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To: Participants at ICW 1994

Date: Oct. 21, 1994

Copy to:

From: Per Pinstруп-Andersen 

Subject: **Report on IFPRI Activities Related to the International Conference on Population and Development**

IFPRI was asked by the Chairman of the CGIAR to represent the Group at the International Conference on Population and Development (ICPD) that took place in Cairo in September 1994. A brief report of the IFPRI activities undertaken in response to this request is attached.

A major lesson for the CGIAR that emerged from the conference is the importance of paying close attention to demographic issues in on-going and future work. There are strong interactions between demographic variables and food and agriculture variables that neither we nor the population community can afford to ignore in our common quest of moving toward a better world for all people. Family planning, poverty eradication, and improved food security must go hand in hand in order to achieve the goals we are all striving for. The attached report provides further details on this lesson.

We at IFPRI are currently involved in preparations for two upcoming international conferences: the World Summit for Social Development, which will be held in Copenhagen, Denmark, on March 11-12, 1995; and the Fourth World Conference on Women, which will be held in Beijing, China, on September 4-15, 1995. As we did for the International Conference on Nutrition (Rome, 1992) and the International Conference on Population and Development (Cairo, 1994), we are planning to prepare relevant background papers for these two conferences. At present, our involvement is on behalf of IFPRI as an inter-governmental organization. However, we would be pleased to represent the CGIAR at these conferences as well, if requested.

## **REPORT OF IFPRI'S PARTICIPATION IN THE INTERNATIONAL CONFERENCE ON POPULATION AND DEVELOPMENT**

### **THE ICPD PROCESS AND IFPRI INPUT**

In Spring 1993, the Chairman of the Consultative Group on International Agricultural Research (CGIAR) requested the International Food Policy Research Institute (IFPRI) to represent the CGIAR at the Preparatory Committee meetings and at the International Conference on Population and Development (ICPD) itself.

IFPRI interacted with the United Nations Population Fund (UNFPA) in preparations for and execution of the ICPD in several ways:

- IFPRI hosted a "Roundtable on Population and Food in the Early 21st Century: Meeting Future Food Needs of an Increasing World Population" in February 1994. The meeting, supported by the Rockefeller Foundation, brought together more than 30 technical experts from around the world and from a range of disciplines to discuss links between population and food. Nafis Sadik, secretary general of the ICPD and executive director of UNFPA, inaugurated the meeting, noting that the roundtable would feed into the conference process and contribute to a "technically sound and internationally acceptable consensus." Recommendations drawn from the roundtable were presented at the third PrepCom meeting in April 1994 for consideration for inclusion in the Draft Programme of Action of the conference (Appendix 1). The recommendations stressed the importance of viewing the relationships between food supply and demand prospects, population growth, poverty alleviation, and the health of the environment. A selection of papers presented at the roundtable will be published shortly in an IFPRI monograph.
- Senior IFPRI staff actively participated in the second and third PrepCom meetings. Nurul Islam delivered a statement on "Population and Food Security Nexus" during the second PrepCom meeting in May 1993 (Appendix 2). At the third PrepCom meeting in April 1994, Islam presented a set of recommendations drawn from the Roundtable meeting of February 1994 (see above).
- During the ICPD, Sohail Malik, IFPRI research fellow, represented IFPRI and the CGIAR and gave a plenary presentation on behalf of IFPRI's director general (Appendix 3). Malik told members of the 182 delegations attending the conference that a close relationship exists between population and food. "The availability of adequate quantities of food at prices that people can afford is a critical determinant of population growth, particularly among the poor." He emphasized that increasing incomes of poor people is necessary to bring down their fertility rates: *increased incomes enable poor people to gain access to food and improve their nutrition.* Malik alerted delegates to two disturbing trends that have important implications for future food production increases: *declining per capita grain production and declining rate of growth of cereal yields.* He told them that a sustained increase in crop yields is key to food production

in the developing world, which will require "investment in research, education, extension, and training of farmers along with investment in rural infrastructure, including roads, transportation, and irrigation." He also told them that environmental factors such as quality and quantity of land and water, soil erosion, and loss of biodiversity will influence what happens to food production and consumption in coming years. "Research on appropriate technology for marginal areas must be vigorously pursued along with efforts to attain sustainable food and agricultural production through improved resource management and institutional reforms that guarantee the poor and disadvantaged better access to the means to these improvements."

## ASSESSMENT OF THE ICPD AND LESSONS FOR THE CGIAR

We applaud the ability of the conference to move away from a narrow focus on family planning techniques to a broader focus on issues that must be dealt with in order for family planning to be effective. These broader issues are primarily eradication of poverty, amelioration of the status of women, improvement of food security, generation of incomes, and increased access to education. Without resolving these broader developmental problems, efforts to maintain reasonable population growth rates are not going to be effective or sustainable.

