the publication of the *Tropical Agriculturist* and transform it into a truly scientific journal.

It is said that between 1901 and 1912 Willis had assembled a brilliant team of scientists comprising of a mycologist (T. Petch), an agricultural chemist (M. K. Bamber), an entomologist (E. E. Green), a horticulturist (H. F. Macmillan), an animal husbandry specialist (G. W. Sturgess), a rubber and cocoa specialist (H. Wright) and a coconut specialist (N. K. Jardine), whose scientific contributions were considered to be of the highest calibre by any standard (5).

By this time the country's reputation in the world of tropical agriculture was such, that a strong lobby began for the establishment of an "Imperial College of Tropical Agriculture", a proposal which later materialized in Trinidad (5).

At the time of Willis's retirement in 1912, the stage was set for the establishment of the Department of Agriculture with separate divisions for botany, mycology, entomology, agricultural chemistry etc. Thus for the first time research, extension and other scientific services in the field of agriculture came under one administrative authority, although a few enthusiastic individuals like the Gate Mudaliyar A. E. Rajapakse were not to be deterred to continue single-plot experimentation, independently on private lands (6).

During the first decade of this century two other important events occurred. The first of these was the inauguration of the De Soysa Bacteriological Institute on the 31st of January 1900 (7). Although two well known Ceylonese doctors held the post of Acting Director of this Institute between 1900 and 1903, it had to await the arrival of an Italian physician by the name of Aldo Castellani (later Sir Aldo Castellani) to take over as its first permanent full-time Director. Castellani had been a brilliant physician and researcher, whose contributions had received world wide acclaim. It is recorded that prior to his premature retirement in 1915, Castellani had made a strong but unsuccessful bid to establish a Medical Research Institute (7).

As much as the period 1900 to 1912 has been described as the "Golden Age" in the agricultural sciences (5), the period 1900 to 1915 has been referred to as the "Golden Era" in the history of progress of medical science in Ceylon (7). Yet the circumstances which attracted such a star-studded team of scientific talent from overseas to this small Island Colony remains enigmatic.

The second important event was the establishment of the Mineral Survey in 1903 with Ananda Coomaraswamy as the Principal Mineral Surveyor. Its main function was the examination of economic mineral resources. However, over the years its functions changed from mineral surveys to geological surveys and geological mapping, which finally resulted in its name being changed to the Geological Survey Department in 1962 (8).

Another significant development during this time was the initiative taken by the British authorities to set up research institutes for the plantation sector. These were of course mainly to serve the British economic and trade interests, since the research policies of these institutes were very much influenced by what were later recognised as the "Scientific Advisory Committees", for tea and rubber, based in London.

The first such institute to be established was the Rubber Research Institute (RRI), which came into existence at Agalawatte in 1910. This was followed by the Tea Research Institute (TRI) at Talawakele in 1918, and the Coconut Research Institute (CRI) at Lunuwila in 1928. In the case of the TRI and RRI, the divisional heads and the Directors' were usually British nationals, while at the CRI the Director was always a non-national.

Yet it is noteworthy that in the early 1930's, these research institutes were instrumental in commencing probably the first ever long term statistically designed field experiments of their kind anywhere in the world. The classical experiment on coconut laid out by M. L. M. Salgado in 1935 stood for 30 years while the corresponding experiment on Tea, which was started by T. Eden a few years earlier remained for even a longer period (9, 10).

As opposed to the situation in the plantation sector, in the other fields of agricultural research, the highly qualified Ceylonese scientists worked with dedication and honour at the frontiers of science (11). Induced by shortages of food caused by two devastating world wars, these scientists turned their attention to rice cultivation, concentrating mainly on breeding trials for the selection of high yielding purelines.

