ers, who will visit 25 to 30 villagers on their way home from school each day and remind them to take their medicine.

The results are expected to clarify some of the findings from the Linxian study, which was far from conclusive on the effects of such supplements as beta-carotene, vitamins A and E, and selenium. Last year a Finnish study co-funded by NIH (*New England Journal of Medicine*, vol. 330, p. 1029) reported an unexpected increase in lung cancer among male heavy smokers who received beta-carotene, leaving epidemiologists scrambling for an explanation. Even so, most scientists remain convinced that such supplements can be effective in lowering cancer rates. They expect that faith to be validated next year in results from the first of two large, long-term U.S. trials among health professionals in the Boston area—22,000 male physicians who have been taking beta-carotene for a dozen years to reduce the incidence of epithelial-cell cancers.

Most intervention studies are too costly to run for such a long time, and there will still be plenty of unanswered questions when the Linqu trial is completed. But the trial is off to a good start, says You, and that is good news for both the residents of Linqu county and epidemiologists around the world.

–Jeffrey Mervis

ENVIRONMENT

National Monitoring Network Does Science—and a Lot More

BEIJING—Ouyang Hao took on a daunting collection of responsibilities when he left the Chinese Academy of Sciences' (CAS's) Institute of Botany here earlier this year to set up shop 1400 kilometers away in a rural part of southern Jiangxi Province. An expert on nutrient cycling in forest ecosystems, Ouyang is measuring the extent of deforestation—a serious problem in the region—and identifying alternative fuel sources. After that, he intends to teach local residents how to implement his findings. And that's just part of his job. He's also monitoring the environmental impact of water cycles, natural disasters, and the emission of greenhouse gases.

Ouyang's heavy load reflects the broad sweep of an ambitious new program called the China Environmental Research Network (CERN), a collection of 29 field sites spread across the country. As a rising population and a booming economy place increasing demands on limited resources, CERN researchers like Ouyang are gathering long-term ecological data on China's growing environmental problems. The network also is expected to set the standard for new data management techniques and pioneer procedures for sharing information among government agencies and with researchers around the world.

CERN's 29 stations, managed by CAS and run by individual CAS institutes, have been equipped and staffed over the past 5 years with $16 million from the World Bank and $10 million from the Chinese government. The sites, selected from among the 52 stations of an older, less sophisticated network, cover a variety of ecosystems: 16 focus on agro-ecosystems, with the rest tracking lake, sea, grassland, and forest ecosystems.

A large share of CERN's budget has been devoted to data management. Some $3 million from the World Bank has gone to pay for computers, with a similar amount paying for training. More than 40 CERN scientists have already traveled abroad, including visiting sites that are part of the U.S. Long-Term Ecological Research (LTER) network funded by the National Science Foundation. Although the U.S. program emphasizes data collection over the short-term implementation of results, scientists familiar with both programs say China has avoided some of the problems of the 15-year-old LTER program.

"One of the big mistakes we made and that the Chinese seem to have learned from was the neglect of data management," says University of Washington ecologist Jerry Franklin, who ran LTER for 12 years and is now a member of CERN's international scientific advisory committee. "Like scientists everywhere, we tried at first to do it on the cheap. The people at CERN have done the right thing by investing in data management from the beginning."

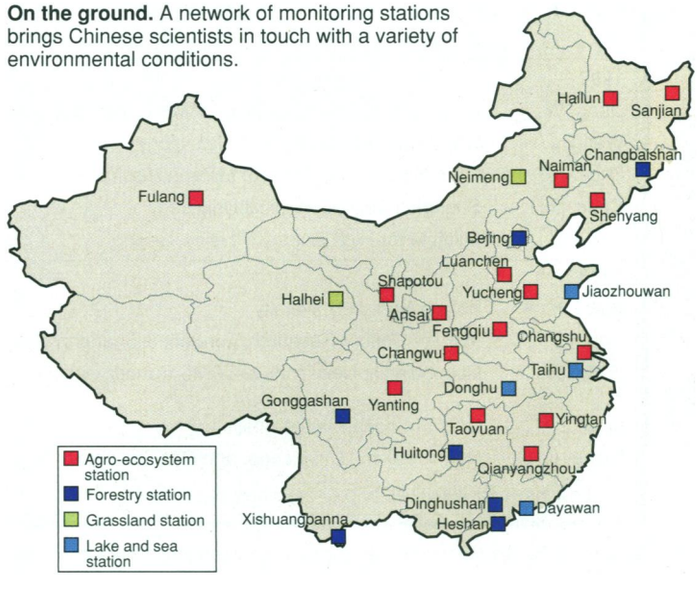
That investment includes a commitment to standardization to make sharing data technically feasible. Potential government users include China's National Environmental Protection Agency (NEPA), the State Meteorological Administration, and the Ministries of Forestry and Agriculture, each of which has a representative member on CERN's data management committee. CERN administrators have also suggested making data available to those doing economic or historical research, and even to businesses. But this commitment to openness runs counter to the Chinese bureaucratic tendency to horde potentially valuable information. And that makes some observers skeptical.

"Whether that will be truly possible in the context of the Chinese system is not clear," says Susan Shen, a senior ecologist in the World Bank's East Asia and Pacific Division. "It is not a secrecy issue, but a commodity issue. A lot of CAS institutes have had to become self-sufficient in recent years, and one of the ways they pay their own way is to sell useful data that they gather. Well, if you share it you can't sell it, can you?"

A staffer at NEPA's policy research center confirms that the problem has the potential to be quite serious. "CERN is supposed to be collaborating very closely with us, but so far they have not been," says the staffer, who requested anonymity. "They have not yet established procedures for informing us of their research results."