However, the conference deliberations did not reflect fully the importance of food security and agricultural development to population considerations; the political controversies around women's reproductive rights and reproductive health dominated the ICPD's agenda. Nevertheless, when it is considered that relationships between population and food supply, food security, and nutrition were not explicitly recognized at the outset of the preparations for the ICPD, some progress was made in bringing these relationships to the delegates' attention, as evident from the following paragraphs of the *Programme of Action of the United Nations International Conference on Population and Development* (unofficial information version of September 30):

Paragraph 3.20: Measures should be taken to strengthen food, nutrition and agricultural policies and programmes, and fair trade relations, with special attention to the creation and strengthening of food security at all levels.

Paragraph 3.29 (b): Take measures aimed at the eradication of poverty, with special attention to income-generation and employment strategies directed at the rural poor and those living within or on the edge of fragile ecosystems.

Paragraph 12.23: Policy-oriented research, at the national and international levels, should be undertaken on areas beset by population pressures, poverty, over-consumption patterns, destruction of ecosystems and degradation of resources, giving particular attention to the interactions between those factors. Research should also be done on development and improvement of methods with regard to sustainable food production and crop and livestock systems in both developed and developing countries.

Probably the most important lesson that emerged from the conference is that neither we nor the population community can afford to ignore the interactions between food and population. For instance, while it is obvious that continuation of present population and food production trends in Sub-Saharan Africa (annual growth rates for population of 3 percent and for food production of 2 percent) will lead to increased food insecurity and poverty, it is now equally clear that investment in productivity increases in agriculture are essential in that region to alleviate poverty and bring down population growth rates. The demographic transition is unlikely to be significant as long as people are starving. On the other hand, eradicating starvation may not in and of itself result in a fast-enough decrease in population growth rates unless accompanied by family planning and other supporting measures. Family planning, poverty eradication, and improved food security must go hand in hand in order to achieve the goals we are all striving for.

On the basis of the IFPRI experience with the ICPD, we offer two recommendations: (1) strengthen research on the interface between population, agriculture, and environment; and (2) increase interaction with the population community.

To accomplish its mission — which is to enhance the nutrition and well-being of people, especially of low-income people — the CGIAR, in its research activities, needs to pay greater attention to and integrate demographic considerations such as the large increase in numbers of displaced persons and refugees, the rapid urbanization underway in parts of the developing world, and the growing involvement of women in formal economic activities, among others.

At this point, there is too little interaction between institutions and individuals engaged in examining demographic issues and food and agriculture issues. The two communities could complement and support each other in their missions to a greater extent than at present. The ICPD called for massive increases in both international and domestic investments in demographic or population concerns. We feel that such expansions are warranted and urgently needed, but they must be paralleled with rapid increases in investment in agricultural productivity and income generation for the poor as well as other measures to enhance food security. The question is not whether to invest in one area or the other, but how to invest in both reduction of population growth rates and improvement of agricultural productivity and enhanced food security. Investments are needed in both areas; investments in one area must not occur at the expense of investments in the other area.

## POPULATION AND FOOD IN THE EARLY 21ST CENTURY: MEETING FOOD NEEDS OF AN INCREASING WORLD POPULATION

*On February 14-16, 1994, IFPRI hosted a meeting that brought together 30 technical experts from a range of disciplines and from around the world to discuss the crucial links between population and food. The Secretary General of the United Nations Conference on Population and Development addressed the meeting. Part 1 of the attached brief summarizes the highlights of the meeting and presents its conclusions. Part 2 presents specific recommendations drawn from the three-day meeting for consideration for inclusion in the Draft Programme of Action of the Conference. For the convenience of the delegates, the recommendations are numbered to correspond to the paragraphs of the Draft Programme of Action.*

### Part 1: Summary and Highlights

More than 2.5 billion people—almost 100 million a year—are expected to be added to the world's population between 1990 and 2020. This unprecedented population increase raises concerns about the prospects for feeding so many more people. What are the likely consequences for global and regional food supply and demand?

The International Food Policy Research Institute (IFPRI), in collaboration with the United Nations Fund for Population Activities and with support from the Rockefeller Foundation, held a Roundtable in February 1994 entitled "Population and Food in the Early 21st Century: Meeting Food Needs of an Increasing World Population." More than 30 experts from a range of disciplines and from both developed and developing regions of the world focused on a number of salient questions. What are the constraints to increasing the food supply in different regions and at what price? Will availability, quantity, and quality of land and water resources be a constraint? What are the prospects for technological progress either through intensification of known technology, that is, wider diffusion and more intensive use of current technology, or through breakthroughs in conventional plant breeding or biotechnology? What are the implications of global warming for future food supply, and how might it affect the distribution of future increases in food supply among different regions?