In the field of medical sciences too major changes took place during the period 1920 to 1945, especially in relation to institute - building and organization of scientific work. The primary function of the Bacteriological Institute was to carry out routine medical tests, and in order to widen the scope of its activities a mycological laboratory and an entomological laboratory were established in 1922. In 1936, the Pasteur Institute which had been set up in 1918, was also absorbed into the Bacteriological Institute, and two years later a department of nutrition was added. In 1942, a department of parasitology was set-up and in 1944 the Department of Blood Plasma was added. Finally by March, 1946, due to the efforts of Dr. A. Nimalasuriya, the first Ceylonese Director of the Institute, the Bacteriological Institute was redesignated as Medical Research Institute (MRI). By then the MRI possessed the nucleus of practically all sections of medical laboratory disciplines which were essential to back-up the clinical work of the network of hospitals (7).

Thus by this time, despite the trauma of a colonial administration, and a British dominated framework for research, an alien scientific culture had become firmly naturalized in the country, although still without being fully indigenized. It is against this backdrop that the formation of the first Ceylonese-dominated scientific body in the country becomes significant. Following a suggestion made by N. G. Baptist, the chemists of the day assembled on the 25 of January 1941 to form the Chemical Society of Ceylon, with A. Kandiah as its first President, and A. A. Hoover and M. L. M. Salgado as Joint Secretaries (12).

The formation of the Chemical Society of Ceylon was an epoch-making event for more than one reason. It is recorded that in December 1942, just two years after its formation, the then British Governor of Ceylon had given formal recognition to the appointment of the "Scientific Advisory Committee", named by the Chemical Society of Ceylon (12). Although the main functions of this Committee were to advise the Government on matters pertaining to industrial development and research, it is not known how long it functioned, and how effective it had been as a scientific advisory body. Nevertheless the recognition granted to it is a unique achievement for a newly formed professional body.

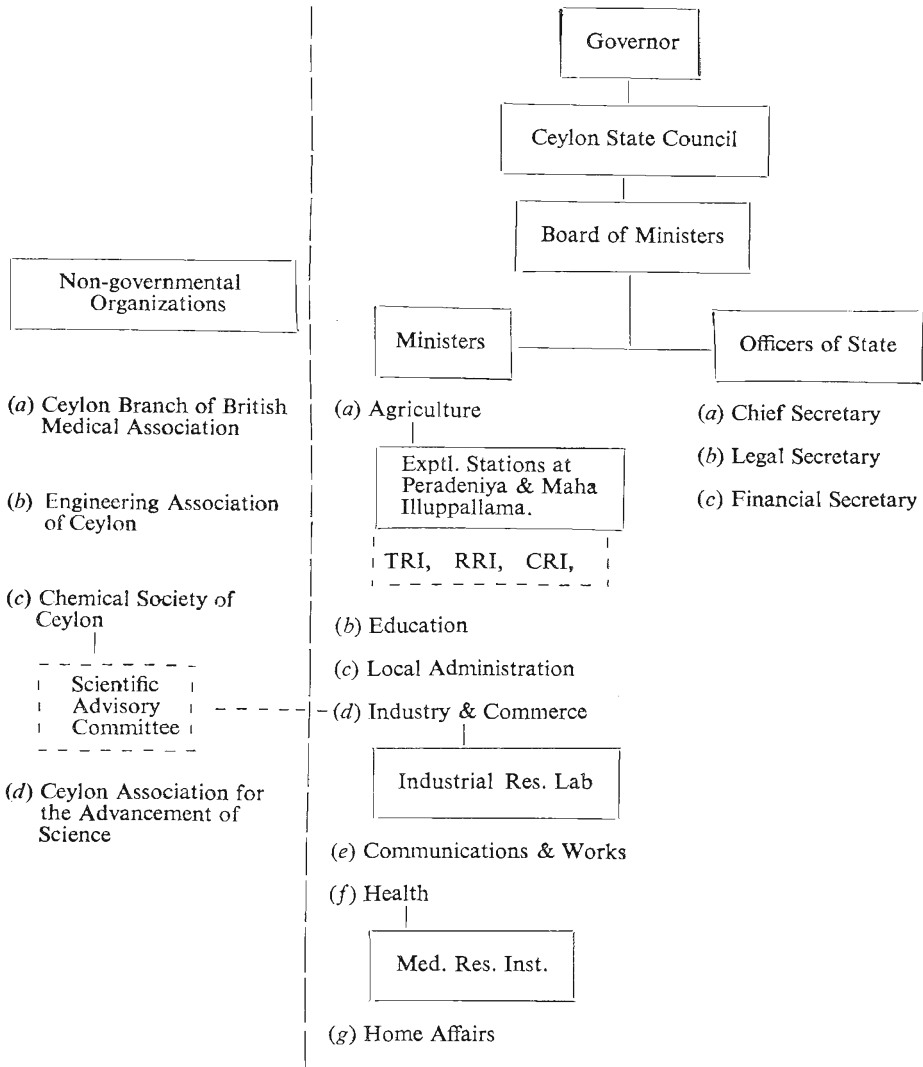
Secondly, in December 1943, on a suggestion made by D. H. Wadia, a former President of the Indian Science Congress, the Chemical Society of Ceylon spearheaded the formation of the Ceylon Association of Science (12), which in July 1944 was then constituted as the Ceylon Association for the Advancement of Science (CAAS). The ability of the Chemical Society of Ceylon to bring together scientists, engineers, medical personnel and social scientists under one banner was indeed a remarkable achievement.

