JAPAN BUDGET

Winners, Losers Abound As Reforms Kick In

TOKYO—Next spring, Japan hopes to finish building the Earth Simulator, a mammoth supercomputer capable of modeling global climate change in unprecedented detail. But researchers may not be able to run it full-time because of budget cuts to the three agencies funding it.

That mixed message was repeated last week to scientists in many disciplines as Japanese ministries unveiled their budget requests for the next fiscal year. Although overall spending for science will rise about 5%, the increases are concentrated in a handful of areas deemed economically important and offset by cuts in other fields.

The crunch is especially severe for research organizations that fall into a special class of public corporations, such as the trio funding the Earth Simulator, which the current Japanese administration has called wasteful and in need of major restructuring.

"It would be awful, but Japanese science could die because of these reforms," says Shun-ichi Kobayashi, president of the Institute of Physical and Chemical Research (RIKEN) near Tokyo, another of the affected bodies.

The budget requests, for the year beginning 1 April 2002, reward projects deemed likely to strengthen industrial competitiveness, invigorate the economy, and promote a high quality of life. That includes a 62% jump in the life sciences within the Ministry of Education, Science, Technology, Sports, and Culture to study the structure and function of proteins, a 49% rise in spending on nanotechnology and advanced materials, and a 12% boost for information technologies.

But the flipside is equally dramatic. "Where is the money coming from to fund those increases?" asks Norio Kaifu, director-general of the National Astronomical Observatory of Japan (NAOJ) in Mitaka. "From other fields," he says, including an estimated 10% cut at NAOJ and cuts in space sciences and astronomy, ocean research, and atomic energy at the education ministry (see table).

The proposed budget cuts may be just the opening shots for institutes such as RIKEN, the Japan Marine Science and Technology Center (JAMSTEC), and the Japan Atomic Energy Research Institute (JAERI). They have the misfortune of being part of a group of 163 special public corporations—which perform functions ranging from building toll roads to running Japan's public broadcasting system—that Prime Minister Junichiro Koizumi has declared must be either privatized or dismantled.

Who's Up, Who's Down...

... By field*	2002 request (in millions)	% Change
Life sciences	$758	+62%
Information technology	$798	+12%
Environmental studies	$543	+14%
Nanotechnology, materials	$269	+49%
Space and astronomy	$129	–3%
Ocean science	$302	–6%
Atomic energy	$216	–6%
... By institute		
Japan Atomic Energy Research Institute	$862	–10%
Institute of Physical and Chemical Research (RIKEN)	$667	–9%
National Space Development Agency	$1200	–5%
Japan Marine Science and Technology Center	$325	+1%

* Funded by the Ministry of Education, Science, Technology, Sports, and Culture.

Wrong direction. Space science takes a hit despite successful H-2A rocket launch (*below*) last month.

CREDITS: (TOP TO BOTTOM) SOURCE: MINISTRY OF EDUCATION, SCIENCE, AND TECHNOLOGY; NATIONAL SPACE DEVELOPMENT AGENCY

On 10 August, a task force issued a string of recommendations for these agencies. Although their fates may not be settled for years, the administration has pledged to start by slicing $8 billion next year from the $44 billion these agencies now receive.

Unhappily for climate modelers, the new supercomputer is part of the Earth Simulator Research and Development Center, which is jointly supported by three of these agencies: JAERI, JAMSTEC, and NASDA, Japan's space agency. "I'm very worried about the effect of this on our research program," says Taroh Matsuno, director-general of the Frontier Research System for Global Change.

The center is scrambling to find other potential users of the computer who might be able to contribute to its operating costs. JAMSTEC is also facing a 10% cut in the construction budget for its large ocean-drilling research vessel. "It means we'll have to push back completion of the ship by a year," says Takeo Tanaka, head of JAMSTEC's ocean-drilling program office, delaying its first scientific cruise until 2007 at the earliest.

Some ministries have already accepted the task force's recommendations. Last week, the education ministry announced that by 2003 it would merge NASDA, which is responsible for launching weather and communications satellites and for Japan's contribution to the international space station, with two other agencies: the Institute of Space and Aeronautical Science (ISAS), which focuses on space science, and the National Aerospace Laboratory, which conducts research into fluid dynamics and other more technological problems.

Although ISAS researchers fear that the merger will shortchange space science, ISAS director-general Hiroki Matsuo says the move is unavoidable: "We just have to try to make this merger work as well as possible."

Other proposals, however, are expected to generate fierce opposition. One involves merging JAERI, which heads Japan's efforts on the International Thermonuclear Experimental Reactor, with the National Institute of Fusion Science (NIFS), which operates the Large Helical Device near Nagoya. NIFS's budget for next year was cut by 27%, and Osamu Motojima, who heads the helical device project, fears that a merger could wipe out his project's alternative approach to fusion. **–DENNIS NORMILE**

With reporting by Charles Whipple in Tokyo.

CELL BIOLOGY

Integrin Crystal Structure Solved

For crystallographers, some of the more challenging proteins are those found on cell membranes. Often large and insoluble, membrane proteins are difficult to induce to form crystals. Even when that can be done, researchers run the risk that their manipula-