#### POPULATION PERSPECTIVES FOR THE FUTURE

The annual world population increase will peak between 1990 and 2020. According to the United Nations (UN) Median Projections, 933 million people are expected to be added to the world's population during 1990-2000, 921 million during

2000-2010, and 900 million during 2010-2020. About 93 percent of the population increase—86 million persons per year—is projected to occur in developing countries. Although the highest growth rate of population in the developing regions will be in Sub-Saharan Africa, the largest absolute increase in population between 1990 and 2025 is expected to occur in Asia (1.62 billion) followed by Sub-Saharan Africa (800 million).

Two issues must be addressed before the effects of future increases in population on food supply and demand can be considered. The first issue is the uncertainty regarding future rates of population growth. The foregoing estimates of population increases can vary 7-8 percent from the median, which could result in differences (plus or minus) in the global population level of about 400 million in 2010 and about 500 million in 2020. The second issue is the even greater uncertainty about these estimates at the regional level. This is especially important for Sub-Saharan Africa because of its high population growth rate and for Asia because of the large absolute size of its population. The consequences of erring on the side of underestimation are greater for these two regions than for other regions. The projections for Sub-Saharan Africa, in particular, are highly speculative: first, the considerable decline assumed in the fertility rate represents a significant break with the past trend, and it is doubtful that it will happen; second, the estimated impact of acquired immunodeficiency syndrome (AIDS) on the population growth rate is based on the assumption that its occurrence will mainly be confined to the regions or countries where its incidence is currently high, which is also in doubt.

For several decades now, the rate of growth in food production<sup>1</sup> has exceeded the rate of growth

<sup>1</sup> Food in this context stands for basic cereals (wheat, rice, maize, and other coarse grains). It does not include roots and tubers, which are particularly relevant for Africa. Nor does it include sugar, pulses, oilseeds, and fruits and vegetables.

in population for the world as a whole. This has also been the case for developed countries as a group, developing countries as a group, and various developing regions, with the exception of Sub-Saharan Africa. Since the late 1960s, average per capita consumption<sup>2</sup> has remained the same or increased in all developing regions as well as in the world as a whole.

Will per capita food production and consumption increase? The Roundtable looked at food demand and supply prospects only up to 2010: the longer the period for which projections are made, the greater is the range of uncertainty. This is especially true for projections of food supply since a large number of factors, including technology, institutions, and international, national, and sectoral policies influence supply prospects. As the time horizon is extended, the long-term environmental implications of increased food production are difficult to foresee, given the current inadequate state of knowledge. These include effects on the quality and quantity of land and water, soil erosion, and loss of biodiversity.

Three studies of projections up to 2010 were presented at the Roundtable by the Food and Agriculture Organization of the United Nations (FAO), World Bank, and IFPRI. The major findings of these studies are reported next.

## SUPPLY AND DEMAND BALANCES

The demand for food in developing countries is expected to increase by 2.4 percent per year during 1990-2000 and by 2.0-2.1 percent per year during 2000-2010. About 90 percent of the increase in demand is due to increase in population, with the remaining 10 percent resulting from increases in income and changes in consumption patterns. The annual population growth rate is expected to be 2.0 percent during 1990-2000 and 1.7 percent during 2000-2010. Per capita income growth is projected to be 3.4 percent per year during 1990-2010, varying among regions during the two decades. The total demand for food incorporates indirect demand for feed purposes, the share of which is expected to increase as demand for livestock products rises with income growth and urbanization in most countries. The share of food used for feed in developing countries is expected to rise from 19 percent in 1990 to 21 percent in 2000 and to 25 percent in 2010: by 2010, the share will be highest in Latin America and the Caribbean (47 percent) followed by East Asia (30 percent).

Two disturbing signs that have recently emerged regarding the food supply situation deserve careful examination. One relates to recent trends in per capita food production and the other to recent trends in the rate of growth in cereal yields. Since the mid-1980s, per capita world food production has been negative. In fact, regardless of the base year from which the growth rate is

estimated, the trend of per capita world food production for every eight-year period since 1980 has been negative. This decline in the growth of per capita food production has been concentrated mostly in developed, cereal-exporting countries. Only a few developing countries (Argentina, Uruguay, Guyana, Pakistan, and Thailand) export cereals. The growth rate in per capita food production has also declined in cereal-importing countries during every eight-year period since 1980, but it has not turned negative. There have been times when per capita food production has declined in the net cereal-importing countries, such as during the 1960s and 1970s, but production has subsequently recovered. It is difficult to explain the decline in the per capita food production growth rate in recent years. Is it a reflection of emerging constraints on food production or is it a transient phenomenon? Will the growth rate of production pick up again? The emerging situation needs to be kept under close scrutiny.