Unlike the Chemical Society of Ceylon, the Engineering Association of Ceylon (Est. 1906), and its counterpart in the medical profession, had their origins in truly colonial tradition, with domination by non-nationals during the initial phases, and remaining so for quite sometime during their formative stages. The Medical Association was established on the 26th of February 1887 as the Ceylon Branch of the British Medical Association, and retained its links with the British parent body for 70 years (till 1957). On the other hand, in the Engineering Association of Ceylon, key positions of the Society were held by non-nationals till the late 1930's. Hence it is presumptive that at least during the first four decades of this century, these organisations while promoting professional interests, may have knowingly or unwittingly sustained colonial interests. It is in this context that the role of the Chemical Society of Ceylon in striving for a indigenous self-reliant scientific structure becomes relevant.

Thus when Ceylon gained independence in February 1948, a creditable scientific organizational framework had been created which was not only capable of producing high quality research in the key areas of medical and agricultural sciences, but was also geared to draw expertise and professional advice from independent scientific bodies. This organizational structure which thus had a rudimentary mechanism for planning of science, may be provisionally depicted as in Figure 1.

FIGURE 1

Diagrammatic Representation of the Administrative Structure during 1944 – 1948 Showing Linkages with Science



The Obstacle Race after Independence (1948-1969)

The formation of the Ceylon Association for the Advancement of Science in 1944 was indeed the turning point in science policy orientation in the country. Because within four years of its inauguration, it began its historical agitation to get the politicians and administrators to recognize the role of science and scientists in national development.

In a memorandum to the Prime Minister and Cabinet of Ministers in 1948, the CAAS pleaded for a Council of Scientific Research to advise, guide and draw-up policies on scientific research. This was followed by meetings with the Prime Minister and other Ministers. Such persistent lobbying forced the Government of the day to seek the assistance of the World Bank, which recommended the establishment of the Ceylon Institute of Scientific and Industrial Research (CISIR). It was their contention that the establishment of such an applied research institute would resolve the main grievances of the scientists. Although the establishment of the CISIR in 1955 was a major step forward, misrepresentation of facts by the World Bank team helped at least for the time being, to divert the attention of the scientists, and keep at a low profile the main demands of the CAAS (13).

Thus when a new government came into power in 1956, the CAAS began its agitation again by re-submitting its request for a Council of Scientific Research. Also, as an interim measure, the CAAS constituted within its organization a committee called the General Research Committee, which had as its main function the fostering of scientific and industrial research (14). In the meanwhile the Prime Minister and the then Minister of Lands who met delegations of the CAAS, agreed to consider their request, which prompted CAAS to prepare a draft Act. Although by the late 1950's CAAS followed up these meetings with interviews with the Secretary to the Treasury and also several other key administrators, interest in this subject began to fade away when the term of office of the government was drawing to a close (13).

