

## SCIENTIFIC AND INDUSTRIAL RESEARCH IN INDIA

THE fourth Five Year Plan of the Council of Scientific and Industrial Research, India, is presented in two parts\*. Part I outlines the approach adopted to planning and the methods adopted by the Working Group appointed in May 1963 by the Council at the request of the Planning Commission. The salient features of the proposals are then summarized, together with the recommendations regarding co-operative research, research grants and facilities, amenities for research and research staff, co-ordination of research between the Council, universities and ministries, the supply of scientific instruments and the utilization of research results. The Working Group was to make a critical review of the progress of the programmes and schemes of the third Plan period, assess the position likely to be reached at the end of that period and formulate proposals for the fourth Plan in the perspective, where possible, of a 15-year period. The desirability of paying more attention to annual phasing was emphasized.

Four broad principles have been followed in working out the Plan and the requirements of scientific policy under the Council for Scientific and Industrial Research.

(1) The national requirements have been established in terms of technological problems and research programmes drafted based on the identification of these problems.

(2) After evaluating progress made so far in research, a policy has been worked out for supporting those areas which have shown promise or significance to science or for the national economy. (3) Attention has been given to broadening and diversifying the base of science and technology, for example, through the Council's pool of scientists, fellowships, scholarships, research grants, research centres and co-operative research associations.

(4) Attention has been given to certain gaps in earlier programmes, for example, by strengthening research activities in some geographical areas or in certain branches of science or technology, or augmenting and creating central facilities, including library and documentation services, or again in the sphere of effective organization.

In order to put its proposals on firm ground, the Working Group held discussions at various laboratories. Besides critical studies of the laboratories over the past 10 years, it had at its disposal critical studies on their growth undertaken by the Unit for the Survey and Planning of Scientific Research. As regards the established laboratories, features of the proposals are the emphasis on project orientation of research, the time targets of the schedules and the allocation of priorities to projects—high priority being given to those projects which are vital to the national economy. Emphasis is also placed on pilot plant and development work and on the replacement of obsolete equipment. It was noted that gaps occurred in the national laboratories at three levels: in multi-purpose laboratories to meet the requirements of an area or to develop and utilize natural resources; in certain areas of research in which India possesses considerable experience and expertise but establishment of well-defined institutions is necessary to organize research properly to utilize fully available resources; in areas where research is needed but sufficient trained personnel are not available.

It is to meet these three requirements that the Plan envisages first the establishment of five new institutes: a Fire Research Station; a National Institute of Oceanography; a National Science Library; a National Institute

for Research in Electrical Engineering; and an Institute for the Study of Social Relations in Science. Five new Regional Research Laboratories are proposed, at Uttar Pradesh, Madhya Pradesh, Kerala, Rajasthan, and Punjab. Eight fields are specifically proposed for new projects: birth control; pesticides, insecticides and agricultural chemicals; marine engineering; automation; meat and fish technology; packaging; substitute materials for electrical appliances; and materials research.

The Plan also provides for the formation of co-operative research associations for tea and cement, and a larger allocation is recommended in the Scientists' Pool to bring back young scientists at present in advanced countries. Besides increased grants to research schemes, the establishment of centres of research in universities (in consultation with the University Grants Commission) is proposed, and funds are to be allocated for sending exceptionally brilliant scientists for training abroad in various specialized fields. Definite provision is to be made for the creation and expansion—both centrally and regionally—of facilities such as libraries, documentation services, service units for routine analysis, and facilities for maintenance and repair of equipment, instruments and calibration. The India National Scientific Documentation Centre and the Publications and Information Directorate are to be further developed, the third Museum of Science and Technology, initiated at Bombay during the third Plan, will be completed during the fourth Plan, and the engineering and design unit will be developed as a fully fledged institution. The Industrial Liaison and Extension Unit at the Council's headquarters is to be reorganized and resources provided for the evolution of an effective programme of international collaboration. Provision is also included for medical help for research staff, accommodation and other facilities.

In 1963-64 the Council provided 24.7 lakhs of rupees for 623 university research schemes and 31.3 lakhs of rupees for 1,428 fellowships, as well as sanctioning block grants of 190,000 rupees to the School of Earthquakes, Roorkee University, 25,000 rupees to the School of Dyestuffs, Bombay University, and 508,000 rupees to the International Meteorological Centre. Proposals are detailed for fifteen different stages to increase collaboration between the Council and the universities, and co-ordinating units on the lines of that already established for defence are to be set up for the Ministries of Health, Industry, Steel and Mines, Commerce, Works, and Civil Aviation. Other proposals relate to the Central Scientific Instruments Organization, and include the establishment in each National Laboratory of a strong instrument division.

Of the total expenditure of Rs. 204.69 crores proposed for the fourth Plan, Rs. 60.69 crores is for the committed expenditure of the Council of Scientific and Industrial Research over the five years. The revised estimates provided for expenditure of 339 million rupees on established institutes and laboratories; 336 million rupees on those started in the second or third Plans; 19 million rupees on science museums; 35 million rupees on co-operative research associations; 74 million on the Scientists' Pool, research grants and fellowships; 40 million on research centres; 146.5 million on central facilities; 24 million on scientific and technical units at headquarters; 21 million on international science collaboration; 91 million on new institutes; 87.5 million on new projects; 184 million on amenities; miscellaneous items bring the total to 1,444 million rupees.

\* India: Council of Scientific and Industrial Research. Fourth Five Year Plan, Part I. Pp. v+74. (New Delhi: Council of Scientific and Industrial Research, 1965.)