Not only did the rate of increase in per capita food production slow during the 1980s, but the growth rates of yields per hectare for most cereal commodities (including wheat, rice, and maize) declined in most developing countries. The decline in yield growth is often associated with a decline in the rate of fertilizer use and in investment in irrigation, probably due to diminishing returns to intensification of agriculture. In addition, food production is extended to poorer or marginal lands as high-quality lands are exhausted. Environmental problems such as waterlogging, salinity, and water pollution also constrain yields from irrigated agriculture.

## PROSPECTS OF YIELD INCREASES

A pertinent question for future prospects for food production in developing countries is whether the decline in yield growth rates noticed in recent years is likely to continue. The key to future increases in food production lies in a sustained increase in crop yields. The supply projections assume that no more than 20-25 percent of the projected increase in production is likely to come from an expansion of land area under cultivation, given the limited scope and high costs of bringing suitable new land under cultivation. Water does not emerge as an important limiting factor to increases in food production, at least until 2010. However, the unit cost of extension of irrigation would increase. Also, investments would be required to offset adverse environmental effects of irrigation, such as waterlogging and salinity.

The projections assume that yields will continue to grow at a slightly slower pace than in recent decades, and will be sustained at this lower level until 2010. In other words, the growth rate of yields will not continue to decline over time until 2010.

Continuation of growth in crop yields in the future will depend on wider diffusion and more

<sup>2</sup> Consumption of cereals includes both direct consumption (by humans as food) and indirect consumption (by livestock as feed).

efficient use of existing technology so that the "yield gaps" between experimental stations and "best-practice" farmers and between the best-practice farmers and average farmers in the same agroecological region or subregion narrow progressively. This requires investment in adaptive research, education, extension, and training of farmers along with investment in rural infrastructure including roads, transportation, and irrigation. Appropriate macro and sectoral policies, including output and input pricing policies, must provide incentives for adoption, adaptation, and diffusion of technology. Diminishing returns from high-yielding inputs such as fertilizer and water need to be offset by increases in the efficiency of their use. In fertilizer, for example, the focus must shift in Asia from increasing the amount used to increasing the efficiency of nutrient balance, timing, and placement of fertilizer.<sup>3</sup> In crop protection, there must be a shift from reliance on chemical pesticides to integrated pest management strategies. And in irrigation, the focus must shift from investments in new irrigation systems to improving the water-use efficiency and productivity of existing systems. Investment in "maintenance" research must continue to ensure the steady supply of pest- and disease-resistant crop varieties needed to maintain yields at existing levels.

The yield potential under existing technology of different crops needs to be raised by generating new plant varieties, through either conventional plant breeding or biotechnology. Given the pivotal role of private corporations in research on biotechnology and the little interest evinced by them so far in research on basic cereals (since they cannot capture the returns from such research), it is crucial that the public sector play a role in research on biotechnology for food products.

As food production expands to less favorable areas with poor soils and limited water availability, a reorientation of research priorities is needed. Otherwise, the cost of increasing food supplies will lead to higher prices for food. Frequently, the less favorable areas are also those where a large number of poor are trapped in endemic poverty as a result of low productivity and stagnation in agriculture, on the one hand, and limited opportunities for migration to high-potential or urban areas, on the other hand. A reorientation of research priorities does not imply a diversion of research efforts away from high-potential areas, where gains from investment are high, but rather an expansion of support and research to the less favorable areas. Continued growth in high-potential areas not only increases food supply and keeps food prices low for consumers—including those in low-potential areas—but also slows the rate of encroachment on forests and extension of cultivation to low-potential areas.

If past trends in yield growth could be maintained at a somewhat slower rate consistently until

2010, the increase in world food demand could be matched by an increase in world food supply at a stable or slightly lower price, depending on the rate of growth in productivity. However, a 20 percent decline in the projected rate of growth in yields would result in an increase in food prices of 10-12 percent and a decline in per capita food consumption in food-importing poor countries. Per capita food consumption in Sub-Saharan Africa, for example, would drop by 5 percent in 2010.

Assuming that yields continue to grow, projections of future supply and demand indicate constant or rising per capita food consumption at a lower price, although there will remain wide divergences among developing regions. Daily per capita food consumption is projected to remain at the current level (about 2,100 calories) in Sub-Saharan Africa, while it is expected to increase from 3,010 calories to 3,120 calories in North Africa and Near East; from 2,220 to 2,450 calories in South Asia; from 2,600 to 3,060 calories in East Asia, including China; and from 2,690 to 2,950 calories in Latin America and the Caribbean. In 2010, South Asia and Sub-Saharan Africa will continue to have the lowest per capita calorie availability.