However, during this period the State Industrial Corporations Act. No. 49 of 1957 was passed which enabled the establishment of a number of industrial corporations with state patronage. Unfortunately the non-existence of a state policy on industrial development resulted in unplanned expansion of the industrial sector.

In the plantation sector the most significant feature during this era was the sustained effort to shake off the remnants of imperial domination in the research institutes for tea, rubber and coconut. It was unfortunate that even almost 10 years after independence, Ceylonese scientists occupied only minor positions in these research institutes. Records however, show that the Boards

of Management of these Institutes were often dominated by Ceylonese nationals (15, 16, 17), being mostly the English-educated and British-trained elite from the upper strata of society, who were quite hesitant to rely on the skills of local scientists. Whether these attitudes were the result of an infliction of the "dependency syndrome" so characteristic of newly liberated nations, will no doubt remain a debatable question. In fact it might be said that if not for the efforts of a strong-willed Minister of Agriculture, who introduced sweeping changes through the Tea, Rubber and Coconut Research (Amendment) Act No. 8 of 1957, the process of Ceylonization would have taken a much longer period. The clause 10(a) of this amending Act which states that, "In the exercise of its powers, . . . the Board shall be subjected to and act in accordance with such general directions as the Minister may issue from time to time", virtually brought to an end the autonomous character of these Institutes. Although this escape route brought the desired effects, events of later times showed how, on many occasions adverse consequences resulted through misuse of authority.

In 1961 the Ceylon Association for the Advancement of Science, despite its frustration over past failures to convince the previous governments of the need to have an apex scientific organization, adopted a resolution requesting the new regime to appoint a Science Commission to investigate the facilities available for development of scientific and technological research (13).

During this period CAAS representatives had also several interviews with the Industries Ministry officials to sort out problems, until finally a Cabinet paper was prepared for the establishment of a National Research Council (NRC). The CAAS however, expressed dissatisfaction over the Cabinet proposals as it was not planned to institute the proposed Council by an Act of Parliament. During 1963 further discussions followed leading to the drafting of a fresh Cabinet paper proposing the appointment of a 5-member Science Commission as a preliminary step to the setting up of the NRC (13).

At this stage, the government sought the assistance of UNESCO to set up these organizations. The final proposals were approved by the Cabinet in November 1963, and a formal announcement was made by the then Prime Minister in December 1963, at the Annual Sessions of the CAAS (18). However, by 1964 conflicting views were evident in respect of the ministerial representations on the NRC. Further it was decided by the Prime Minister that a Science Commission was not necessary to set-up the NRC. It was also decided that a meeting of representatives from the various departments, and organizations conducting research should be convened to prepare a new Act for the setting up of the NRC (13).

A draft Act was finally drawn up, but the then Secretary to the Ministry of Food and Co-operatives who was a member of the Committee, submitted a dissenting note in which he recommended that all Ministers who had research departments under their Ministries should be ex-officio members of the Council. The CAAS representatives however, opposed this proposal, which they argued would virtually create a Cabinet Sub-committee on Scientific Research. Nevertheless the draft Act together with the dissenting note, and the CAAS reply to the dissenting note were submitted to the Prime Minister in August 1964 (13). Unfortunately as happened earlier, interest in this subject began to recede again with the approach of parliamentary elections.

This political era however, saw the creation of a major technological organization, when the State Engineering Corporation was established in 1962 under the chairmanship of Mr. A. N. S. Kulasinghe.

The Ceylon Association for the Advancement of Science by this time was convinced that their failure to persuade the government to establish a National Research Council, was linked to the retrograde activities of the non-technical state officials in the Planning Committee (13). The conflicts that arose between the CAAS representatives and the representatives from Ministries with regard to the draft Act for the establishment of a NRC, no doubt stalled an early decision on the matter.

