

WOMEN IN SCIENCE

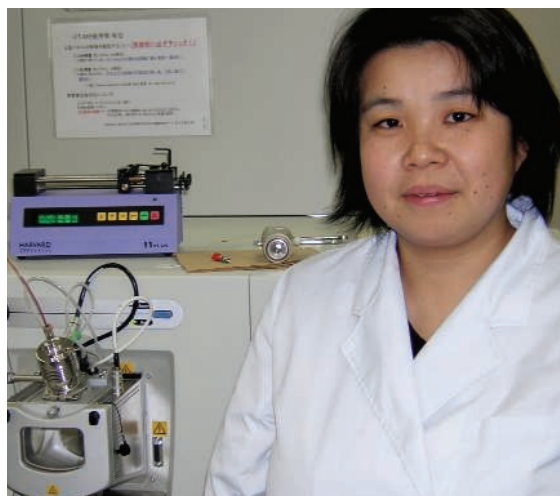
Getting Women Scientists Back on The Career Track in Japan

Japan is one of the richest countries, but it's also one where women have little chance of succeeding in science; several new programs aim to end this dubious distinction

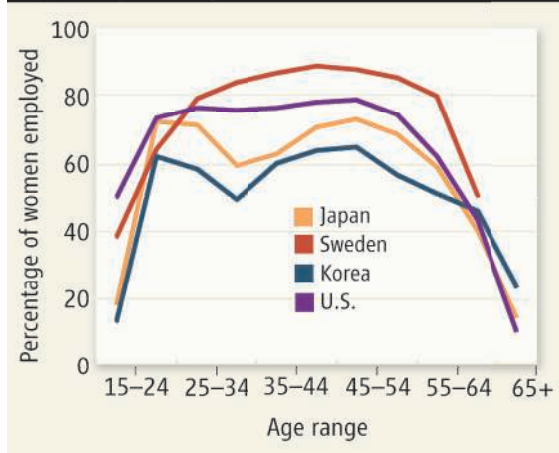
TOKYO—Five years after she gave up research to be a full-time mother, Kumiko Usuda is trying to pick up her career where she left off. The Ph.D. astronomer quit working when her first child was born and stayed home until her second child was comfortable with a babysitter. Now living in Hilo, Hawaii, where her husband, also an astronomer, heads engineering for Japan's Subaru Telescope, Usuda does voluntary outreach work for the observatory as she updates her thesis research on molecular gases in galaxies for publication. She would like to arrange observing time at radio telescopes and attend conferences. But it's hard. Although the observatory has given her office space, "there is no financial support for business trips," she says.

Help is on the way. Next month, Japan's government will launch a new category of grants open only to parents returning to the scientific workforce after extended child-rearing breaks. It is part of a package of initiatives that also includes grants for institutions to develop schemes to help women balance research careers and family life. The underlying objective—set out in a draft 5-year policy plan—is to have women claim 25% of all new science and engineering positions at governmental institutions.

Usuda appreciates what the government is doing: "I'm so happy somebody is thinking about my situation," she says. But many worry that the measures will barely dent the formidable barriers that women face. A shortage of daycare facilities and a tradition of long working hours make research careers difficult for mothers with young children. The biggest challenge may be raising the consciousness of senior—primarily male—administrators. Labs and universities "are far from ever thinking of what it takes to be a mother and a scientist," says Kuniko Inoguchi, minister of gender equality and social affairs and a former professor at Sophia University in Tokyo.



Careers, Interrupted



Timing is everything. Yoko Iijima had her first child in between postdoc stints. Other women in their 20s temporarily step off the career ladder.

The Japanese government has taken up the gauntlet out of embarrassment, not chivalry. In 2004, women made up only 11.1% of the scientific workforce, the lowest proportion among the 30 member countries of the Organisation for Economic Co-operation and Development. (Portugal has the highest rate, more than 40%; the U.S. figure is 26%.) "This is a very dubious honor for Japan," says Akira Kawamoto, director for science and technology policy in the cabinet office.