## AGRICULTURE AND POVERTY ALLEVIATION

There are close to a billion people who earn less than a dollar a day in the developing world today. Most of the poor are in the rural areas, where they subsist on agriculture and agricultural-related nonfarm activities. For low-income developing countries with heavy dependence on agriculture as a source of employment and income, the key to overall growth lies in rapid agricultural growth, which through intersectoral linkages in consumption and production, leads to overall economic growth, expansion of employment, and reduction in poverty. Agricultural growth, therefore, is not only needed to supply basic foods but also to generate employment and income for the poor. Many of the developing world's poor live in marginal areas such as hillsides or forest margins, where prospects for increasing productivity in food and agriculture to earn even a minimum level of living are limited. Research on appropriate technology for marginal areas must be vigorously pursued, along with efforts to attain sustainable food and agricultural production through improved resource management and institutional reforms such as property rights.

## FOOD IMPORTS OF DEVELOPING COUNTRIES

Projections indicate that all regions will increase food imports substantially. Net food imports of developing countries are projected to increase 1.8-2.4 times between 1990 and 2010, again, with wide differences among regions. The relatively high-

<sup>3</sup> However, fertilizer application levels are very low in Sub-Saharan Africa, and the emphasis there must remain on increasing the amount of fertilizer used.

income countries will account for a larger share of the total food imports of developing countries: Near East and North Africa will account for 46 percent, East Asia for 34 percent, and Latin America for 14 percent in 2010. Although, in 2020, the share of the developing-country absolute volume of imports is expected to be relatively small in South Asia (6 percent) and Sub-Saharan Africa (12 percent) (due to poverty and, in Africa, smaller population size), the projected increases in their imports are quite large, 3-4 times for South Asia and 2-2.5 times for Sub-Saharan Africa.

Production and net exports from developed countries are projected to rise to meet the increase in import demand. The growth rate of production in developed countries, although lower than in the past, is higher than the growth rate of consumption. However, net exports from developed countries are not projected to increase as much as the increase in imports projected for developing countries. Net exports from developed countries are expected to go up by 30-65 percent, depending on the net trade position of the former Soviet Union and Eastern Europe. However, a degree of uncertainty remains about the production and export prospects in the developed, exporting countries for two reasons: the growing concern about the environmental consequences of intensive, high-input systems of food production that depend heavily on fertilizers and pesticides, and the elimination of price support and subsidy programs and the impact on food production and exports. As additional environmental protection measures are undertaken, the cost of food production is likely to go up, unless the environmental measures contribute to increased efficiency. New cost-effective, environmentally friendly technology needs to be devised through research and development efforts. The elimination of subsidies and price supports is likely to raise the cost of imports (some estimate increases of up to 10 percent above the current level) and may require compensatory measures such as food aid and a special financing facility for food purchases. The elimination of concessional or discounted prices for exports, as required by the Uruguay Round agreement of the GATT, would raise the import cost of food for current recipients of concessional sales. During the late 1980s, the discount rate on food sales by the United States amounted to 30-40 percent.

What are the prospects that developing countries will be able to pay for their rising volumes and values of cereal imports? Will poor people in the developing countries be able to purchase the food they need? Will they have adequate incomes and purchasing power to acquire entitlement to adequate food needs?

In the aftermath of the Uruguay Round, and

reductions in food surpluses in developed countries in response to recent policy reforms, the future of food aid remains uncertain. The developing countries will have to rely largely on their agricultural and manufactured exports to pay for rising food imports. Markets for their exports have to be opened up both in developed countries and in each other's markets through the liberalization of global and regional trade barriers. A big push to rapidly expand exports of traditional agricultural commodities—for example, raw materials and tropical beverages—may result in decreased export prices. This needs to be offset by a diversification of exports toward newer and more dynamic agricultural exports and labor-intensive manufactured exports.

In sum, increases in world food production can meet the food needs of an expanding world population. In view of the limited scope for and high economic and environmental costs of expanding land area under crop production, four-fifths of the increase in food production in developing countries must come from increased yields. Recent disturbing signs of a slowing of the rate of growth in yields of most basic cereals in many developing countries should alert the world to the need for sustained efforts to maintain future increases in crop yields. Achieving a sustained increase in yields will require investment, not only in research to generate and diffuse productivity-enhancing technology without adverse environmental consequences, but also in irrigation, input supplies, infrastructure, education, and training, combined with supportive macroeconomic and sectoral policies. Recent downward trends in national investment in and international assistance to food production, including research expenditures, must be reversed.

At the regional level, challenges are especially great in Sub-Saharan Africa and South Asia. The high population growth rate, acute poverty, and past record of slow growth in agricultural productivity demand special attention to Sub-Saharan Africa. At the same time, South Asia's large, poor, and undernourished population also demands attention. New efforts are needed to raise crop yields to sustain the effects of the green revolution in Asia and to accelerate yield increases in Sub-Saharan Africa.

In spite of continued increases in yields and in food production, demand for food will exceed supply in developing countries. Food imports of developing countries will double by 2010. In order to pay for the increase in imports, developing countries will require access to new and expanding markets for their exports in both developed and developing countries, through concerted efforts at liberalization of both global and regional trade.



