

Budget boosts science

India's Finance Minister, Yashwant Sinha announced his proposals for the Union Budget 2002–03 (his fifth) on 28 February 2002. The media have various opinions about this budget – 'insipid', 'lacklustre', not conducive to growth and so on. Quite a marked difference, however, is the response from members of the science and technology (S&T) fraternity who are euphoric about the boost given to research and development (R&D). In reaction to the science component of the budget, 'an overall increase, highest seen over one year since independence' said a happy Raghunath Anant Mashelkar, Secretary, Department of Scientific and Industrial Research (DSIR) and Director-General, Council of Scientific and Industrial Research (CSIR), simply terming the budget, 'great'. The Ministry of Science and Technology sees a budget estimate for 2002–03 of Rs 1290 crore, up 40% from the previous year's allocation, a significant

increase (see Table 1). Y. S. Rajan, Executive Director, TIFAC, said that S&T seems to be the only sector where considerable hike in allocation has been made, and appears to be a follow-up of the Prime Minister's commitment made at the Indian Science Congress.

The Department of Science and Technology (DST) gets a raise in plan allocation to Rs 625 crore, an increase of more than 52% over the current year. V. S. Ramamurthy, Secretary, DST laid out plans on how he proposes to utilize these funds. First, he was extremely pleased that the Fund for Improvement of Science and Technology (FIST) established in 2000–01 for augmenting laboratory facilities in Universities is to receive an increased allocation to Rs 75 crore in 2002–03, an increase of almost 115%. Any fears that one might have on lack of investments for basic research have been put to rest. For the Science and Engi-

neering Research Council (SERC) of DST, the piece of cake is a total of Rs 212 crore (about 2.5 times increase from last year). Secondly, SERC's motto for funding is 'cutting across disciplines and cutting across institutions'. Ramamurthy felt that SERC's funding has got augmented and several projects can now get funded that were on hold due to lack of funds. Thirdly, the situation would ease for autonomous institutions such as the Indian Association for the Cultivation of Science (IACS), Bose Institute, both at Kolkata, etc., suffering due to increased burden since the Pay Commission raised the salaries. Ramamurthy also said that there would be a 20% allocation towards research projects across the board in such institutes. Fourthly, Ramamurthy asserted 'we are committed to seismic research'. He pointed out that the average age of researchers in this field is between 60 and 70 years, with

Table 1. Central plan outlay for selected Ministries/Departments for 2000–01 and 2002–03

(In crore of rupees)

Ministry/Department	2000–2001 revised estimate	2001–2002 budget estimate	2001–2002 revised estimate	2002–2003 budget estimate
<i>Ministry of Agriculture</i>	2457	2954	2894	3242
Department of Agriculture and Cooperation	1677	1970	1970	2167
Department of Agricultural Research and Education	550	684	684	775
Department of Animal Husbandry and Dairying	230	300	240	300
<i>Ministry of Environment and Forests</i>	610	800	900	990
<i>Ministry of Health and Family Welfare</i>	4478	5780	5140	6630
Department of Health	1188	1450	1350	1550
Department of Indian Systems of Medicine and Homeopathy	90	120	90	150
Department of Family Welfare	3200	4210	3700	4930
<i>Ministry of Human Resource Development</i>	6300	7570	7220	9225
Department of Elementary Education and Literacy	3250	4000	3750	4900
Department of Secondary Education and Higher Education	1700	1920	1820	2125
Department of Women and Child Development	1350	1650	1650	2200
<i>Ministry of Non-Conventional Energy Sources</i>	859	1040	857	1101
<i>Ministry of Science and Technology</i>	831	947	925	1290
Department of Science and Technology	362	410	410	625
Department of Scientific and Industrial Research	329	362	340	440
Department of Biotechnology	140	175	175	225
<i>Department of Atomic Energy*</i>	1820	2068	2105	2741
<i>Department of Ocean Development</i>	86	142	120	175
<i>Department of Space</i>	1600	1710	1600	1950

*The R&D expenditure is approximately 20% of total budget for DAE, according to the budget estimates of 2002–03.

Source: Central Budget, 2002–03, Budget Division, Ministry of Finance, Government of India.

only a few youngsters. Seismic research required a change in operational strategies in terms of investment and time-scale, while disaster relief should be carried out with one's 'own source of funds'. The Himalayan Ridge would be augmented with a network of monitoring stations, presently still uncovered in this respect, compared to peninsular India. The government intends to institute at least 100 scholarships each year to be provided by DST to women scientists and technologists to encourage the entry of large number of women into the scientific profession.

