

Science in Sri Lanka*

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For the next few decades, the development of this country will depend largely on the application of science and technology. "...the nation has to recognise that technology is a major national resource and a vital element in the task of achieving self reliance".¹ For example, the role of agriculture, industry and health care delivery in the national development plan—through increased agricultural and industrial production with the resultant savings of foreign assets; the increase of employment through expansion of agriculture and industry; the utilisation of natural resources; better health care delivery and the increase of manpower utilisation; the conservation of the environment and the avoidance of pollution—should be quite obvious.

"Investment of resources in science and technology can bring substantial economic returns as can investment in education and training. Yet, they must not be regarded as isolated activities deserving some support, but as components of a dynamic system to convert human skills and enterprise into new material, wealth, and social amenities. The effective use of the achievements of science and technology requires the removal of all obstacles of a political, social and economic character which have been inherited by the less developed countries from past stages of their history... Science and Technology contribute but one factor of change, which must be integrated into the overall economic and social plan".²

In Sri Lanka in the past, science was given just bare recognition by its control, firstly, by a Ministry of Housing and Scientific Affairs, which was followed by a Ministry of Scientific Affairs and Industries. The latter situation begged the question of the equally important but uncoordinated roles of science in agriculture, health, fisheries, etc. The inclusion of science with industry was apparently more for reasons of administrative convenience than for a fundamental liaison at the planning level. There are many examples of the lack of co-ordinated scientific impact on the national development plan. Some of these are discussed below.

Some of the constraints in the local scene which hinder the effective contribution that science could make to the development of this country are also briefly reviewed below, together with some general suggestions. On account of the basic similarities that exist between this country and India in respect of developmental needs, the scientific background and capability, extensive reference to the Indian science situation will perhaps be profitable.

Lack of recognition of the role of science in the National Development Plan

"We have in this country, a Planning Ministry monopolised by a group of economists—no doubt they may be important but that is only one aspect of planning... They have no doubt emphasised the employment aspect but national planning is something far greater. It needs the participation of other scientific groups like the pure and applied scientists of at least the major areas of relevance to Sri Lanka".³

The National Planning Committee, at present, is represented by only the Cabinet Ministers amongst whom direct technical or scientific expertise is absent and whose deliberations on technical matters are often amateurish exercises, at their best. Shortcomings in technical progress are seldom evaluated or corrected. Compare this situation with the Indian scene. "There is a Scientific Committee of the Cabinet to deal with scientific matters. It consists of the Prime Minister and certain other Ministers. This Committee is assisted by a committee of scientists known as the Scientific Advisory Committee to the Cabinet...The functions of this Committee are:

1. To advise the Cabinet (a) in the formulation and implementation of the government's scientific policy; (b) the coordination of government and between governmental, semi-governmental and nongovernmental scientific institutions in the country, including scientific and technical departments of the universities; (c) on scientific and technical cooperation with other countries and with international scientific and technical organisations; (d) on such matters as may be referred to it.
2. To place before the Cabinet such proposals and advice as may improve and develop scientific and technical work in the country".⁴

The following simple example of the unfortunate consequences of the lack of scientific expertise and collective decision-making, bears mention. A few years ago, the Sri Lanka Association for the Advancement of Science inquired into the workings of some technical corporations; one of these was the Flour Milling Corporation. It was found that wheat bran was being exported at a low return of approximately 10 US cents per pound. At that time, the local supplies of animal feed were fast dwindling, with concomitant increase of the costs of running poultry and cattle farms which compelled some to close down. This resulted

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in a fall of egg and meat with milk output and a loss of gainful employment. This matter was brought to the notice of the Minister of Agriculture who was informed that the stoppage of the export of the bran and its addition to the feed of animals in this country would have provided the much needed support of poultry and dairy farming and of animal husbandry. Almost unbelievably, the reply of the Minister was that his business was to look after human health and not animal health and this matter was thereafter dropped.

To quote this document⁴ further in illustration of the State patronage afforded by the Indian government to science... "The Council of Scientific and Industrial Research is a semi-autonomous body responsible to no one Ministry of the government. Its President is the Prime Minister, its Vice President is Prof. Humayun Kabir, the Minister for Scientific and Cultural Affairs, and a number of other Ministers are members of its governing body, on which serve also one member each of the Lok Sabha (Lower House of Parliament) and the Rajya Sabha (Upper House) as well as a number of the ablest industrialists and scientists of India." Noteworthy is the opportunity given at a national and official level for coordinated decision-making in the course of National Planning. "Scientific Research was not thought necessary to industrial development even though in neighbouring India, this was being given the highest priority with the patronage of the Prime Minister Nehru, himself"⁵ wrote Wijesekara on scientific research in this country.