## Part 2: Recommendations for the Draft Programme of Action of the International Conference on Population and Development

The Draft Programme of Action of the International Conference on Population and Development emphasizes population issues related to sustained economic growth, poverty alleviation, and human resource development, on the one hand, and those related to sustainable development and the environment, on the other hand. In both these aspects, relations between food supply and demand prospects and between population growth, poverty alleviation, and the health of the environment deserve close attention. Specific recommendations bearing on these relationships need to be incorporated in the Program of Action in a more focused way, as indicated below.

**Add end para. 3.10.** Most of the poor in developing countries live in rural areas and are engaged in farm and related nonfarm activities. Food and agricultural production employ a significant portion of the total labor force of most low-income developing countries and generate a large part of their national income. The key to economic growth and alleviation of poverty in these countries is accelerated growth in the food and agriculture sector, which, through production and consumption linkages with the nonfarm and industrial sectors, provides a basis for sustained overall growth.

**Add end para. 3.11.** Since poor people spend most of their income on food, availability of food at low and stable prices is critical to maintain their food security, prevent undernutrition, and encourage low mortality and fertility rates. Undernutrition impairs educational performance and thus holds back returns on educational investments. Population growth, rapid urbanization, and rising incomes will increase the demand for food by as much as 400-500 million tons per year in the developing world by 2010. Meeting these increased food demands will require a sustained effort to increase food production in developing countries and to generate a sufficient export surplus in the developed, exporting countries to meet rising import needs of developing countries.

Uncertainty persists regarding the rate at which food production can be increased without increasing food prices and irreversibly degrading the natural resource base. The rate of increase in crop yields has been declining in recent years. While there is potential to raise yields on the basis of existing technology, most experts observe that it is unlikely that the rate of adoption of existing technology, including further investments in irrigation and use of high-yielding inputs, can be increased without food price increases. Generation of productivity-enhancing and cost-reducing technological innovation is essential for increasing yields to prevent food price increases. Yet investment in agricultural research, both national and

international, has declined in recent years. If such investment is not increased soon, the impact will be felt within the next two decades in reduced food production and increased food prices.

The current extent of poverty and expected future increases in poverty and population size make Sub-Saharan Africa and South Asia priority regions for international action in the coming years. Food imports are expected to double in Sub-Saharan Africa and triple, if not quadruple, in South Asia by 2010. The insufficient infrastructure and technology in Sub-Saharan Africa and the accelerating problems of environmental degradation in South Asia require urgent attention, if poverty and undernutrition in these regions are to be alleviated.

**Add end para. 3.15.** Increased investment in rural infrastructure, including irrigation systems, input supplies, adaptive research, and education, extension, and training of farmers, are urgently needed to increase food production through wider diffusion and more efficient use of existing technology. Investment in agricultural research is needed to increase crop yields through significant breakthroughs in conventional plant breeding and biotechnology as well as to maintain yields of current plant varieties. An appropriate combination of the public and private sectors in expanding agricultural research should be identified. The public sector has a particularly crucial role in biotechnology research on basic cereals, which has been neglected by the private sector.

**Add end para. 3.20.** Donor support for international agricultural research has stagnated in real terms since the mid-1980s and declined successively in the last two years. These declines must be reversed and investments in international agricultural research expanded. For instance, funding support in 1994 for the Consultative Group on International Agricultural Research (CGIAR) is, in real terms, 35 percent below the peak reached in 1987-88.

National and international research to design appropriate input and crop technology for low-potential areas should be increased: large numbers of poor people live in these areas, unable to find or afford alternative settlements or employment opportunities. However, resources should not be diverted from research on high potential areas, most of which are densely populated, but additional resources should be found for research in low-potential areas.

Adverse effects of possible increases in food prices, arising from reforms and liberalization of trade, on the low-income, food-importing countries should be offset or compensated for either through food aid or additional financing for food imports.

Priority in development assistance and trade should be given to Sub-Saharan Africa and South Asia.

**Add end para. 3.22.** Slow growth or stagnation in food production on high-potential or good agricultural land has increased pressures on marginal lands and forest margins, leading to soil erosion, water pollution, and loss of biodiversity, all of which threaten long-run food supply prospects. Adverse environmental effects of intensified chemical inputs and ill-designed irrigation systems are increasingly visible. Technologies and management practices that slow down degradation and protect the natural resource base are often not available in all regions and, even when they are available, they are not widely adopted.

Environmental concerns related to high dependence on chemical inputs for food production in developed countries may slow their production unless environmentally friendly technology is designed and expenditures on agricultural research are maintained and even increased.

**Add end para. 3.34.** Looking beyond 2010, negative consequences of global warming are largely projected to affect developing countries located in the South. Increased production due to greater plant intake of carbon dioxide, higher precipitation, and longer growing seasons in most developed countries are expected to be more than offset by decreased production in most of the developing world resulting from increased flooding, salinization, heat stress, and shorter growing periods. The end-result is expected to be higher foodgrain prices and increased numbers of hungry people, particularly in Africa. Research, therefore, is needed to monitor the various effects of global warming on agriculture, particularly in those countries likely to be under considerable stress.

