

THE MAKING OF A SCIENCE AND TECHNOLOGY PLAN*

BY
AQUEIL AHMAD

HISTORICAL PERSPECTIVE

Prior to her Independence in 1947, India experienced so-called Western science and technology in small doses for nearly one hundred years. But the British government in India did not have a national policy or plan for scientific and technological development. Scientific research and explorations started in response to the interests of some British (or British-trained Indian) scientists and explorers in the Indian continent, its flora, fauna and diseases, as well as the needs of science-based education in the few universities established by the government. Modern transport and communication systems were introduced as administrative exigency. Dams and canals were built to check recurring floods and famine. Industrial technology was adopted by rich entrepreneurs influenced by the West. None of this was, however, done as a planned effort to uplift Indian society out of centuries of stagnation under feudal-colonial rule. The leadership of free India decided early to change this situation.

Starting with Prime Minister Nehru's personal interest and stewardship, national science and technology policy in India has enjoyed the patronage and encouragement of the highest political authority, the Central Cabinet, under the chairmanship of the Prime Minister, directly accountable to the Parliament of India. In Nehru's vision, political independence and self-reliance were invariably linked with economic self-reliance for which a strong scientific and technological capability was imperative. It was generally agreed among the early planners in India that the country's S&T capability was among the lowest in the world. It was also agreed that the major task ahead was to expand existing scientific and technological infrastructure by way of building new institutions, augmenting the supply of qualified scientists and engineers, increasing financial investments in relevant areas, etc. Three major landmarks in the early days of independent India toward laying down the foundation for such developments were the establishment of the Ministry of Scientific Research and Culture in 1948 under the Prime Minister, establishment of the Department of Atomic Energy (DAE) in 1954, and passing of the Science Policy Resolution by the Indian Parliament four years later, (in 1958).

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A centralized structure of (governmental) science, such as that initially conceived in India, required laying down overall (national) scientific and technological priorities and translating them into well-stated R&D objectives to be coordinated at the apex and implemented at various levels of operations. The Ministry of Scientific Research and Cultural Affairs was established with these objectives in view. However, the Ministry's role in national S&T planning remained insignificant. The Planning Commission assumed the responsibility of incorporating S&T concerns in the Five Years Plans, under the direction of a member of the Commission, P. Mahalanobis, the famous statistician of India.

It is evident that high-level policy-making structures were lacking in India, until a beginning was made in the mid-fifties (1956) by constituting a Scientific Advisory Committee to the Cabinet (SACC). As a body of scientists and technologists (mostly scientific agency heads), the role of SACC during its 11 years of existence was confined to advising the Cabinet and assisting the Planning Commission on charting national directions for scientific and technological matters and incorporating them in the Five Years Plans.¹ The SACC was replaced by the Committee on Science and Technology (COST) in 1968 for a similar, mostly advisory, role. The Planning Commission, SACC, and COST were assisted from time to time by various groups and institutions, including an expert group called Research Survey and Planning Division (now the Planning Division) established by the CSIR in 1963.

In 1971, the Government of India created a separate Department of Science and Technology (DST) with the Prime Minister as its minister, and a secretary to the government (scientist by profession) as the chief executive officer. As a permanent bureaucracy, the role of DST has been to assist in the formulation of plans drawn up by the Planning Commission; compile, collate, publish and disseminate vital statistics on science and technology; initiate, sponsor, implement and monitor a large number of S&T projects of national importance through the research institutes (both government and private) and universities; encourage and administer international collaboration; and generally promote science and technology in the country. The most recent and significant offshoots of DST are the Departments of Environment and Oceanography established in 1981-82 with the Prime Minister as the Minister, and a Secretary to the Government as the Chief Executive Officer for each department. (Following the DST tradition, the Secretaries of the Departments of Environment and Oceanography are distinguished scientists).