In our own context, in addition to such a general body, similar devices for co-ordination at more peripheral levels may provide effective links between such departments as:

- Health-Engineering,
- Health-Social Sciences,
- Fisheries-Zoology,
- Forestry-Botanical Sciences.

Industrial Development-Engineering, etc., as again, is being done in India "...The Council's Board of Scientific and Industrial Research supported research in the Universities and Research Institutions through the following fifteen research committees. These committees are composed of representatives of Universities, research institutions and industry, and function in effect as *National*" (my italics) "committees in their respective fields".⁴

Lack of Resources

Too low an input as Research and Development (R & D) investment.

One of the basic shortcomings of the local scene has hitherto been the very low investment on the national scale, in research and development in addition to the nonprovision of adequate funds for even the maintenance of routine service functions in Universities and scientific institutions.

The absence of a sufficient input as R & D is mainly due to the absence of a proper evaluation of the role of science in national development and the absence of a national science policy.

"Today between 15 to 30 of the 120 countries of the world with less than one-third of its population, possess practically all of its science. They spend more than 95% of the world's development and research funds... Furthermore, these countries reaped in the past and are now reaping most of the direct economic, political, social and general cultural benefits of scientific research..."⁶

Lack of literature.

This results from low financial allocations, sub-optimal utilisation of available funds for journal imports, absence of interlibrary coordination in journal imports, absence of readily available means of duplication of scientific literature.

Constraints with equipment.

The absence of essential items of equipment, absence of technical facilities and expertise for the repair and maintenance of existing equipment with consequent wastage of large sums of foreign exchange on the re-import of substitute equipment. For example, the Universities have several million rupees worth (in foreign exchange) of microscopes without any servicing facility for the cleaning of lenses and prisms to prevent fungal colonisation. A few years non-cleaning will result in the uselessness of the instrument due to opacity of the lenses. This, and other similar needs have been pointed out, at each year's estimates for development proposals, without response. The National Science Council is now investigating this matter but the implementation of whatever recommendations it may think necessary will be stilled unless there is full authority and patronage at the highest governmental level. The provision of the Council with more executive powers is dealt with below.

Lack of funds and grants for R & D — both in local and foreign exchange.

In Western and other highly industrialised countries a large part of the financial input for R & D is from private sources. This source has hitherto been untapped in this country, although private firms and institutions which could benefit from the results of basic and applied scientific research are also those institutions which could provide such funds. The present five-year plan placed great emphasis on the role of the private sector but "whereas the plan envisaged a total investment of Rs. 14,820 million expected from the private sector, the Finance Minister's taxation proposals dealt so severely with the private sector's capacity to save that the investment of anything approaching this scale is made almost impossible".⁷ Suggestions for the cooperation of the private sector in this respect, are made below.

There is almost a total lack of an emergency fund for the import of emergency supplies of consumables and components of equipment (e.g. a spare part or bulb) of small cost, which however are vital for the continuation of work in hand; this leads to serious delays or even abandonment of the work. One cannot help but refer in contrast to the many fancy items of general merchandise (salmon and sardine included) which are imported freely.

There is a serious lack of proper perspectives and determination of priorities on the part of the University administration in respect of research. The lack of foreign aid, both as fellowships and grants for research, the need for locally oriented research and the training of scientists locally has meant increasing requirements of funds for these purposes. These increased demands have sometimes been met with even an inverse response from the University's administrators. One finds oneself in anomalous situations such as the University's directive on one hand that junior staff should obtain their qualifications (postgraduate) by research done locally, while on the other hand, insufficient funds are provided for these increased demands; even existing votes are sometimes reduced.

"The total expenditure on research, including salaries of research assistants has been only about 1.2% of the University's vote. On the other hand, the Kothari Commission⁸ which examined higher education in India has emphasised that for a country like India, at least 25% of the University vote should be spent on research. So far, funds available to the University through the Ministry of Education" (in Sri Lanka) "has been inadequate even for normal undergraduate teaching".³

As an example of effective planning, one may again quote the Indian situation. In the 1950's, in the early days of India's postcolonial development, sufficient funds and expertise were invested in atomic energy research which today is the threshold of providing India with energy to replace oil which it imports at great cost.

Insufficient recognition of the worth of scientists.