Research to quantify the extent of environmental degradation, such as soil erosion, waterlogging,

and salinity; the contributory causes; and the effects of degradation on crop yields should be expanded with a view to developing a system of sustainable agriculture based on efficient management of natural resources. The capacity of developing countries to respond flexibly in terms of farming technologies and institutions to the effects of environmental degradation should be built up.

**Add end para. 12.14.** Appropriate macroeconomic and food sector policies and national and local institutions are crucial not only for promoting the diffusion and efficient utilization of technology but also for ensuring its maximum impact on economic growth and alleviation of poverty.

**Add end para. 12.16.** Food policy research is urgently needed on the impact of economy-wide trade and investment policies, output and input markets, prices, and management of natural resources on food production, economic growth, and alleviation of poverty and undernutrition.

**Add end para. 12.19.** Priority should be given to research on relationships between population, food, and nutrition. Prominent among these are relationships between fertility and improved nutrition and survival of children, as well as those between environmental degradation or technological change in agriculture and demand for labor (of women and children) which also may affect desired household size.

**Add end para. 12.20.** Increased research is needed on the effects of urbanization on diet and on the consequences for the pattern of food production. Increased urbanization requires an expansion of the marketing and distribution systems of developing countries to make food available to the urban poor at reasonable and stable prices.

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**Presentation by Nurul Islam, IFPRI, at the  
Second Preparatory Committee Meeting for  
the International Conference on Population  
and Development, New York, May 1993**

## **THE POPULATION AND FOOD SECURITY NEXUS**

The interrelationship between population growth and food security has important implications for demographic transition (the transition to lower fertility rates). Food security is an essential component in reducing population growth and in socioeconomic development.

The population in developing countries will probably double by the third decade of the next century, posing several challenges to the food and agriculture sector. An annual addition of 90-100 million to the population in developing countries will increase both direct and indirect demand for basic food staples at an annual rate of about 2.6 percent over the next 20-30 years. The structure of food demand will change, with a shift toward livestock and high-value agricultural products. A large part of productive employment for the rapidly growing labor force will have to be found in the agricultural sector. Entitlements to income and access to food for the rural poor will depend on growth in this sector. Alleviation of rural poverty is critical in facilitating the process of demographic transition.

The multiple challenges posed by population growth will require acceleration in food and agricultural production and in employment with a focus on the rural poor.

Since opportunities for the cultivation of new land are rapidly being exhausted, as much as four-fifths of increases in future food production must come from higher yields—an increase of at least 40 percent in yields in the next 20 years. The technological progress in agriculture observed during the early years of the green revolution has slowed or even stalled. Significant expansion of agricultural research and development efforts will be necessary to generate technical breakthroughs. This can only be accomplished through increased investment supported by efficient policies and institutional reforms.

Without technological progress, the pressure of population on natural resources is likely to cause environmental degradation and agricultural stagnation.

Such stagnation would either delay or impede the process of demographic transition, as is strikingly evident in Africa.

The movement of surplus populations from slow-growing agricultural areas to fragile lands and forest margins leads to land degradation and soil erosion. This aggravates agricultural stagnation, accentuates poverty, and mitigates against demographic transition. Accelerated agricultural production, aided by appropriate technology, will offset this trend. Also, increased nonfarm employment linked to a rapidly growing agriculture sector creates modern employment for women that leads to reduced fertility rates.

Modern agricultural technologies influence demand for and returns to different kinds of labor—including child and female labor—in different ways. For example, if the new agricultural technology increases the demand for household labor, women may increase their fertility to ensure the availability of child labor. In this case, in tandem with new agricultural technologies, effective and vigorous family planning services should be available.

In the long run, successful agricultural technologies that increase household income lead directly to decreased fertility. As the result of improved nutrition, more children survive, so pressure to have many children is reduced. Sustained increases in household income also lead to increased education, which ultimately reduces the fertility rate.

New technologies affect men and women differently. In many cultures, men and women have different responsibilities for crops, labor, and support of the household. Women work both in and outside households at all income levels, so reproduction needs during pregnancy compete with other productive activities. Where agriculture places a high demand on women's time, or in fragile hillside and water-scarce areas where water and fuelwood often have to be fetched long distances, fertility may increase in order to provide

child labor. Hence, women's vital roles influence the ways in which agricultural growth affects population growth.

Women often act as shock absorbers, sacrificing their own needs for those of their family; increases in household income frequently benefit the children before the women. When the health and nutritional status of women can no longer be protected, adverse consequences result for both agricultural progress and demographic transition. In future research much more attention must be directed toward understanding how agricultural policies and programs affect women's health and

nutrition, and conversely, how women's health and nutrition affect agricultural productivity.