The percentage of women scientists has remained low despite rising achievement. In 2004, women made up 23% of those enrolled

in science and engineering doctoral programs, up from less than 15% in 1995. Yet few women find permanent academic jobs. At Japan's national universities, the proportion of women holding associate professorships is stuck at about 10%.

To boost the numbers, the Council for Science and Technology Policy (CSTP), the nation's highest science advisory body, set targets for the proportion of newly available permanent positions that go to women in the Third Science and Technology Basic Plan, expected to be adopted by the cabinet this month. Targets vary by field: 30% for health and life sciences, 30% for agricultural sciences, 20% for physical sciences, and 15% for engineering. The percentages are based on the proportions of women currently earning Ph.D.s in each area. "We assume that the ability of men and women are equal, so we can naturally expect that the rates [of women earning Ph.D.s] should be reflected in the rates of women becoming professors or assistant professors," says Kawamoto, who oversaw the drafting of the plan.

The initiative is getting mixed reviews. Plant biochemist Yoko Iijima, a postdoc at the Kazusa DNA Research Institute in Chiba, thinks candidates "should be chosen based on abilities, irrespective of gender." Others argue that gender is an ever-present factor. Mariko Kato, an astronomer at Keio University in Tokyo, says that during initial postdoc fellowships, the male-female ratio closely reflects the proportion of men and women earning Ph.D.s. But as the years pass after graduation, more men find permanent positions, leaving a disproportionate number of women cycling through postdocs or other temporary jobs. Nobuko Wakayama, a protein crystallographer at the National Institute for Materials Science in Tsukuba, says that it is typically the older male scientists who set the tone for institutional decisions on hiring, promotion, and funding. And "they tend to look down on women researchers," she says.

Kawamoto says the targets will make institution heads accountable for helping the nation boost the number of women in responsible research positions. "To change [attitudes], this sort of top-down target is necessary," he says. Although the cabinet office can only rely on "moral pressure," Kawamoto says, it will publicize which institutions are making progress and which aren't.

Beating the "M" curve

To address the day-to-day issues that weigh on women scientists, the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) in the fiscal year beginning in April is launching a trio of new initiatives.

How to balance work and family demands is a challenge for women everywhere. But in

A \$214 Billion Plan of Action

TOKYO—Women researchers are not the only beneficiaries of Japan's Third Science and Technology Basic Plan (see main text). The blueprint for the next 5 years, expected to be finalized and adopted by the cabinet this month, is designed to tackle unfinished business across the R&D spectrum.

The first plan, adopted in 1996, set an ambitious goal of doubling public research spending to ¥17 trillion (\$145 billion) over 5 years. That target was achieved. The second plan in 2001 called for ¥24 trillion for R&D, which would raise annual expenditures to about 1% of gross domestic product (GDP). Due to Japan's fiscal woes, however, spending fell short, totaling about ¥21 trillion. For the third plan, policymakers are again eyeing a 1% of GDP benchmark, up from 0.67% in 2003. That translates into ¥25 trillion (\$214 billion) for R&D over the next 5 years. Spending increases will depend on economic growth averaging 3.1%, a figure that may be in reach with Japan's economy on the mend.

Highlights of the draft plan include:

Priority areas. The S&T plan aims to continue previous policies of concentrating funding increases in four priority areas: life sciences, information technology, environmental sciences, and nanotechnology and materials sciences. It will also continue to focus on four areas of secondary priority: energy, manufacturing technology, social infrastructure, and frontier sciences (a catchall category).

Fostering competition. To create a more competitive research environment, the plan calls for increasing funding for peer-reviewed grants for individuals and small teams by 30%—up from about \$3.3 billion in fiscal 2005—over the next 5 years. And to promote the best institutions, the plan seeks to make universities and labs compete for funds. Currently, they receive most of their funding as block grants based on factors such as enrollment. The goal is for about 30 institutions to break from the pack as world class according to number of citations, says Akira Kawamoto of the cabinet office.

