JAPAN BUDGET

Deficit Reduction Nicks Science Funding

TOKYO—Japan's recent commitment to a rapid increase in R&D spending over the next several years has bumped into a firm pledge to reduce the country's serious budget deficit. The resulting collision, described in a report last week from a high-level government advisory body, is likely to delay, but not derail, the country's new Basic Plan on Science and Technology, and it could pose problems for several big-science projects, including the $10 billion International Thermonuclear Experimental Reactor (ITER). However, many scientists are breathing a sigh of relief after looking at a list of recommended spending cuts. "Relatively, science is doing well," says an official with the Science and Technology Agency.

The Fiscal Structure Reform Council, an ad hoc committee chaired by Prime Minister Ryutaro Hashimoto, wants to pare the budget deficit from 5.4% to no more than 3% of gross domestic product by 2003. The first step would reduce by 0.5% next year's so-called ordinary budget, which accounts for the major share of government spending. The report, already endorsed by the Cabinet, will be incorporated into a fiscal-reform law that is expected to be approved by the Diet (parliament) with few, if any, changes.

Because the report lacks detail, however, the real battle over research spending will take place during this fall's budget negotiations with the Ministry of Finance. And science administrators take hope from the council's recommendation for an increase in the science promotion fund, a budget category that covers spending at most national labs and research grants. While the council suggested a rise of no more than 5% in a category that went up 8% this year, many nonscience areas are targeted for budget cuts of up to 10%.

There will be some belt tightening. The council recommended "flexibility" in executing a 5-year, 17-trillion-yen ($136 billion) plan that is often erroneously described as a doubling but that would actually add about 50% to current levels. It is widely believed that this suggestion would extend the timetable by at least a few years. The report also urges the delay of "big-science projects" in atomic energy, fusion, and space. It mentions waiting until 2003 to begin construction of ITER, a fusion reactor that proponents hoped would be under way by the end of the decade. Keiichi Nagamatsu, an official of Keidanren, an influential business group that has staunchly supported Japan's bid to host the ITER reactor, says such a delay is in line with current thinking by international partners. The group still believes the project is "indispensable" for meeting the world's energy needs, he adds.

The same may not be true of the Monju experimental fast breeder reactor, which has been plagued by leaks of radioactive material and complaints of lax management. The council's report calls for the plan "to be thoroughly rethought," which many scientists interpret as the first step toward cancellation.

The report leaves a question mark hanging over other big projects. One is the Japan Hadron Project, a $700 million accelerator that would produce K mesons for use in studying basic nuclear physics. After a decade of planning, officials at the High-Energy Accelerator Research Organization (KEK), the former National Laboratory for High-Energy Physics, had hoped to get initial construction funding next year. Hirotaka Sugawara, director-general of KEK, says delaying the start or 5-year schedule "would be a serious blow to basic science."

Even muddier is the future of the Japan Linear Collider, a $3 billion project that researchers hoped would ride on the coattails of Japan's 5-year spending plans, with construction beginning in 2001. With the national plan stretched out, Sugawara now expects the project to be delayed, although he is confident it will not be abandoned. "People realize that it is important to support [science] projects," he says.

–Dennis Normile

SCHOOL PERFORMANCE

U.S. Kids Score Well in Primary Grades

Elementary school students in the United States are world-class achievers in science. But their success may be as much a result of what happens outside the classroom as inside, and their achievements drop off sharply in later grades.

Those findings are part of the latest data collected by the Third International Mathematics and Science Study (TIMSS), a massive exercise involving three grade levels and 50 countries. This week, TIMSS released results for the subset of 26 countries that tested third- and fourth-grade students on general knowledge, applications, and reasoning skills. Last fall, it posted results for seventh- and eighth-graders (*Science*, 22 November, p. 1296), and the scores for high school seniors are due out in February.

The new data show Korea clearly out front in science, with several countries, including the United States, Japan, Austria, and Australia, fighting for second. In the mathematics test, Singapore, Korea, Japan, and Hong Kong share top billing, with the United States in 12th place.

Although U.S. educators may cheer the latest results, the downside is that by grade eight, U.S. students fall farther than any other country in the international rankings, to just above average in science and below average in mathematics. "We don't begin behind; we fall behind," says William Schmidt of Michigan State University, U.S. coordinator of TIMSS.

TOP 10 IN ELEMENTARY SCIENCE

Country	Score
Korea	597
Japan	574
United States	565
Austria	565
Australia	562
Netherlands	557
Czech Republic	557
England	551
Canada	549
Singapore	547
International average	524

SOURCE: TIMSS, FOURTH-GRADE STUDENTS

Experts point to several causes for the fast start. Students in the United States begin formal science instruction earlier than in many other countries, spending on average just under 3 hours a week in science class by fourth grade. Singapore, for example, does not begin specific science instruction until third or fourth grade. But part of the early lead may come from outside of school. "Science is taught so little in the first four or five grades that it is difficult to give a lot of credit to the schools," says Andrew Porter of the University of Wisconsin, Madison. Educational television, science magazines for young readers, and science museums may be giving U.S. children a boost over their international peers. "Our kids really swim in a media environment," says Senta Raizen of the National Center for Improving Science Education in Washington, D.C. "A lot of information is absorbed through television if they watch anything at all worthwhile."

But *3-2-1 Contact* and *Bill Nye the Science Guy* aren't enough by eighth grade. While the fourth-grade science curriculum in the United States looks very similar to those in other countries, says Schmidt, by eighth grade they look quite different. The difference is especially pronounced in math, where most of the rest of the world studies algebra and geometry and many U.S. students are still reviewing arithmetic. "The rest of the world has shifted," says Schmidt, "but we haven't made that shift."

–Gretchen Vogel