"From a purely practical point of view, also, it is impossible to import technical know-how and to apply it successfully if one does not have available locally a corps of learned men to whom one can appeal for guidance on matters of pure scientific principle".⁹

In India now, there is a scientific talent search which goes out to recognize scientific talent amongst her young students, sponsor it and find effective outlets for its utilisation and expression. It is perhaps not untrue to say that hitherto in this country even the body of of practising scientists has been regarded by the successive governments as an expendable or dispensable elite. Whatever cooperation there has been in local applied projects, has been achieved through personal

contact and friendly persuasion. This country imported a team of Soviet scientists to report on the state of affairs at the CISIR, inspite of having sufficient men of internationally acceptable stature and more significantly, who would have possessed a greater insight into the constraints that exist within our own scene.

In any country, scientific research for its own sake as an intellectual pursuit is probably indulged in by only a small minority of scientists. On the other hand, some form of incentive is the more usual stimulus for research. This need not be only in financial terms but could and perhaps more effectively be in terms of such incentives as recognition of work, merit awards, merit promotions, state sponsorships of participation in meetings and congresses abroad for the presentation of research work and appointment to higher posts. The participation of local scientists in meetings abroad or in foreign training courses has not been as often as their competence or achievements, and the local need for such training, would demand. The main obstruction appears, sometimes, to have been bureaucratic red tape, the mere 'sitting on' a file by a subject clerk, but basically to the absence of a national appreciation of the usefulness of such foreign contact.

Obstructive administration

This is perhaps the most obnoxious of all constraints. Innumerable instances could be cited of virtual control of scientific affairs by petty bureaucrats, or even clerks, and the latter's abjudication on what really are technical or scientific matters. A treasury official would arbitrarily and unilaterally delete development proposals for the following year or a clerk will decide as to which scientist should attend the next technical congress abroad. These are real situations.

Excessive Bureaucracy

Especially in regard to the provision of technical needs for working scientists. "It is imperative that the scientific organization, institutions and laboratories should be exempted from having to go through the Directorate-General of Supplies and Disposals for procurement of stores and equipment and that they be allowed to set up their own purchase sections".¹ To have valuable, urgently needed perishable supplies rotting on the wharfs or at Customs, is an all too frequent occurrence.

Insufficient consultation of scientists on matters of technical or scientific importance. While this lack results, basically from an absence of an appreciation of the value of the advice which scientists could give, the absence of coordinating bodies of scientists and planners, has resulted in the situation where little or no informed opinion is brought to bear on nationally important projects such as deforestation, the problem of the coral reefs, rainmaking, fisheries in inland waters and

wild life conservation. In some of these areas, it was left to private bodies and enthusiasts writing through the daily press to provide the necessary perspectives.

The drain of scientists

Much has been spoken and written about this subject, but little of it is understood and much less has been even attempted in the way of reversing this trend. Apart from the constraints listed above which contribute to the absence of job satisfaction (one of the rewards of nearly any occupation), considerations of emoluments have been postponed for too long. The present day administration, especially of the Health Department is inefficient to the extent that even the stipulated salary increments of medical officers have not been paid, in some cases for as much as 2 to 4 years. double house rents have been recovered from staff after recent transfers and payment of arrears on correction of salary anomalies have not been made for several years. Salary scales have remained static for several years and in some instances as in the Universities since 1956, without increases compatible with the large increases in the cost of living over these decades.

Some Solutions

Apart from those already alluded to above, the following general suggestions may be considered:-

1. The Government should formulate a National Policy for Science and Technology and should indicate a program for its implementation. (*Vide* Premier Nehru's speech to the Indian Parliament in 1958).
2. Scientific Affairs should be included in the Ministry of Planning under the Prime Minister, who as in the case of India, can then be in coordinating control over the scientific aspects of the National Development Plan. The science area may also, as an alternative, be in a separate Ministry but with close links to the National Planning body.

The advantages of bringing the science programme under the Prime Minister's own Ministry are—

- (i) The most cogent being that science should be an integral part of the National Development plan and is therefore an umbrella which covers many aspects of the plan and its implementation. Upto now, these seemingly disparate activities have come under separate Ministries and have been uncoordinated at a national level. In addition, to such an overall view, a central avenue for the exercise of scientific expertise may prevent the situation envisaged by the Indian policy document (a situation which our administrators have shown an alarmingly great tendency towards). "Special care must be taken to ensure that planning science and technology does not become

a matter of acquiescing to the power of advocates of this or that project rather than a matter of rational" (and I would add national) "decision making".

