

World Food and Population Crisis

AAAS Symposium • 26–27 December 1968

Food and population are the most crucial problems facing mankind. At least 40 percent of the world's people live on diets varying from distinctly substandard to insufficient even to maintain life. Most of these hungry people live in developing countries where rapid population increases continue to accentuate the problem. Some countries—India, Pakistan and Brazil, for example—will require twice as much food by 1985 even to maintain current, insufficient dietary levels. Some authorities despair about the capabilities of the world's people to feed themselves and predict widespread famine within one or two decades.

There is evidence, however, that the war on hunger can be won, at least for another two or three decades, buying time for critically needed programs to halt population increases. This evidence is provided in the beginnings of an agricultural revolution in a number of developing countries. Nations such as the Philippines, India and Pakistan, with long histories of chronic food deficits, are or soon can become self-sufficient in major food grains, rice and wheat. Major keys to these dramatic increases in productivity are vastly improved technologies of production, developed by research, and large numbers of trained specialists. This revolution is as yet a meager beginning compared with world needs, but the requirements for transformation of traditional agriculture are known. The efforts required are staggering, but it can be accomplished. The question is not whether we can but whether we will.

This statement by W. M. Myers (Rockefeller Foundation) sets the theme for the symposium "Research for the World Food/Population Crisis," to be held 26–27 December 1968 by the Agriculture section of the American Association for the Advancement of Science during the AAAS annual meeting in Dallas, Texas. Myers will present the keynote address for the two-day program which has the general purpose of providing an overview of the problem on a world scale. The first day will hear reports of progress in the food/population ratio in India, South Asia, Africa, Latin America, Europe, and the United States. The second day will be devoted to reports on research and technology in the areas of animal pro-

duction, environment control, regulation of plant growth, agricultural mechanization, nitrogen fixation, plant management, soil management, water management, and potential uses of nuclear power in agro-industrial development.

It no longer can be said that people interested in world affairs are unaware of the rapid growth rate in population, especially in the developing countries. There is now broad realization that as a result of the dramatic declines in death rates since World War II, without corresponding decreases in birth rates, the world's population in the year 2000 may be double that of 1965, or six to seven billion people. There is also wide agreement among those who consider the problem that all humanity faces great peril in the situation, unless unprecedented and concerted effort is directed toward increasing world food supplies and, at the same time, toward bringing rampant population growth under control.

However, demographers and others who early predicted the magnitude of the problem were for the most part ignored. Even now, political leaders in this country express little public concern for this great crisis. Perhaps the Malthusian equation has seemed insurmountable. The sheer magnitude of numbers of the world's hungry breeds discouragement, and the social, political, and religious problems in fomenting necessary change compound despair. Yet agriculturalists in the United States and in many regions abroad have quietly worked on what seemed an impossible task—that of bringing world food production apace with the growing millions of mouths to feed. And it is only recently that experts working on a world scope, such as Myers, have sounded a note of optimism.

The rationale for optimism, albeit slight, exists in the progress of agricultural research during recent years and in the number of very worthwhile experimental projects which are in opera-

tion in developing countries. These are in cooperation with such organizations as the Ford and Rockefeller Foundations, FAO, the UN Special Fund, AID and numerous universities. AID alone is supporting about 140 of these projects. However, success in the battle against hunger rests in obtaining full participation in modern technology by the two-thirds of the world's population who are now "stand-bys" in the scientific revolution. They must ultimately create their own institutions and their own specialists. But for a long time they will need to import Western competence to develop local manpower resources. The United States must continue to be a major reservoir of such talent. The emphasis of U.S. efforts must be directed toward preparing the developing countries to help themselves.

Demonstration projects such as the International Rice Research Institute in the Philippines have shown the technical possibility of increasing food production more than tenfold by combining techniques for obtaining high yields per acre with techniques for growing crops as high a proportion of the year as possible. Year around "multicroping" is of particular significance in the tropics where temperatures are favorable for crop production in every month. By proper selection of crops, adequate amounts of protein, vitamins, and minerals can be produced for a well-balanced diet. Many laborious operations can be mechanized, sizes of farms, production, and income per farmer increased, standards of living improved, and the way paved for increased industrialization.