The National Innovation Foundation (NIF) set up in March 2000, for building a national register of outstanding traditional knowledge and grassroots innovation has Mashelkar as its Chairman. In his budget speech, the Finance Minister said that, 'this initiative has shown good results. In the second annual campaign NIF has received more than 11,000 entries from all over the country, up from 948 entries in the first year'. Encouraged by this 'enthusiastic' response, Sinha proposes to set-up 'a micro-venture capital fund for small innovations to be initiated by the Small Industries and Development Bank of India (SIDBI), in cooperation with the NIF for facilitating the transition of innovations into enterprises'.

With an allocation of Rs 703 crore (total budget estimate) to national laboratories of CSIR, Mashelkar is confident that several new initiatives (about 55 projects) that are at 'cutting-edge' would be benefited. The revised estimate for 2001-02 was Rs 567.85 crore for National Laboratories. He also drew attention to the equipment budget that in 1995 was Rs 25 crore and now stood at Rs 150 crore. He expressed satisfaction for the support given to FIST and basic research in this budget.

For the Department of Biotechnology (DBT), the budget sees an increase in plan outlay of the order of Rs 50 crore over the previous year. DBT would continue to march forward in all aspects of biotechnological R&D and human resource development plans. A research programme on 'inventory of bioresources of Indo-Burma biodiversity hot spots' has been initiated at the new institute - Institute of Bioresources and Sustainable Development (IBSD), Imphal.

Highlights of Central Plan 2002-03 for Health are:

- Rs 235 crore for national vector-borne disease control programme (malaria, kala-azar, Japanese encephalitis, filaria and dengue).
- Rs 75 crore for national leprosy control programme
- Rs 225 crore for national AIDS control programme
- Rs 115 crore for national tuberculosis control programme
- Rs 86 crore for national blindness control programme
- Rs 61 crore for national cancer control programme
- Rs 7 crore for national iodine deficiency disorders control programme.

A provision of Rs 155 crore for various health programmes has been earmarked for development of the North East including Sikkim. Several life-saving drugs have become cheaper. Eight more drugs for treatment of cancer and other critical diseases have been included in the list of drugs fully exempt from customs duty. Vaccine for immunization against Japanese encephalitis is also exempt from customs duty. To boost domestic production of certain indigenously made drugs, a basic customs duty of 5% would be levied on selected drugs. To the large number of diabetic patients in India, Sinha has brought some relief by reducing customs duty on glucometers and test strips from 25 to 10%. For combating the scourge of HIV-AIDS, the Finance Minister has exempted specified anti-AIDS drugs from excise duty with effect from 1 March 2002.

The budget gives emphasis to development of medical sciences, including medical education, training and research for which a total outlay of Rs 404.20 crore has been provided during 2002-03. For water supply and sanitation the outlay is Rs 2359 crore.

In the agriculture sector, Sinha said that 'the country is now ready for its third revolution of agricultural diversification and food processing'. The first was the 'Green Revolution' and the second, the 'White Revolution'. For this to happen, policy changes, renewed thrust on agricultural research and extension, better investment climate from both public and private sectors, and elimination of procedural and regulatory bottlenecks are required. There would be a countrywide integrated market for agricultural products and some decontrol measures have been envisaged. The problem of food adultera-

tion and insufficient quality control is an issue that affects the health of the nation, partly caused by multiplicity of regulations (for food standards). The regulatory framework would now be modernized and converged. Legislation for a modern integrated food law has been proposed. Some highlights of the Central Plan provisions for this sector are Rs 300 crore for Crop Insurance Scheme, Rs 682 crore for Macro-Management in Agriculture, Rs 101 crore for On-Farm Water Management Scheme and Rs 120 crore for Technology Mission in Horticulture in the North Eastern Region. Irrigation, vital to agriculture has an increased allocation from Rs 2000 crore this year to Rs 2800 crore in 2002-03. Agricultural research gets enhanced allocation from Rs 684 crore in the current year to Rs 775 crore for 2002-03.

Oceanographic research has an outlay of Rs 175 crore for 2002-03. In addition to the existing activities of the Department of Ocean Development such as polar research, research in polymetallic nodules, drugs from the sea, etc. some new activities are planned in the Tenth Five-Year Plan. These are comprehensive swath bathymetric survey of entire Indian EEZ, gas hydrates exploration and technology development, geophysical studies at Laxmi Basin, etc., for which Rs 32.50 crore has been provided for 2002-03.

Space research has a plan outlay fixed at Rs 1950 crore. Some of the provisions made are Rs 16.40 crore for sensor development, Rs 5.35 crore for Megha Tropiques, Rs 184.76 crore for Indian remote sensing satellite projects, Rs 30.74 crore for Development & Educational Communication Unit (DECU) and Rs 40.13 crore for national natural resources management system.

Atomic research has an outlay of Rs 535 crore for the R&D sector, which includes new schemes to be taken up in the Tenth Plan under the atomic energy programme at various institutes and research centres under the Department of Atomic Energy.