The Government, through the DST, appointed a National Committee on Science and Technology (NCST) in 1971 with the purpose of writing the first ever Five Year Science and Technology Plan. The creation of NCST was a significant landmark for more than one reason. First, it took India over a decade after passing the Science Policy Resolution in 1958 to consider formulating a science and technology plan in consonance with national priorities laid down by the Planning Commission (in the Fifth Five Year Plan). Second, it was, for the first time, through the NCST, that a large number of scientists and engineers

participated in formulating a national science and technology policy in the form of a five year plan. And third, the NCST, unlike its predecessors, had a clear mandate as well as an institutional base in the Department of Science and Technology.

The NCST issued an Approach to the Science and Technology Plan in January 1973,² and the Draft Science and Technology Plan itself in the month of October, 1974.³ The plan laid heavy emphasis on R&D in agriculture, industry, electronics, space, nuclear energy, natural resources, and others, and institution building in these priority areas. Soon after finalizing the Plan, the NCST became inactive. By 1978-79, it had become more or less non-functional, although it did provide some assistance in writing the S&T components of the Draft Sixth Five Year Plan--1978-83.

After a lull of almost two years, the Government constituted a fresh Science Advisory Committee to the Cabinet in 1981. The membership of the new SACC consists of mainly agency heads in the governmental R&D establishment. It will function under the Chairmanship of the Member (Science and Technology), Planning Commission,⁴ and will be responsible to the Prime Minister and Cabinet. The exact role of this SACC, besides being advisory to the Government like its predecessor SACC, is not clear as of now.

What has been described above, constitutes the top of the structural hierarchy of Indian science. Its main role has been formulation of national policy for scientific and technological developments, which includes laying down overall S&T priorities in consonance with the Government's socio-economic policies and developmental plans as enunciated by the Planning Commission; suggesting appropriate infra-structures and institution building; and proposing (subject to the approval of the Planning Commission, the Ministry of Finance and the Cabinet) total as well as sectoral financial allocations for research and development.

This structure would remain incomplete without taking into consideration the role in policy formulation and implementation played by various ministries and ministerial level departments of the Government of India, under which all the autonomous research agencies function. The role of the Department of Science and Technology vis-à-vis scientific and industrial research in general has already been mentioned. The DST's bureaucratic counterpart for nuclear research and development is the Department of Atomic Energy; for R&D in electronics, the Department of Electronics/Electronics Commission (DDE, established in 1971); for space research, the Department of Space/Space Commission (DDS, established in 1972). Like the DST, these departments (through their secretaries) are directly responsible to the Prime Minister and the Cabinet.

There are no DST equivalents for agriculture, medicine, defence and energy. These come under the jurisdiction of the concerned ministries, of Food and Agriculture, Health, Defence, etc. The heads of the apex R&D agencies in these sectors⁵ report directly to the respective ministers who are, of course, members of the Cabinet whose chairman is the

Prime Minister. Other ministries also have research establishments relevant to their special needs and areas of operations--some of them transferred there about three years ago from the Council of Scientific and Industrial Research when it was reorganized by the Janata Government (1977-79) headed by Morarji Desai.

There is no national policy or planning for in-house industrial R&D in public or private sectors. Some public sector undertakings in high technology areas, such as BHEL and others, have large R&D divisions as part of their corporate policy. Government encouragement and incentives have helped the growth of in-house R&D in private industries, up from 300 units in 1975 to approximately 800-1000 at present. Most of the in-house R&D activity is of an elementary nature confined mainly to product/process testing and modification rather than new product/process development.

The organizational apex for all types of university research is the University Grants Commission (UGC) which comes under the Ministry of Education, although university research may be sponsored by any national or international agency subject to appropriate sanctions at various levels in the educational administration. National level policy and commitment to university research have remained extremely fuzzy over the years.