Thus during April-May 1965 negotiations began again with the new government that came into power. But amidst the main confusion that prevailed in relation to some of the provisions of the draft Act, the new Prime Minister declared in December 1965, that he intends to set up a new Ministry for Research and Technical Education(19).

Significantly however, the Ministry of Planning and Economic Affairs, at this stage stepped in to resolve the main areas of conflict in the draft Act, by submitting fresh proposals to the CAAS. Many of these new proposals were received favourably by the CAAS, though in respect of the chairmanship of the NRC, the CAAS was still not satisfied and hence requested a discussion with the Prime Minister (13).

While these discussions were taking place, the CAAS itself went through a transformation, when it was incorporated by an Act of Parliament in April 1966.

It has to be noted that although the government had proposed the setting up of a Ministry for Scientific Research, CAAS was not in favour of substituting such a Ministry for the proposed NRC. It was their belief that the NRC should be an autonomous body, especially in respect of matters which

did not impinge on ministerial affairs (13). However, regardless of other matters, the government implemented its proposal by setting up a Ministry of Scientific Research and Housing in January 1968. This move was followed up later by the establishment of the National Science Council (NSC) by Act No. 9 of 1968, as an alternative to the previously suggested National Research Council. The NSC was established as a statutory body under the Ministry of Scientific Research and Housing, and unfortunately therefore fell far short of the expectations of the scientific community, which hoped for an autonomous scientific organization shorn off of the usual administrative and financial bottlenecks. Nevertheless these two epoch-making events brought to a close a 20 year period of negotiations and consultations in which periodic set-backs kept the fortunes fluctuating between hope and despair.

In the following year, the Ministry of Industries established the Industrial Development Board, by Act No. 36 of 1969. It was essentially to be the extension arm of the Ministry with its specific functions including the encouragement, promotion and development of industries in Sri Lanka.

The National Science Council commenced functioning in October 1969, with Sir Nicholas Attygalle, Vice-Chancellor of the University of Colombo as its first Chairman. The same year another important scientific institution was created, when by Act No. 19 of 1969 the Atomic Energy Authority was established. Its main function was to co-ordinate all activities relating to the use of atomic energy in scientific research.

Towards Science Planning in Ceylon (1970 onwards)

By 1970 many of the organizational structures required to set in motion the planning processes for science and technology in Ceylon (now renamed Sri Lanka), were well established. Sri Lanka's record for high quality scientific research in agriculture was reaching its zenith through the efforts of the crop research institutes. Research in the industrial sector was getting into gear through the efforts of the CISIR. A two-tier science planning organizational frame work, consisting of a Ministry for Science and a National Science Council had been established to co-ordinate and plan scientific activities on the one hand, and to advise the government and promote curiosity-oriented basic research on the other hand. A host of other institutions such as the IDB, Atomic Energy Authority, and the State Engineering Corporation had been created to facilitate the utilization and transfer of scientific and technical know-how. Yet at this stage, the efforts to demonstrate the role of science in economic development (21) and the need for conscious support to research (20) failed to generate the necessary enthusiasm to initiate a science plan.

This was partly because the organizational framework had not matured sufficiently and motivated to move in this direction, and partly due to the absence of three major policy instruments which facilitate the formulation of a science plan. The three components are: (a) guiding principles for scientific and technological research, (b) reliable data on the country's scientific and technical resource potential, and (c) informative material on the effects of scientific interventions, through case studies and policy analysis.

However, by the early 1970's initial moves to assess the country's resource potential were evident. The first such attempt to evaluate the scientific resources in Sri Lanka was the survey on public sector expenditure on research and development carried out by the CISIR in 1970 for the period 1955-1965(20). This was followed in 1972 by a survey on scientific and technical manpower in Sri Lanka carried out by the CAAS (22).

