Japanese budget

Science benefits despite cuts elsewhere

Tokyo

SCIENCE, particularly basic science, made a few small gains even from Japan's most stringent budget for almost thirty years.

After a long battle against the opposition parties in the Diet, with the April budget deadline looming ever closer, the government has finally won agreement for a 0.5 per cent cut in public expenditure during fiscal year 1984-85. Even so, the government will still be short of cash, and will have to issue bonds worth around $Y2 \times 10^{13}$ ($\$8 \times 10^{10}$) to cover expenditure, adding to the $Y10^{14}$ of public debt already incurred.

Expenditure increases have been granted in only a few areas: defence (plus 5-6 per cent), overseas development aid (plus 6 per cent) and science and technology (plus 0.7 per cent). None of the big three science and technology bodies shown in the table — the Science and Technology Agency (STA), the Ministry of Education, Culture and Science (MESC) and the Ministry of International Trade and Industry (MITI) — has gained much in total, but all have managed to protect their basic research programmes.

The biggest increase of all is for the new projects in areas related to computers and the life sciences. MITI's fifth generation computer project, the plan to build an "intelligent" computer which has sent Western governments scrambling to support artificial intelligence research, receives an 88 per cent budget increase. Close behind comes a 43 per cent increase, within MITI's large-scale industrial technologies programme, for research towards building the world's most powerful supercomputer. The goal is a machine capable of 10,000 million floating point operations per second, with applications in areas such as weather forecasting and the design of nuclear warheads.

All ministries, including the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Health and Welfare (MHW), have increased expenditure in the life sciences, concentrating on biotechnology and cancer research. Precise budget increases are hard to calculate, for Prime Minister Nakasone's approval in June last year of a comprehensive "ten-year strategy for cancer control" has led to a recategorization of some funds for life science research.

There is little doubt, however, that total expenditure on fundamental research into molecular biology and the treatment of cancer is growing now that each ministry has established special "anticancer" funds (MHW $Y1,600$ million, MESC $Y1,200$ million, STA $Y7,700$ million, STA Radiological Institute $Y400$ million) as well as supporting cancer-related research in their general budgets. Research is being

coordinated under seven main themes: oncogenesis, carcinogenesis, early diagnosis, chemotherapy, radiotherapy and immuno-modulation and the use of monoclonal antibodies.

The budgets of the various agencies of the Japanese Government are as follows:

Science and Technology Agency. The budget for "special promotion funds", the interministerial grants for basic research thought vital to Japan's long-term prosperity which are given out directly by the prime minister's own advisory council, is further increased. Priorities are now recombinant DNA research, the development of new materials and cryogenic tech-

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Science and Technology Agency	Y (thousand million)	Percentage increase or decrease
Total science-related budget	408.1	+ 2.4
Special promotion funds	6.4	+ 2.4
ERATO	2.3	+ 3.9
Nuclear energy	210.2	- 0.7
NASDA	85.9	
Cancer campaign	7.7	
RIKEN	9.6	+ 13.0
Disaster prevention	2.1	- 5.3
Expo '85	26.7	+ 4.6
Ministry of Education, Culture and Science		
Total science-related budget	282.9	+ 0.2
Grants-in-aid	40.5	+ 2.5
Research institute grants	100.4	+ 2.0
Special grants for large-scale facilities	22.7	+ 13.0
Ministry of International Trade and Industry		
Total science-related budget	232.7	+ 3.4
Basic technologies for future industries	6.0	+ 1.7
Large-scale industrial technologies	11.1	- 30.0
Sunshine project	39.8	- 5.2
Moonlight project	9.6	+ 1.0
Fifth-generation computer project	5.1	+ 88.0

nologies. But there is also an increase for Project ERATO which, by its support for work by small interdisciplinary groups on novel and sometimes eccentric themes, sets out deliberately to stimulate creativity.

The budget for research at STA's two massive nuclear energy institutes, the Power Reactor and Nuclear Fuel Development Corporation and the Japan Atomic Energy Research Institute, is slightly down but the figures conceal a large increase (33 per cent) for Project Monju — the building of a prototype 300 MW fast-breeder reactor by the late 1980s.

Expenditure on the commercial space programme by the National Space

Development Agency (NASDA) remains static although big increases are likely next year as the plan to build the H2 rocket, capable of putting 200-kg satellites into orbit, gets under way (see *Nature* 308, 3; 1984).

For the second year running, a big chunk of STA's budget is swallowed by preparations for Expo '85, the international exposition on the theme of "Science and Technology for Man at Home" which will open in Tsukuba Science City in March next year. Expenditure on Expo will practically cease in the next fiscal year and various groups are already eyeing the spare cash that will then become available.

Of the research corporations attached to STA, the Institute of Physical and Chemical Sciences (RIKEN) has the largest budget increase. Part of this represents continuing investment in the construction of a heavy ion accelerator.

Ministry of Education, Culture and Science. Grants to research institutes and grants in aid of research both increase a little but there is a bigger increase in "special funds" for large-scale facilities. Much of the extra will go to the High-Energy Physics Laboratory (KEK) for the 30-GeV per beam electron-positron collider (TRISTAN) at Tsukuba Science City. The project is on target, with the first results still expected in autumn 1986.

Also blessed among MESC's research laboratories are the National Institute of Genetics, which acquires the coveted status of a National Research Institute for Joint Use by Universities (see *Nature* 305, 372; 1981); the Institute for Space and Astronautical Science which receives a 10-15 per cent budget increase, mostly earmarked for the launch of the Halley's comet probe, Planet-A; the University of Tokyo's Astronomical Observatory, which gains further investment in the Nobeyama millimetre-wave telescope; Kyoto University's Institute for Mathematical Sciences, where a new section of algebraic analysis is to be set up; and Osaka University's Microbiological Institute, which adds a section to study the molecular biology of cancer.

Ministry of International Trade and Industry. The ministry's "Basic Technologies for Future Industries" programme, made up of long-term research projects on biotechnology, new materials and new electronic devices, continues to be fully supported, giving credence to the avowed aim not to cut back on fundamental research even when funds are tight. Some of the more conventional programmes, the Sunlight programme for the development of new energy sources and the Moonlight programme for energy conservation, have done less well. Within the Large-Scale Industrial Technologies programme, which covers nine projects ranging from robot flexible manufacturing systems to computerized sewing systems, only the supercomputer project and the "robots for extreme environments" projects will see budget increases. **Alun Anderson**