Research supplies and scientific journals from the West are not embargoed per se, but they cannot be purchased because there is not enough "hard" currency, meaning dollars or other Western currency, to do so. One consequence is that more Poles rely on Soviet scientific publications, which are inexpensive.

"The majority of the science faculty are giving up trying to do work," says one American scientist who visited Poland during 1983. "Those still trying face tremendous obstacles. They must order chemicals a year in advance sometimes, so they have to beg, borrow, or steal chemicals to do any work." Laboratories resemble "chemistry labs of the 1920's, where everything was made from scratch," he continues. "In chemistry, biochemistry, and physics, it's difficult to sustain research projects that have any meaning." The exception to this generalization is that some Polish scientists, who have contacts in the West, receive vital supplies through an aboveboard but thoroughly ad hoc system managed by understanding friends outside the country. The system includes many Polish scientists now working in the West, some of whom set aside part of their salaries to benefit the research of their colleagues at home.

For some programs, this informal supply system makes the crucial difference between disaster and workable conditions. But this outside effort serves another purpose. "A basic problem is to maintain a certain level of knowledge," explains one Polish molecular biologist who hopes someday to return. "If people are cut off, at some point they stop understanding the current literature. Scientists are going outside to stay current and then teach young people." Although this scientist and others are cynical about the Polish government's intentions in granting them relative freedom to go abroad, they say it eventually will help to rebuild Poland's research capability. "It's rare the authorities behave reasonably," this scientist adds wryly. "Perhaps this is one instance."

Though the scarcity of crucial supplies hampers research in Poland, some observers point to other equally important impediments. "Everyone is despondent and depressed, so they're not working but sitting around drinking tea and reading underground newspapers," says one American who visited Poland in mid-1983. "Also, people don't get enough to eat and can't think straight.

"A scientist who was trying to work told me," this same American continues, " 'You have to be very mature, stable, and highly motivated to do science in Poland right now. Look, we tried [to change the political system], but it didn't work. It doesn't help to spend time writing manifestos at the expense of doing your work.' "

"The euphoria of 1981 has changed to resignation," says John Romberger, a retired U.S. Department of Agriculture scientist who has been to Poland several times during the past 15 years—most recently last month. Nonetheless, he points out, some research groups are maintaining active programs. In some cases, this involvement in science is used by individuals as "an escape from reality," he says. Romberger's observation is amplified by a Polish scientist now working at a U.S. university, who says about his colleagues at home, "If a scientist [continues working], it's easier to keep a balance in that terrible environment, so one is not closed within the miserable political and economic conditions. For some, it's the only thing to keep them from going crazy." At his institute, scientists went back to work "right after the tanks left the streets."

This Polish scientist says that his former institute has remained relatively untouched by the current troubles, and thus a fair amount of research still is getting done there. But in the same breath, he warns not to mention its specialty, location, or anything that might risk bringing attention to it and perhaps jeopardizing its chances to continue. His fears are justified say other colleagues who point to politically more visible institutes, particularly the Institute for Nuclear Research, that have not fared so well. Late in 1982, the government officially dissolved that Institute, breaking it into three separate units—a procedure that was used to fire some of the Institute's scientists and harass many others.

Recounting such instances makes the Polish scientists now in the United States feel gloomy about the near future in their country. Laws, which have been largely unenforced so far, specify that university appointments are to be made not only on an academic basis but also on moral and political grounds. "If this policy is enforced, it will become possible to eliminate everybody who in the smallest way disagrees with present policies," one scientist points out. However, the scientific community may be spared such interference because it represents an "altogether marginal problem for the government compared to what the authorities face in the factories."

A chemical engineer, who was forced to leave Poland, recently learned that some of his former colleagues and friends were made to leave their positions because of their "political attitudes." Others, who still have jobs, lack money and equipment needed to continue working. "When I think of the colleagues I left, it makes me feel really sick," he says. Another Polish scientist adds, "Scientists in the United States should give support to their colleagues in Poland. It's important for the development of progress. . . . In Poland academic freedom is not completely gone."—**JEFFREY L. FOX**

Seeds of Dissension Sprout at FAO

Third World nations vote change in system to conserve germ plasm over objections of industrial countries which fund the program

A simmering dispute over international arrangements for conserving world plant genetic resources boiled over at the general meeting of the U.N. Food and Agriculture Organization (FAO) in Rome in November. Third World countries won approval of a proposal designed to give them more influence in a system in which the industrialized countries, which provide principal support for the activities, exercise major control. The effect of the action remains unclear because the willingness of the donor nations to continue to participate is uncertain.

The debate is another face-off over what militant less-developed countries (LDC's) see as the use by Western in-

dustrial countries of their superior financial and technological resources to the disadvantage of the LDC's. In particular, Third World countries complain that transnational companies have used plant genetic material originating in the LDC's to develop commercial seed lines that are then sold back to the LDC's at high prices.