Simultaneously in 1970, the National Science Council commenced one of its most important functions, *viz.*, the award of grants for scientific research. In the first year the Council recommended 23 grants to the new Ministry of Industries and Scientific Affairs for allocation of funds (23). Thus for the first time in Sri Lanka, funding became available for what may be referred to as curiosity-oriented basic research. Although the National Science Council's contribution to the total research budget of the country was less than 5 percent, the non-restrictive and open-ended character of the scheme made it a potential source of information on the research orientation of the Sri Lankan scientists.

However, by 1972 it became clear that the National Science Council as constituted, was not effective to carry out its main functions, primarily due to the fact that it had virtually no links with the Ministries which conducted scientific research (24).

Hence in 1975, major amendments were introduced into the NSC constitution by the Law No. 36 of 1975. By these amendments provision was made for the appointment of statutory working committees in specific areas of interest. With these changes, six committees were appointed with ministerial approval, which included a body for Science Policy Research. Thus for the first time Science Policy Research became a major area of interest at the NSC. This Committee entrusted with the task of carrying out research into science policy, organized a national seminar on Science Policy and Planning in 1976 with the hope of reviewing problems and prospects for a National Science Policy for the country (25).

Earlier in 1973 following the guidelines prepared by UNESCO, the NSC carried out the first systematically designed survey on scientific and technical manpower potential in the country. The purpose of this survey was to assess, monitor and forecast the scientific and technical manpower in the country. This survey indicated that the total stock of economically active scientists and engineers in 1973 was 6845.

In 1977, the National Science Council carried out its second major survey which included an assessment of funding for basic and applied research in the country for the 10-year period 1956-1965, and the scientific and technical manpower during 1977. These studies clearly indicated that the total research funding in the country had been gradually increasing in relation to the Gross Domestic Product, from 0.17 per cent in 1966 to 0.21 per cent in 1975 (26). On the other hand it was also revealed that the scientific and technical personnel in the country had dropped from 521 per million population in 1973 to 457 per million population in 1977 (27). The NSC's Statutory Committee on Science Policy Research which guided these surveys to study the state of science in the country, then commenced deliberations on a framework for a national policy on science and technology.

In the meantime, the Sri Lanka Association for the Advancement of Science (SLAAS) sensing that a state institution such as the National Science Council would be inhibited, and hence unlikely to be critical even responsibly of State policy, began to voice its concern. It was evident that State machinery was not often geared to seek the independent and considered views of the scientific community when major development or industrial programmes are drawn up. Hence a strong consensus began building within the SLAAS for the creation of an advisory body of scientists and engineers to provide technical guidance to the Ministries, when development programmes are initiated. There was however, a difference of opinion as to whether this advisory body should be a newly constituted committee or the existing General Research Committee of the SLAAS.

Nevertheless between 1977 and 1978, the National Science Council's Committee on Science Policy Research worked intensely to formulate a policy framework on science and technology. By September 1978 a seven-point proposal, generally described as the National Science and Technology Policy Statement was prepared and placed before the government for consideration.

This proposal which constituted the general framework of the government's policy on science and technology, was accepted and promulgated by H. E. The President in December 1978, when he addressed the 34th Annual Sessions of the Sri Lanka Association for the Advancement of Science (28, 29). The membership of the SLAAS was jubilant, although a large majority of them even to this day are unaware of its origin.

As a professional body, the SLAAS was quick to realize the significance of the development and hence sought to establish the requisite machinery to implement the proposals. Accordingly between October and November 1979, the Council of the SLAAS prepared a memorandum and met His Excellency The President to outline a package of strategic proposals to implement the seven-point National Policy on Science and Technology (30). The SLAAS also spear-headed the call for a Presidential Advisory Committee; and encouraged by the President's interest in the proposal, proceeded to name the prospective candidates to this Committee (30, 31).