It may be significant to note that from the point of view of national policy, the social sciences in India do not have the same status as the natural sciences or technology and engineering subjects. They do not constitute a part of the planned national scientific and technological thrust. One never hears of anything like a social science research policy. The most active and visible aspects of the social sciences at the national level are the institutions and research schemes in universities and institutes supported by the Indian Council of Social Science Research (ICSSR, established in 1969); education and research in management, one autonomous national institution and a number of universities, private institutes and colleges throughout the country run by individuals, industries, and trusts.⁶

THE MAKING OF THE FIRST SCIENCE AND TECHNOLOGY PLAN, 1974-79

It is noteworthy that despite a fairly long-standing, although somewhat erratic, experience of planning for science and technology going back to the early days of independence, our First Five Year Science and Technology Plan (1974-79) was issued only in the beginning of the seventies. As mentioned earlier, in 1971 the government of India constituted a National Committee on Science and Technology for this purpose. The original membership of NCST consisted of ten eminent men of science and technology selected by C. Subramaniam, then Minister of Planning, who had also assumed the chairmanship of this committee.

The NCST went through a very complex and elaborate process for formulating the first comprehensive science and technology plan and took about three years to complete it.

Under the able guidance of its Chairman, the NCST was aware of the stupendous task before it. India's first national science and technology plan had to be thorough, broad-based, integrated, specific, and task-oriented. In this effort, the NCST decided early to involve a large number of scientists, technologists, educators and industrialists.

From the very beginning, a sectoral but integrated approach was adopted. The entire national S&T thrust was divided into 27 sectors. Specific and time-bound programs of research, development and design were to be identified in each sector according to development profiles formulated by task forces of the Planning Commission. Each sector was divided into a number of more specific sub-sectors, totalling 140. In many cases the sub-sectors were further demarcated into more concrete areas or projects, totalling about 100.

Each member of the NCST was assigned responsibility for nominating a panel of experts to look after a particular sector within his own area of competence and knowledge. Several members nominated panels for more than one sector. A total of 27 panels, one for each sector, were thus constituted to coordinate the planning process. The panels, in turn, formed sub-committees to identify priority areas/projects critical to a particular sub-sector. The work of the sub-committees was reviewed and coordinated by a planning group consisting mainly of the convenors of all the sub-committees of the concerned sub-sector, two members from the sectoral panel, representatives of the Planning Commission and the concerned ministry, plus one or two people from other relevant organizations. The sub-committees internally appointed their convenors while the planning groups were generally chaired by the chairman of the sectoral panel. Certain sub-sectors were not divided further into areas or projects to be separately handled by sub-committees and coordinated by planning groups. For these a different methodology was followed as, for instance, in the case of the Family Welfare and Health sector:

Unlike the other panels of the NCST...the panel on Family Welfare and Health did not constitute planning groups (or sub-committees)...in view of the fact that the Ministry of Health and Family Planning (Department of Family Planning) had already set up a high-powered Coordination Committee for Research in Human Reproduction and Family Control. The convenor of the NCST Panel was also a member of this Committee and he was of the view that the recommendations of this Coordination Committee could form the basis for the formulation of research and development programs in this vital area. In fact, the NCST has largely drawn upon this material for its overall plan in the field of health and family welfare.

(However) a separate Task Force on nutrition was constituted in consultation with the Planning Commission and it was agreed that the Task Force of the Planning Commission and the Task Force of the NCST would work on a complementary basis, (the former) to indicate broad strategies for fighting malnutrition (and the latter) to work out the research and development components for these strategies.⁷

In other cases, no sub-committees were appointed. Only planning or working groups were constituted to prepare sub-sectoral reports. In others, even planning/working groups were considered unnecessary. The sector panels themselves incorporated in their reports the plans already prepared by the apex/sectoral agencies--for example, the plans for space exploration, atomic energy, agriculture, scientific and industrial research, etc., were originally prepared by the concerned agencies and subsequently incorporated in the national plan with slight modifications, additions or deletions. This diversity of approaches seems to have created some confusion of nomenclature, blurring the distinction between planning groups, working groups, and sub-committees. In all, 233 planning/working groups, task forces, or sub-committees are reported to have worked to bring out the first Five Year Science and Technology Plan. The total membership of this formidable assembly consisted of 1855 distinguished scientists, engineers, industrialists, and other experts, drawn from research laboratories/institutes, design engineering groups, manufacturing units, natural resources surveys, institutions of higher learning and extension organizations throughout the country.