The future scientific workforce and improving the scientific temper in India emanates from the efforts put on all levels of education and Human Resource Development. Table 1 gives a break-up in plan outlay for the various departments. Rs 1650 crore has been provided for Sarva Shiksha Abhiyan for implementation of universal elementary education in mission mode, Rs 1175 crore

for national programme for nutritional support to primary education, Rs 1380 crore for district primary education project, Rs 207 for teacher's training programme and Rs 233 crore for adult education.

The budget was formulated against a backdrop of a continuing fall in the growth rate. Growth in real GDP in 2001–02 (at constant factor cost) is expected to be 5.4%, some recovery over the low growth rate of 4% in 2000–01 (*Economic Survey 2001–02*, Economic Division, Ministry of Finance, Government of India). The agriculture and allied sectors contributed to this increase from a negative growth rate of (–) 0.2% in 2000–01 to 5.7% in 2001–02. The GDP in absolute values by advance estimates for 2001–02 at current prices is Rs 2080.3 crore and for 1993–94 prices is Rs 1258.8 crore. The R&D expenditure as percentage of GNP is shown in Figure 1.

Today, more than 50% of the children in the age group of 1–5 years in rural areas suffer from malnutrition. Power is available to only 40% of rural households and 80% of urban households. Safe drinking water, necessary to curb 75% of all diseases in the country, is still elusive. Only 60% of urban households have taps in their homes and far less have latrines. Infant mortality rate is about 72 per thousand. Literacy rate is currently about 65%. India's Census 2001 has shown the population to be at 102.7 crore. State finances are in doldrums and all developmental strategies would have to address this issue.

The budget is to be welcomed, but money is not the issue. A country such as India can find this kind of money for R&D efforts. What is going to drive Indian science is young blood entering the science streams. This is the sense got from speaking to a DRDO 'point person'

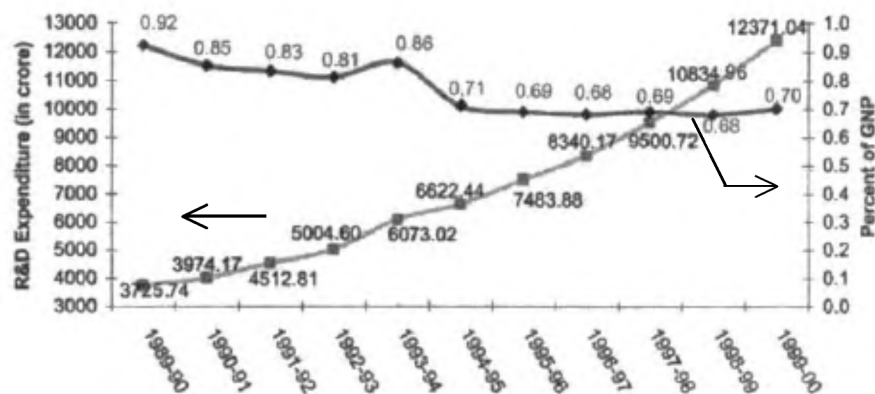


Figure 1. R&D expenditure as percentage of GNP. Source: Report of the Comptroller and Auditor General of India (No. 5 of 2001) for Scientific Departments, Union Government.

controlling funding research in the academic sector. This kind of research funding is of the order of about Rs 25 crore on basic research, spread over nearly twenty-four universities and academic institutions. One way out is to bring stipends for research associates, etc. up to agency-type level. This would close the gap between a stipend and a job, making a career in science more lucrative. Sponsored Ph D programmes are needed to guarantee job security.

The university system requires a revamp in terms of infrastructure support and facilities if it is to train the future generation of scientists and provide the impetus for basic scientific research. According to V. Siddhartha, DRDO and Chairman TIFAC Home Grown Technology Apex Board, the administrative machinery within the academic institutions is in poor shape and affects implementation of research projects. For example, while handling research grants from funding agencies, the source of frustration for the researcher has shifted from 'external'

(i.e. research funding agencies, including UGC) to 'internal' (i.e. administrative offices of the academic institutions). There should also be greater networking among institutes, keeping bureaucracy to a minimum.

Better land-management techniques have to be followed to increase cultivable land and to better-use existing wastelands. Only 40% of available agricultural area is at present irrigated. In health care and nutrition, India requires a drastic reorganization of health-care infrastructure. The fruits of research in border areas of modern biology, etc. should be introduced into the teaching curricula of medical colleges. India has a lot of work still in fighting malnutrition, micronutrient deficiencies (hidden hunger), iodine deficiencies and providing safe drinking water and improving sanitation.

Nirupa Sen, 1333 Poorvanchal Complex, J.N.U. New Campus, New Delhi 110 067, India (e-mail: nirupasen@vsnl.net).