the normal crop. Yet so far there has been no way to estimate whether any of these measures can avert disaster. There has not even been a coordinated plan of attack.

This week, however, the United Nation's Food and Agricultural Organization will present representatives from more than 100 nations, including the United States, with a detailed plan for preventing world famine. The plan, known as the Indicative World Plan for Agricultural Development, contains the most specific predictions about the future of the world food production that have ever been attempted, and recommends the first overall scheme of action which the developed nations can adopt to combat famine.

Essentially, the plan is a model of the current world agricultural situation, including factors such as population growth and industrial development which affect agriculture. By projecting current trends, the model offers a picture of global food problems for the next 20 years. The model also makes it possible to predict the probable effects of antifamine programs.

Even though statistics on agriculture and population in the underdeveloped countries are notoriously weak, the plan, which has been in the making for the last six years, provides the most accurate forecast possible.

The forecast is, as expected, grim. Between now and 1985, 85 out of every 100 people born will live in underdeveloped nations. These nations will have to increase their food supplies at least 80 percent to avoid famine. The rising income of the underdeveloped nations actually makes matters worse: As people become wealthier they demand more food, so the total increase in demand for food by 1985 will be closer to 140 percent.

The Indicative World Plan calculates birth control programs will have a negligible effect on the problem. Nor will the importation of food from food-surplus countries be much help. In order to meet their food requirements, underdeveloped nations would have to import some $26 billion worth of food annually by 1985. Politically and economically, importation on that scale is out of the question.

The only hope, therefore, is for the underdeveloped countries to increase their own agricultural production. If the new strains of high-yield cereals were extensively used, the output of staple grains by 1985 could be doubled. Such an increase, the plan predicts, would be sufficient to prevent a catastrophic famine. Although the immediate result of a doubled grain supply would be to reduce prices, thus leaving many farmers even poorer than they were before, the reduced prices would make it possible to use the grains as livestock fodder, and so to improve the supply of meat.

At first glance, this seems like an optimistic prediction. But the plan makes it clear that agricultural technology by itself will not be enough. The high-yield grains cannot be used without fertilizers, irrigation systems and greatly expanded marketing facilities. Moreover, there is a limit to the number of people who can efficiently work a given area of land. The underdeveloped countries will have to undertake major expansions of the non-agricultural sectors of their economies simply to provide jobs for people who cannot be employed on farms.

None of this can be done without the assistance of the wealthier nations. One of the major recommendations of the Food and Agricultural Organization is that developed countries like the United States expand their assistance to impoverished nations beyond the realm of agricultural technology. The plan urges, for example, that rich nations make substantial trade concessions in order to provide the underdeveloped countries with more foreign exchange.

In the past the United States has reacted unfavorably to such recommendations. Many of the goods that underdeveloped countries want to export, such as sugar, cotton and cereals, the United States prefers to produce itself or to import under the protection of tariffs.

The Food and Agricultural Organization is neither politically powerful nor popular. It believes that world famine can be avoided. But whether its recommendations, to be made at a conference in Rome this week, will be adopted, depends finally on whether the well-fed world wishes to alter the future pictured in the Indicative World Plan. ◻

TEKTITE II

Science from a habitat

Manned habitat projects have so far tended generally to be oriented to testing the technology of underwater life-support systems, and demonstrating man's physiological and psychological ability to live and work under the sea for extended periods.

This was natural enough; the sea floor still has to be regarded as an alien environment for man. Yet earlier this year four aquanauts stayed two months below the surface of Great Lameshur Bay off St. John in the Virgin Islands in the highly successful Tektite I project (SN: 2/15, p. 161). As a result many scientists felt the time was then ripe for the next step in underwater habitat operations: an emphasis on basic scientific studies making use of men's ability to stay on the sea floor.

Such a project is about to begin, and scientists from all over the country are being invited to submit proposals for participation.

The project, Tektite II, will use the same habitat and be carried out in the same location and depth, 50 feet, as was Tektite I. But there are fundamental differences.

Tektite II will be the most ambitious underwater exploration program ever attempted. Over a span of seven months, beginning sometime next spring, more than 50 scientists will spend between two and three weeks each beneath the surface, which could not have been done with any confidence the first time around.

"Tektite I established the fact that man can live and work safely in undersea habitats," says Richard A. Waller of the Department of Interior. "But a one-shot 60-day project is not enough to provide continuity to any kind of scientific research. Tektite II will allow the scientific programs to be extended over seven months, and expose great numbers of scientists to this approach for research." Waller, chief aquanaut during Tektite I, is deputy project manager for Tektite II.

Like its predecessor, Tektite II will be a cooperative effort of several Government and private organizations. But this time, with the shift in emphasis to marine studies, the lead agency responsibility has shifted from the Navy to the Department of Interior. Management of the scientific program has been given to the Smithsonian Institution. This week the Smithsonian began calling for proposals.

Although the entire Tektite II operation is expected to cost about $1 million, the Smithsonian will support the work of the 50 undersea scientists with some $50,000 of additional funds obtained from private sources.

In addition to the main habitat, which is now being refurbished at the Philadelphia Navy Yard, a smaller, two-man habitat, yet to be built, will be placed at a depth of 100 feet to determine whether a nitrogen-oxygen breathing mixture can safely be used at that depth.

Tektite I demonstrated that nitrogen was safe at the shallower, 50-foot level. A nitrogen-oxygen mixture has many advantages over helium-oxygen at shallow depths, but beyond about 100 feet the nitrogen mixture thickens so that breathing becomes difficult. ◻