Research fraud. Although details are still being worked out, the final plan is likely to call on universities and institutes to set up offices to investigate allegations of misconduct.

—D.N.

Japan (and Korea), scarce daycare and a cultural bias in favor of mothers staying at home with small children result in an unusual pattern of midcareer dropouts. In most industrial countries, the percentage of women in the workforce stays fairly constant at all ages. In Japan and Korea, however, the percentage peaks for women in their early 20s, dips to a low point for those in their early 30s, and then recovers to the earlier level as they enter their late 30s. This "M" curve of workforce participation plotted against age is deceptive, says CSTP member Reiko Kuroda, a University of Tokyo biochemist. "Women are not able to come back to positions where the quality of the work is the same as before the break," she says. Kuroda suspects that returnees typically end up in jobs with less responsibility and fewer chances to advance to leadership positions.

MEXT officials hope two new programs will get the kink out of the curve. One will challenge institutions to devise novel approaches to balancing motherhood and work. Many women feel pressured to quit a research post rather than take maternity leave because they worry that a prolonged absence will inconvenience colleagues. One possibility is to provide money to hire temps for women on maternity leave. The ministry expects to select proposals from 10 institutions based on a competitive review. Winners will share \$12.6 million over 3 years.

The second program will offer research reentry grants to men and women who, like Usuda, put careers on hold to start a family. The \$2.2 million program will provide 30 scientists with 2-year fellowships, which are expected to be steppingstones to permanent posts.



Unheralded dilemmas. The new initiatives fail to tackle cultural issues such as late-night lab discussions that mothers must miss, says Miwako Ishido.

The third program reaches further up the pipeline. MEXT plans to set up exchanges between high school girls and role-model women scientists and develop brochures on research careers. The ministry has \$300,000 for the program in the fiscal 2006 budget. If the programs are successful, it's likely they will be expanded, says MEXT's Masaaki Tanaka.

Women welcome the programs but tend to see them as small steps when leaps are called for. "I really think highly of these initiatives," says cell biologist Miwako Ishido. However, she says, they do little to tackle "the range of cultural issues that make it difficult" for women in research.

Maternity leave isn't likely to improve much, some say. Most women who want to start families are postdocs. "Many women worry that taking maternity leave while on a postdoc won't look good on their resumé," says Iijima. She planned her pregnancy so as to give birth between the completion of a postdoc fellowship at the University of Michigan, Ann Arbor, and the beginning of her current postdoc at Kazusa. "All of my friends are in a dilemma over when to have kids," she says. Ishido adds that many institutions have an age limit—typically 35—for candidates for permanent positions, adding a twist to the child-rearing puzzle.

One of the biggest headaches remains unaddressed: "We need childcare centers in labs and universities," says Inoguchi. Only two of Japan's dozen or so top research universities have on-campus daycare. Tohoku University opened the first last fall, and Nagoya University will follow suit in April. The Nagoya nursery will keep children until 9 p.m. But that may not be late enough for what Ishido calls "the night-owl culture" of Japan's labs. Researchers typically arrive late in the morning and work until midnight. "All the most interesting lab discussions take place late at night," she says.

The slow pace of change in the academic community has already pushed many talented women in other directions. Ishido, who earned her Ph.D. at Kyoto University and did a postdoc stint at the Scripps Research Institute in San Diego, California, chose to get off the postdoc treadmill when she returned to Japan last year. She now splits her time between benchwork at a biotech start-up and evaluating high-tech investment opportunities for a venture-capital firm. "This trend of talented women pursuing opportunities outside academia is likely to push universities to change," she says.

But the extra nudge from the new clutch of programs is welcome. Usuda says she regularly checks the Web site of the Japan Society for the Promotion of Science, where details of the grants for women returning after career breaks are due to be posted. The new programs may not usher in an era of equality, but they send a strong message that the status quo is no longer acceptable.

—DENNIS NORMILE

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