Strangely however, at this stage, the idea of a Presidential Advisory Committee lost favour and the crucial move which would have indirectly conferred on SLAAS authority for strategic planning of science, was aborted. It was explained later that this was due to the planned move to create an apex organization for environmental management, and an Authority for co-ordination and management of activities pertaining to natural resources, energy and science. The disappointment of SLAAS as reflected in its subsequent memorandum to the government in late 1980 (30), has to be viewed with understanding in the light of the event which took place way back in 1942 when Sir Andrew Caldicott the then Governor of Ceylon gave recognition to the high level 'Scientific Advisory Committee' requested by the Chemical Society of Ceylon (12).

In December 1980, the General Body of the SLAAS considered a proposal to institute a new Committee, mainly to review and monitor science policy issues (31). But there were controversies, since the General Research Committee being a statutory committee could be empowered to handle these issues. Nevertheless, the senior members of the Association believed that a special high-powered committee should be established to deal with these matters, and thus was born the Scientific and Technological Policy Advisory Committee (SATPAC) (31). However, the unexpected premature breakdown in communications between the scientists and the government in December 1980, naturally resulted in the gradual withdrawal of SLAAS from the science planning scene. Thus by mid 1981, SATPAC by its own free will decided to change its name to Science and Technology Advisory Committee (STAC), with its primary function now being to advise the Council of SLAAS (32). While these developments were taking place in the SLAAS, the government went ahead with its plan to establish the Central Environmental Authority by the National Environmental Act No. 47 of 1980.

About the same time major changes took place in the National Science Council. Firstly, its scope of activities was widened to include natural resources and energy. With these changes, in June 1982 the NSC Act was

repealed and in its place the Natural Resources, Energy & Science Authority (NARESA) was created (33). Secondly, its hierachial position in the government's organizational structure was changed by placing it under the Presidential Office. One of the other significant changes that took place during this transformation was the disbanding of the Committee for Science Policy Research and the transfer of its functions to the Board of Management. Although in some quarters this was considered an unfortunate step, NARESA continued to carry out its main function of advising the government on specific issues relating to science and technology policy. But its main thrust has been to enhance the research capability of young scientists, and thereby building a viable scientific community. In persuance of these objectives, it has continued to support curiosity-oriented research in all fields of science including social science, giving preference to programmes which had a component for post-graduate work (34).

NARESA's efforts to enhance research capability of young scientists can be seen from the output of post graduates and publications. Between 1970 and 1984 NARESA's grant-awarding scheme had produced 70 M.Sc's, 6 PhD's and over 150 scientific publications out of a total of 261 completed grants.

NARESA also established two specialized glass-blowing units and a well equipped workshop for the maintenance and repair of electronic equipment to serve all scientists. It has also established the Sri Lanka Scientific and Technical Information Centre with a network of S & T libraries associated with it, to back-up the country's scientific and technical information system. Finally it has also instituted several awards for scientific work of which the most prestigious is the "President's Award for Scientific Achievement".

These activities, together with the resources studies carried out by NARESA, reflect the strategy of this organization to catalyse the process of science planning in Sri Lanka, since the promulgation of the Science and Technology Policy Framework by H. E. The President in December 1978.

Finally before concluding this review, reference has to be made to the most recent phase in the evolution of science planning in Sri Lanka, in which the Ministry of Plan Implementation jointly with the Institute of Fundamental Studies made an effort to draw up a National Science and Technology Policy. This exercise carried out during 1984-1985 has been described as elaborate and costly, and involved about 125 scientists covering eight scientific sectors. Since the provisions and proposals of this Science Plan are yet being discussed and debated, no attempt will be made at this stage to place in perspective the historical significance of its controversial steering and consultative processes.

It must be mentioned that in this review only the major events have been highlighted. There have been many individuals and groups of people who have promoted the cause of science planning in Sri Lanka and whose contributions are not reported in this presentation. The role of universities and the proliferation of higher education in the scientific disciplines has also not been reviewed here, although it is conceded that these events have in no small way contributed to the advancement of the science planning process in Sri Lanka.

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