Even if CERN does live up to its promises, however, some environmental scientists doubt that it can greatly improve China's chances of heading off ecological disaster. Environmental degradation costs China at least 10% of its gross domestic product each year, says geographer Vaclav Smil of the University of Manitoba in Canada, who has written extensively on China's environmental problems, and there are few signs that the trend will be reversed.

"If they could get it together scientifically, which is a questionable assumption to begin with, priorities elsewhere among the



On the ground. A network of monitoring stations brings Chinese scientists in touch with a variety of environmental conditions.

government and among the people make it impossible," says Smil. "Even if a successful integrated network like CERN does everything it says it will, there is now this get-rich-as-fast-as-you-can climate all over China. I am afraid nothing much will improve in the next 15 to 20 years."

Xia Guang, associate professor of environmental economics and environmental policy at People's University in Beijing, agrees that the stiffest challenge is to infuse China's 1.2 billion people with a sense of environmental stewardship to temper the drive for economic gain. "We must tell people what rights they have and what benefits they can share," he says. "Only if such awareness rises among common people will they do more to protect their environment."

Ouyang has already accepted that challenge. His preliminary findings suggest that solving the problem of deforestation in rural Jiangxi Province has as much to do with changing population and migration patterns as it does with the mechanics of nutrient cycling. And he believes that tackling such issues is part of the job for environmental scientists in China. "My solution will have to take into account the precise local conditions," he says, "and my demonstration project will have to convince the people there that it serves their own best interests." In other words, Ouyang wants his work as an environmental researcher to become everybody's business.

–Ted Plafker

Ted Plafker is a free-lance writer in Beijing.

THESE PAPERS TOP THE CITATION CHARTS

First Author	Institution	Journal	Topic
1988			
Huang, M. E.	Shanghai Second Medical University	*Blood*	Retinoic acid for leukemia
He, J.	Third Medical University, Chongqing	*Chest*	Sleep apnea
Shu, S. Y.	Fourth Military Medical University, Xian	*Neuroscience Let.*	Brain histochemistry
Huang, K.	CAS Institute of Semiconductors, Beijing	*Phys. Rev. B*	Superlattices
He, L. X.	CAS Atom Imaging Lab, Shenyang	*J. Mat. Sci. Let.*	Quasi-crystals
1989			
Chen, C. T.	CAS Fujian Inst. for Research on Material Structure	*J. Optical Society B*	Optic crystals
Jiang, W.	Columbia U., New York, and CAMS Cancer Institute, Beijing	*Oncogene*	Rapid detection of RAS oncogenes
Sun, C. P.	Chinese Center for Advanced Science and Technology, Beijing	*J. Physics A*	Particle theory
Yeh, F. S.	U.S.C., Los Angeles, and Guangxi Medical College, Nanning	*Cancer Research*	Hepatitis B virus, aflatoxins
Ling, Y.	Fudan University, Shanghai, and Northwestern U., Chicago	*Phys. Rev. B*	Surface physics
1990			
Zhang, M. Y.	UC San Diego and Shanghai Institute of Mental Health	*Annals of Neuroscience*	Dementia
He, D. C.	Beijing Normal University	*J. Cell Biology*	Nuclear structure
Han, C.	Emory University, Atlanta, and Beijing Medical University	*European J. of Pharm.*	Cardiovascular pharmacology
Zhu, L. M.	CAS Changchun Institute of Applied Chemistry and University of Strathclyde, Scotland	*Tetrahedron*	Asymmetric synthesis
Lu, K.	CAS Institute of Metal Research, Shenyang	*Scripta Met & Mat*	Nanomaterials
1991			
Hsu, I. C.	National Cancer Institute, NIH, and CAMS Cancer Institute, Beijing	*Nature*	P53 mutations
Yeh, H. J.	Washington U., St. Louis, and Shanghai Institute of Cell Biology	*Cell*	Neuronal growth factor
Chen, Z. X.	Suzhou Medical College	*Blood*	Retinoic acid for leukemia
Chen, Z. M.	U. Oxford, England, Shanghai Chest Hospital and Medical U.	*British Med. J.*	Coronary disease
Wu, Z. G.	Carnegie Institute and CAS Inst. of Developmental Biology, Beijing	*J. Cell Biol.*	RNA splicing
1992			
Jiang, W.	Columbia U., New York, and CAMS Cancer Institute, Beijing	*Cancer Res.*	Oncogene detection
Wang, J. H.	CAS, Shanghai Institute of Physiology	*PNAS*	Molecular components of memory
Zhu, X. Z.	CAS, Shanghai Institute of Materia Medica	*J. of Neurochem.*	Neurotransmitter release
Chen, S. J.	Shanghai Second Medical University	*Oncogene*	APL fusion gene
Bai, J. Z.	Institute for High-Energy Physics, Beijing	*Phys. Rev. L.*	Tau-lepton mass
1993			
Saibil, H. R.	Beijing Normal University	*Curr. Biol.*	Adenosine triphosphate structure
Chen, Z.	Inst. for Cancer Research, London, & Shanghai 2nd Medical U.	*EMBO J.*	APL fusion gene
Jiang, W.	Columbia U., New York, & CAMS Cancer Institute, Beijing	*PNAS*	Oncogene detection in human cancers
Li, D. Z.	CAS Shanghai Cancer Institute	*Carcinogene*	*P53* mutations
Wang, D. S.	Northwestern U., Chicago, and CAS Institute of Physics, Beijing	*Phys. Rev. L.*	Crystal structure

SOURCE: INSTITUTE FOR SCIENTIFIC INFORMATION, PHILADELPHIA

An elite. The five most cited papers by Chinese-based researchers for each year from 1988 to 1993 reflect the prominence of Shanghai and Beijing and, as in the rest of the world, the much larger audience and greater number of references for papers in the life sciences.