(ii) There is now little authority behind the efforts at getting the science machine moving. For instance, the postgraduate training program in Medicine is being stifled by various impediments at a parochial level, by vested interests which are opposed to the National interest or more gravely by a lack of precise policy on the part of the Health Ministry. This situation may have been prevented had the program been given a backing by its inclusion in the National Development Plan.

(iii) International relations (aid, development programs, grants exchange of expertise and technology) may be more effectively controlled.

As important, perhaps, as any of these advantages is the recognition and patronage afforded to science and scientists by the inclusion of these affairs within the central ministry of the government. "The most significant reason why scientific research failed to develop in Sri Lanka, is, of course, the lack of high level, political patronage".⁵

3. Advisory Boards or Committees incorporating scientific expertise should be set up within the Planning Ministry in the major fields which are relevant to the National Development Plan (Agriculture, Health, Industry, Fisheries, Natural Resources, etc.) A good example of such a committee or commission is the one proposed by the symposium organized recently by the Sri Lanka Foundation Institute and the Medical Education Unit of the Peradeniya Medical Faculty—a National Health Manpower Development Council—for the training of personnel involved in health care delivery.
4. The National Science Council (NSC) should be a part of the Ministry of Science and be given wider powers and a more effective role through its newly formed committees. These should be given executive powers since many of the important functions which could be performed by these committees are now not possible owing to the lack of executive authority; for example, the enforcement of rationalisation of the import of scientific literature. The NSC should fulfil the role envisaged by the Indian scene "It will also require government to set up and adequately finance machinery that will monitor, evaluate, correct and redirect the implementation of the various programmes in the science and technology plan".⁴
5. Agricultural, Medical (or Health) Engineering, Fisheries, and other research councils may be

necessary to co-ordinate and integrate, sponsor and promote research and to disburse grants in their respective fields.

6. A research and development cess or fund may be created through a levy from private enterprise, for the general support of research; tax free grants, for specified research projects may also be allowed to private firms.
7. University science research. A University Grants Commission (UGC) is desirable. The corresponding Indian body is a Statutory Body, not responsible to any Ministry of the government, which coordinates and promotes University education and maintains standards of University teaching, examination and research.
8. Creation of a suitable climate for the working of scientists. Some possible approaches have been mentioned above. In addition, the following may be considered.

(a) Higher appointments to be made on the basis of merit although seniority may be taken as a minor criterion.

(b) Director's and other high posts in technical and similar institutions be filled on the basis of public advertisements and the appointment be made essentially on technical and administrative competence and perhaps on a contract basis. At the present time, such appointments seem to be made on seniority which may lead to the situation of a square peg in a round hole which is one of the most damaging of conditions for the proper development of an institution. A distinction should be made between holders of 'posts' and those who are actively engaged in specific jobs. The latter alone should be on advisory boards of technical corporations and institutes. The former are most often "flag wavers" in search of honourific titles and have no first-hand experience of any worth. Their *curriculum vitae* should be used in screening their claims.

(c) Science talent quests and sponsorship of such individuals for appointments to national posts.

(d) Proper utilisation of foreign technical assistance. It has been remarked that this country is characteristic in its under-utilisation of foreign technical aid, through improper selections (often made without guidelines or outside guidelines), non-utilisation, unnecessary official or political interference in selections, bureaucratic delays.

In relation to (b) above, this approach may also have another advantage. These high posts are prestigious and therefore much coveted but are few in number. Their accessibility to the many able persons in this country, through open advertisement may afford new avenues to professional advancement which otherwise would not have been available except to the senior staff. This situation, was commented upon by Dandekar writing on the Indian situation (which is quite similar to ours) on the Brain Drain.

"There are today, only a few senior positions available and they are all occupied. There are a larger number of junior positions below in a series of graduations and the gap between the salary and status belonging to the senior positions and those belonging to even the next immediate junior position is very large. This is a structure which we have inherited from the British administration. During the British administration, the top man everywhere was a Britisher and his salary was way above the salaries of the Indian subordinates working under him. Essentially, the same structure exists today, though the top positions are all occupied now by the Indians. Under the circumstances, all that the juniors can do is to wait and hope that the senior will one day pop off, so that at least one of them may move up and the others may begin another long wait. This is most frustrating. But when in their attempt to break through the frustration, the juniors began to show their ability and assert their competence, they made the positions of the senior, insecure. .

"There is little doubt that these two phenomena (one of which is the matter referred to above) are mainly responsible for the frustration and resentment which permeates the intellectual life in the country today".¹⁰

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