Plan formulation was informed and aided by broad-based as well as in-depth methodologies, from the very general to the particular, at various levels. At the highest level of generality, several regional seminars were organized in collaboration with national institutions (including one with ASCI in 1972) to which large numbers of experts and professionals from different fields were drawn for articulation and identification of national needs and corresponding science and technology/R&D priorities. The NCST itself assumed the responsibility of providing broad guidelines and overall coordination. Each sectoral panel, under the chairmanship of an NCST member, met approximately six times to focus upon the sectoral S&T priorities. These meetings were sometimes attended by other NCST members as well as invited experts.

The sub-committees and/or planning groups, which actually formulated or coordinated the priority areas or sub-sectoral plans had similar meetings and discussions to arrive at consensus regarding operational matters, plan proposals, and other technical details. They were aided in this process by a large number of macro project proposals submitted by various groups, institutions, and ministries on request through an elaborate proposal proforma especially designed for this purpose. The sub-committees or planning groups critically examined proposals and either approved or disapproved them. If approved, a proposal was included in the sub-sectoral plan under a particular priority area.

These proposals contained information on financial outlays, the groups and institutions to carry out the projects (in government, industry, or universities), and the prospective users of research results. Sub-sectoral plans were discussed and reviewed by sectoral panels prior to presentation to the NCST as sectoral plans. NCST approved and presented the Plan to the Planning Commission (toward the end of 1973) in two volumes, a 67-page outline and the detailed sectoral plan consisting of 517 pages.

The major sectoral recommendations of the S&T Plan were incorporated in the Fifth Five Year Plan which was endorsed, as usual, by the National Development Council and the Union Cabinet. The following quotation sums up the approach to this planning process:

In short, the formulation of the S&T Plan has been an interactive process. It has involved an examination not only of the scientific and technological efforts as also of the policies and procedures necessary for maximising the returns from the existing investments and achieving self-reliance....

The need for a total systems approach also made the planning an imperative one. For example, the first step of identifying the process or product technology in turn led to the spelling out of the technological skills covering the entire spectrum of engineering design capability, materials know-how, the production techniques that are critical to the fabrication and manufacture of equipment and machinery. Similarly, emphasis on agriculture brought into focus not only non-industrial resources like land, water and seed, but also matters relating to fertilizer, soil nutrients, pesticides, machinery, post-harvest technology, and climate control.⁸

THE LACUNAE

The main difficulties in carrying out this very complex process of planning were those of coordinating and integrating the work of vast numbers of sectoral panels, planning groups, and sub-committees into a national science and technology plan, sector-wise and as a whole. Looking at the total profile of the Plan it is obvious that not much integration was accomplished by the NCST at the overall level. The Plan, as a whole, is a collection of sectoral plans which implied but did not specifically identify inter-sectoral links. In any case, integration would not be easy in planning as diverse a set of activities as the First S&T Plan attempted to cover through the efforts of such a large number of people, groups, and institutions. While intra-sectoral integration depended greatly upon the efforts of planning groups and sectoral panels, whatever integration could be achieved in the total plan was due mainly to the fact that S&T sectoral plans were complementary to the national plan. They identified the scientific and technological components/contributions necessary to achieve the main sectoral goals set forth by the Planning Commission. Sectoral reports generally display a much greater degree of internal consistency and coherence than is found in the total Plan, despite the fact that all the panels, planning groups and sub-committees did not follow a universal methodology of work.