Even in tropical Africa the possibility exists that with improved methods, including mechanization, very large areas of land which are at present virtually unused could become an important new granary for the world. Much existing farming exploits the environment in extensive and seemingly wasteful ways, including shifting cultivation (bushfallowing) and nomadic grazing, which belong to the Iron Age rather than the 20th century.

However, in much of the world many of the most important obstacles to agricultural change lie outside the areas of research, education, and extension, which are the usual Western recipe for agricultural success. Improved communications, better means of storing and transporting food, and economic organization to provide incentives,

credit, marketing, and merchandizing arrangements, usually are necessary.

Furthermore, important social resistances may have to be overcome. The very structure of social organization may tend to value practices which inhibit agricultural change. Research in these areas is at least as important for many areas of the world as agricultural research in the conventional sense. Even in the highly developed countries of Western Europe and in the United States, many of the principal concerns for agriculture are other than "agricultural." These include problems of over-

production, low return on capital investment, marketing, government policy, social concern for migratory workers, rehabilitation of those who are displaced by advanced technology and mechanization, and persistent "pockets" of poverty and hunger amid relative plenty.

Experience of the past few years with research and its applications in developing countries has led agriculturalists to express some optimism for the world's ability to feed greater populations. However, the process of research and increased food production does not

appear boundless, even with potential applications of nuclear energy to agro-industry. Myers estimates in his keynote statement that, with unprecedented effort, mankind can buy two or three more decades before being overcome by widespread famine. Experts are keenly aware that even this effort will require new combinations of agricultural, social and political achievement. The question we leave here unresolved is how, or whether, mankind will achieve control of its population.

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Vice Presidential Addresses

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Mathematics—A. H. Taub: "Variational Principles and Stability Phenomena," 29 Dec.

Physics—Stanley S. Ballard: "Trends in Physics Education," 29 Dec.

Zoological Sciences—Vincent G. Dethier: "Whose Real World?," 30 Dec.

Botanical Sciences—Warren H. Wagner, Jr.: "The Role of a Botanical Garden in a Modern University," 28 Dec.

Anthropology—Gabriel W. Lasker: "Physical Anthropology: The Search for General Processes and Principles," 27 Dec.

Psychology—Delos D. Wickens: "Compounding and Stimulus Selection and Classical Conditioning," 29 Dec.

Social and Economic Sciences—Guy E. Swanson: "Comparison of Comparative Sociology and Other Sociologies," 28 Dec.

History and Philosophy of Science—R. Bruce Lindsay: "Review of the History of the Development of the Energy Concept up to the Publication of Lagrange's 'Mecanique Analytique,'" 28 Dec.

Pharmaceutical Sciences—Andre Archambault: "Some Thoughts on Research," 27 Dec.

Industrial Science—Allen V. Astin: "Evaluating Research Results—Before and After," 30 Dec.

Education—Willard J. Jacobson: "Education for Societies in Transition," 27 Dec.

Information and Communications—J. C. R. Licklider: "Hangups in Information Networks," 30 Dec.

Statistics—Chester I. Bliss: "Problems of Communication between Biologists and Statisticians," 30 Dec.

The *General Program* for the AAAS Annual Meeting describes the content of each talk in more detail.

General Program Notes on the AAAS Annual Meeting (26–31 December 1968) appear in the 6 December issue of Science. Reports of symposia at the Meeting appear in the following issues: 13 September, "Sport and Its Participants"; 20 September, "The Control of Fertility"; 27 September, "Unanticipated Environmental Hazards"; 11 October, "Continuing Education for Engineers"; 18 October, "Antarctic Research"; 25 October, "Water Importation into Arid Lands"; 1 November, "Jupiter and the Outer Planets"; 8 November, "Use of Space by Animals and Men"; 15 November, "Environmental Geochemistry: Health and Disease"; 22 November, "The Physiology of Fighting and Defeat," "New Developments in Educational Technology," "Space Applications: Earth-Oriented Applications of Unmanned Satellites"; and 29 November, "Cellular Aspects of the Control of Color Changes," "The Prehistory of the Nile Valley."