The intent of the proposal is to replace the relatively informal organization now in place with a legal structure that would give the LDC's a greater voice. Specifically, the meeting voted to replace the present working agreement with a formal international undertaking whose participants would collaborate in operating a network for the collection, preservation, and exchange of plant genetic material. In another action, a Third World majority successfully pushed the establishment of an FAO Commission on Plant Genetic Resources that would monitor the program. The assumption is that the new commission would have review power over policy for the germ plasm system.

Such changes would diminish the status of the International Board for Plant Genetic Resources (IBPGR), which promotes the activities of existing international plant research centers that also are concerned with collecting and preserving plant germ plasm. IBPGR is one of 13 institutions operating under the aegis of the Consultative Group on International Agricultural Research (CGIAR), familiarly known as CG, which administers the network of international research and plant breeding centers identified with the Green Revolution. The CG is a consortium of government, international, and private organizations. CG policy has been dominated by the industrial countries which have been major donors of operating funds. The CG has functioned without a charter and with an unusual independence of action for an international agency.

The international effort to preserve plant genetic resources developed in the 1960's and early 1970's because of a growing recognition that the world genetic base for food plants was being narrowed. Heavy pressure on original native plant varieties was being exerted by a widespread trend in agriculture toward use of high-yielding varieties of food plants which are genetically similar (*Science*, 23 October 1981, p. 421).

IBPGR was established in 1974 in response to the concern. By the mid-1970's, criticism was building from the LDC's about their lack of influence in the germ plasm system. At the same time, seed companies were pressing for enactment of a model law conferring virtual patent status on commercially developed plant varieties propagated by seeds. Action by industrial countries to strengthen so-called plant breeders rights (PBR) had a polarizing effect on Third World attitudes.

Third World sentiment surfaced at the 1981 general meeting of FAO with a demand for establishment of an international convention to provide a legal framework for the preservation and exchange of plant germ plasm and for creation of an international gene bank. A resolution embodying these demands was passed and Third World and donor nations then began fencing over how to proceed.

In the discussion, the LDC's invoke the formula familiar in the ongoing North-South dialogue in the United Nations that natural resources such as plant germ plasm are part of a "common heritage" of mankind and that benefits from them should be shared on a more equal basis. The argument has been applied, for example, in the Law of the Sea Conference and the debate over international allocation of radio frequencies.

Exponents of the Third World case blame trends in the seed industry for exacerbating the situation.

In respect to germ plasm resources, the United States, Japan, and the countries of Western Europe are decided have-nots. Because of the ice ages, a preponderance of the present major food crop plants originated in regions of Latin America, Africa, and Asia. Northern countries, however, have larger gene bank holdings than the South. As a result, Third World countries accuse the industrial countries of creating a system under which they claim free access worldwide to germ plasm material, but assert proprietary rights to commercial plant varieties developed from that germ plasm.

Exponents of the Third World case blame trends in the seed industry for exacerbating the situation. Large American and European chemical, pharmaceutical, and energy companies which produce fertilizer, herbicides, and pesticides have moved strongly into the seed trade in the last decade or so by buying existing seed companies. The critics say that the multinationals have successfully promoted plant breeders rights legislation with their governments and they accuse the companies of using PBR to control the market and raise the costs of seed in the Third World. The United States and other donor countries have also been charged with limiting LDC access to germ plasm holdings, but such charges do not appear to be clearly documented.

The issue of plant breeders rights attracted moderate attention when the U.S. Plant Variety Protection Act was amended in 1980 and the seed company position was bolstered. The implications of biotechnology for the seed industry, however, has piqued the interest of Congress. Representative George E. Brown, Jr. (D–Calif.), who chairs the House Agriculture Committee's research subcommittee, has indicated he will hold hearings on the subject in the coming session of Congress. And the action taken at the FAO meeting is likely to result in a broadening of the focus to include international issues.

Donor country attitudes toward the international germ plasm system continue to be influenced by the views that led originally to the establishment of IBPGR. FAO had been slow to act on the problem of genetic erosion and had a record of bureaucratic ineptitude and high administrative costs in earlier programs. Although such views are not aired in FAO debates, it is evident that the donor countries feel that U.N. machinery is ill adapted to running a program such as the plant germ plasm network. Donor countries argue that high-yielding crop varieties have revolutionized agriculture in the LDC's by dramatically increasing production and that only PBR protection offers the incentives necessary to develop and distribute the new plant varieties required to maintain and increase production. The proponents of the present system argue that it is not plant breeders in the Third World but politicians who insist on change.

The issue, however, is now thoroughly politicized. A worst case scenario would have industrial countries reject the undertaking and withdraw support and the LDC's prohibit collection of germ plasm in their countries by those outside the scheme. Such an outcome should not be inevitable since all sides agree that genetic erosion is proceeding at an alarming rate, the present level of effort is inadequate, and effective action is necessary to forestall irreparable losses. But far from settling the issue, the FAO vote revealed something very like a deadlock. It should also dramatize the urgency of reaching an accommodation.

—JOHN WALSH