On a more substantive basis, large portions of the Plan were merely reiterative. For instance, in many sectors there was hardly any original thinking but simply reiteration by the panels of data supplied by the concerned ministries and agencies, such as in the case of agriculture, space, nuclear energy, industrial research, electronics, health and family planning.

From the the very beginning, the NCST was concerned about the success or failure of the Plan it was formulating. The committee did not have any mandate to implement, monitor, or review the Plan. These were to be the responsibility of various ministries, agencies, and institutions of government, in keeping with the administrative system and traditions in India. Financial allocations indicated by NCST for the identified projects and programs were merely suggestive, not committed. If these projects and programs were already budgeted items in the ministry or agency plans, well and good. Otherwise their fate depended on the motivation and zeal of individuals and institutions to which they were assigned to seek funds and carry them out. In the absence of a systematic assessment of the First Science and Technology Plan, it would be hard to generalize about its successes and failures. But, knowledgeable people agree that many of its targets have either been abandoned or remain incomplete due to lack of commitment to them, both financial and motivational. However, in no way do these lacunae mitigate the importance of the Plan as an historic landmark of considerable symbolic and practical significance. Nor do they gloss over the fact that it was a grand exercise in planning for science and technology.

SCIENCE AND TECHNOLOGY FOR THE SIXTH PLAN: THE SECOND S&T PLAN, 1980-85

The NCST was established primarily for the purpose of preparing national science and technology plans. As described above, the greatest achievement of NCST was the methodical and elaborate preparation of the First Five Year S&T Plan. The NCST, and its mandate, were the brainchild of C. Subramaniam, its first Chairman. When P. N. Haksar replaced Subramaniam as Deputy Chairman of Planning Commission during the emergency, he automatically became the Chairman of NCST as well. The NCST had already begun to degenerate soon after completing the Plan. The sectoral panels became non-functional with the exception of a specially created, general plan of Futurology which continued to be active until lately. Subsequently, the Government in Delhi changed hands in 1977. Prime Minister Morarji Desai dissolved the old NCST and constituted a new one under the chairmanship of Atma Ram, retired Director-General of CSIR. The First S&T Plan was coming to an end in 1979. The preparation for the next Plan should have started in earnest at least soon after the NCST had been reconstituted. However, nothing of that sort happened, for reasons largely unknown. The NCST remains functionally non-existent to date, neither formally abolished nor renewed.

Instead, the Planning Commission appointed a Working Group in late 1980 to prepare a Plan/Report on science and technology for the Sixth Plan. The Group was constituted through two office memos No. M. 12018/83/80 - S&T, dated September 12 and 15, 1980. Initially, the names of 12 persons from different agencies were announced as members with M.G.K. Menon, Secretary, DST, as the chairman, along with the terms of reference. Subsequently, nine more names were added through the later memo, to include all the agency heads, the Chairman of the University Grants Commission, Director, RRL,

Hyderabad (now DG, CSTR), and the Chief of Planning, CSIR. The group met five times during the months of September, October, and November, completed its work by November 6, circulated the draft report to all the members, incorporated their comments, and submitted the final report to Narayan Datt Tiwari, Minister for Planning, on December 22, 1980.⁹

It is indeed an incredible accomplishment that a five year national science and technology Plan could be put together in a short period of three months. The Working Group must be congratulated for that. However, the shortage of time also proved to be the greatest handicap for the Working Group. Consequently, there were no preliminary meetings with larger participation, regional seminars, brainstorming sessions, etc. There was no assessment of strengths and weaknesses, successes and failures of the First S&T Plan. Contrary to the terms of reference, "sub-groups relevant to the component sectors of the Plan" were not set up "to assist the core Working Group for a mere detailed exercise in the second phase". Projects of national importance were not identified and specified for implementation by various agencies as necessary components of sectoral priorities laid down in the Sixth Plan. One would expect the nation to have learned through elaborate formulations of the First S&T Plan seven years ago and improved upon it in the Second. On the contrary, the entire experience gained earlier seems to have been lost to history in the preparation of the "Second Plan" which, like the Science Policy Resolution of 1958, ends up being a statement of good intentions, albeit a grander one.¹⁰

Compared to the First Plan, non-involvement of the scientific community in the Second Plan formulation was a serious handicap. It may be noted here that at about the time the First S&T Plan was under preparation, a sample survey of scientists' participation in S&T Plan formulation had clearly demonstrated that participation was low. But it was much desired, and wherever indicated, it had a positive influence on the perception of the policy and commitment to it by the scientists.¹¹ During 1971-73, the NCST was able to involve about 2000-3000 scientists, engineers, industrialists, and educators either directly or indirectly in the planning process and one could sense a great deal of awareness and excitement in the involved and concerned sections of the scientific community about the Plan, its formulation and implementation. This was not the case in 1980. The scientific community, let alone the public at large, hardly knew anything about the Plan or seemed to care about it. The only notable exception was a series of seminars and meetings hurriedly conducted in various parts of the country by the Vice-President of CSIR, S. Nurul Hasan, to obtain the views and sentiments of some scientists, professionals, and others about the role and priorities for science and technology (and scientists and technologists) in the Sixth Five Year Plan. These were fed into the S&T Plan through the CSIR channels in the Working Group.

Apparently, the above shortcomings in the planning process were mainly due to lack of time at the disposal of the Working Group. The questions to be asked, however, are: Why in such a great haste? Why was the planning exercise not started earlier and the tradition

and methodology established by the NCST seven years ago not maintained? Why was the NCST not reactivated for formulating the Second Plan? The answers are not readily available although some reflections may be helpful.

Firstly, it seems the mandate given to the NCST by C. Subramaniam, as its chairman, to formulate not only the First Science and Technology Plan but the succeeding ones as well did not last beyond his term of office. His successor for a short interim period, P. N. Haksar, had misgivings from the very beginning about the way the First Plan was prepared and doubted the future role of the NCST in science and technology plan formulation. The committee soon began to lose much of its punch. Secondly, Haksar's successor, Atma Ram, was the first scientist to chair the NCST--the first time the charge was held by anyone other than the Minister for Planning and/or Deputy Chairman of the Planning Commission. Atma Ram viewed NCST in a totally different light than C. Subramaniam had envisioned. He (Atma Ram) wanted the NCST to be a promotional and advisory body rather than the formulator of national S&T plans, a task for which he would consider the Planning Commission responsible. Naturally, the committee under his chairmanship functioned the way he wanted it to function. It did not do any preparatory work for the Second S&T Plan, although at one time Atma Ram did express (including to this author) NCST's intention to prepare the first-ever national technology plan. The sectoral panels constituted during the preparation of the First Plan were never revived because there was no reason to do so. The old membership of the committee was neither renewed nor terminated.

Thus, by the time Congress (I) returned to power in 1979 the five year period of the First Science and Technology Plan (1974-79) had just about run out without any preparation for the Second Plan to feed into the Sixth National Plan which itself had been considerably delayed. In its anxiety to issue the Sixth Plan, the Planning Commission, perhaps on the suggestion of the Prime Minister, appointed the ad hoc Working Group in September 1980 to do a quick job of preparing the Second S&T Plan/Report before the year was out. The reasons why the dormant NCST were not reactivated for this purpose still remain obscure.

CONCLUDING REMARKS

India's experience in planning for science and technology is reflective of the process of national planning in general. The present case of the First and Second Science and Technology Plans is a study in contradictions in national-level policy-making, as much as it is a study of influence on the planning process, of political vagaries and personal styles of men and women at the helm of public affairs. It raises certain fundamental issues about our vision of the future, the future of science and technology in Indian society, and more importantly, about the seriousness of the business of national planning. The reader is expected to zero-in on these issues and make his/her own judgement about them with the intention of contributing toward our ability to foresee rightly and plan earnestly.

The question to be ultimately answered is: What makes a good policy/plan as opposed to a bad one? Public policy is not and cannot become an end in itself. It is to be judged in terms of its social objectives, in terms of its short and long-term impacts on society: in short, in terms of its values. The other criterion is that of practicality: Is the policy implementable, manageable? Does it set forth achievable goals? Is it realistic enough in terms of the human condition and resource constraints to be cost effective and yield results, either partially or wholly? Does it commit resources to accomplish stated goals and identify resource mobilization strategies?, etc. The further we go in identifying parameters of good policy/plan, the closer we come to understanding the relationship between good policy and good policy making--the axiomatic relationship between process and the product. If the axiom that process determines the product is to be held valid in the realm of public policy, we must ensure sound policy making procedures allowing careful and critical examination of the criteria of values and practicality in order to ensure a good public policy.

This case study on the making of science and technology plans*in India is intended to be a pointer to S&T policy analysts and policy makers toward identifying the lacunae in our policy making/planning procedures and improving them for the future. Emerging out of the case are four critical factors for consideration: political influence on the policy process; the time allowed for policy making; extent of participation; and identification and commitment of resources to policy implementation.

NOTES

*This work has greatly benefited from discussions with, and material supplied by the following individuals, the first three of them having been personally involved with NCST in various capacities in the making of the First Science and Technology Plan, 1974-79: Dr. Hari Narayan, Director, NGRI; Dr. G. Thyagarjan, Director, RRL; Mr. G. Hanumantha Rao, Scientist, NCRI; and Dr. G. S. Rao, Scientist, RRL, all from Hyderabad.

1. For a critical assessment of the role of SACC in S&T policy making, see Ashok Parthasarathy, "Appearance and Reality in Two Decades of Science Policy" in Rahman and Sharma (eds.), *Science Policy Studies*, Somaiya Publications, New Delhi, 1974, pp. 81-95.
2. *An Approach to the Science and Technology Plan*, National Committee on Science and Technology, New Delhi, January 1973.
3. *Science and Technology Plan, 1974-79, Volumes I and II*, National Committee on Science and Technology, New Delhi, August 1973.

4. M.G.K. Menon of the DST has now replaced M. S. Swaminathan as the Member (S&T), Planning Commission after the latter relinquished in Manila. The new DST chief is S. Varadraj, an industrial chemist by profession and formerly chairman of the Indian Petrochemicals Corporation (since 1974).
5. Except the CSIR which has a ministerial level Vice-President and is placed under the office of the Prime Minister who is the ex-officio President of the Council.
6. For the development of management education and research and performance of management training institutions in India, see S. R. Ganesh, "Collaborative Institution Building: A Critique of Three Experiences in Higher Education", *Vikalpa*, Vol. 4, No. 2, April 1979, p. 162; and "Performance of Management Education Institutions: An India Sampler", *Higher Education*, 9 (1980), pp. 239-253.
7. *Sectoral Science and Technology Plan for Family Welfare and Health*, National Committee on Science and Technology, New Delhi, August 1975, ps. iv and v.
8. *Science and Technology Plan, 1974-79*, Volume I, Introduction, ps. 2 and 3.
9. *Report of the Working Group on Science and Technology for the Sixth Plan (1980-85)* Planning Commission, New Delhi, December 1980.
10. Aqueil Ahmad, "Scientists and Science Policy Formulation", *Journal of Scientific and Industrial Research*, Vol. 37, No. 11 (November), 1978.
11. This is not to deny some of the unique features of the Working Group Report. For the first time, subjects like scientific temper, S&T for weaker sections, women, and rural development, involvement of young scientists, S&T administration, scientific academies and professional societies, working conditions for scientific personnel, etc. were given due prominence in the highest national document on science and technology. The document was also relatively more specific on the procedures to be followed while making foreign versus indigenous technology choices.