The effects of the pace and pattern of agricultural technological progress and changes in agrarian institutions on population growth are poorly understood. In view of the important policy insights that a better understanding of this interrelationship could provide for facilitating demographic transitions, it has not received the attention it deserves. This highlights the importance of national and international agricultural research in finding ways to increase agricultural productivity while protecting the environment and lowering fertility rates.

**INTERNATIONAL  
FOOD  
POLICY  
RESEARCH  
INSTITUTE**

**Plenary Presentation by Sohail Malik,  
IFPRI/CGIAR at the International Conference  
on Population and Development, Cairo,  
Egypt, September 8, 1994**

Mr. President, Excellencies, Ladies, and Gentlemen.

I am honored to be here today to represent the International Food Policy Research Institute and the Consultative Group on International Agricultural Research to speak briefly about "Population and Food," a relationship that has only marginally been addressed here today.

The availability of adequate quantities of food at prices that people can afford is a critical determinant of population growth, particularly among the poor. The International Food Policy Research Institute estimates that some 600 to 700 million people in the developing countries do not have access to enough food to maintain healthy, productive lives. Over 1.1 billion people live in poverty — abject and persistent poverty — in households that earn less than one dollar a day. Increasing the incomes of poor people to enable them to gain access to food and improve their nutrition is necessary to bring down their fertility rates. At the household level an understanding of the dynamics of the relationships between nutrition, both maternal and child, and fertility is crucial.

What are the likely consequences of projected population growth for global and regional food supply and demand?

The demand for food is estimated to increase by 2.4 percent a year during the decade from 1990 to 2000 and by 2.0 to 2.1 percent a year during the following decade from 2000 to 2010. About 90 percent of the increase in demand will be due to population increase, with the remaining 10 percent coming from increases in income and changes in consumption patterns. These estimates are based on the assumption that population will grow at 2.0 percent a year during 1990 to 2000 and 1.7 percent a year from 2000 to 2010, while annual per capita income growth is projected at 3.4 percent during the 20 years from 1990 to 2010. The total demand for food estimated here incorporates the indirect demand for livestock feed, the share of which is expected to increase over time as demand for livestock products rises with income growth and urbanization in most countries.

For several decades, the rate of growth in food production exceeded the rate of growth in population for the world as a whole. With the exception of Sub-Saharan Africa, this has also been the case for developing countries as a group. From the late 1960s until the mid-1980s, average per capita consumption remained the same or increased in all developing regions as well as in the world as a whole. However, recent indications are that per capita grain production is declining and that 1984 may have been the peak year.

There are two disturbing trends to note: one relates to the decline in per capita grain production and the other to the rate of growth in cereal yields. The key to food production in developing countries lies in a sustained increase in crop yields. Only 20 to 25 percent of the increase in production is expected to come from expansion of land under cultivation; the rest will come from increases in yields. In the longer term, water, not land, is expected to be the limiting factor to increases in food production.

The required yield increases need investment in research, education, extension, and training of farmers along with investment in rural infrastructure, including roads, transportation, and irrigation. Appropriate macro and sectoral policies, including output and input pricing policies, must provide incentives for adoption and diffusion of technology.

What will happen to per capita food production and consumption in the long run will also depend crucially on environmental factors such as quality and quantity of land and water, soil erosion, and loss of biodiversity.

Most of the poor in the developing world lives in rural areas, where they subsist on agriculture and agriculture-related nonfarm activities. For countries with a heavy dependence on agriculture as a source of employment and income, the key to overall growth lies in rapid agricultural growth, which through intersectoral linkages in consumption and production leads to overall economic growth, expansion of employment, and reduction of poverty. Agricultural growth, therefore, is needed

not only to supply basic foods but also to generate employment and income for the poor. Many of the developing world's poor live in marginal areas such as hillsides and forest margins, where prospects for increasing productivity in food and agriculture to earn even a minimal living are limited. Research on appropriate technology for marginal areas must be vigorously pursued along with efforts to attain sustainable food and agricultural production through improved resource management and institutional reforms that guarantee the poor and disadvantaged better access to the means to these improvements.

In spite of increases in yields and food production, the demand for food will exceed supply in developing countries. Food imports of

developing countries will double by the year 2010. In order to pay for the increase in imports, developing countries will require access to new and expanding markets for their exports in both developed and developing countries, through concerted efforts at liberalization of both global and regional trade.

The importance of food security in efforts to reduce population growth needs to be highlighted. For food security it is important, among other things, to focus on sound policies, effective agricultural research, and technology that brings about unit-cost-saving productivity increases in food production.

Thank you very much.

## REPORT OF THE CDC TO ICW 1994

C. Bonte-Friedheim

October 27, 1994

The Center Directors and the staff of the International Agricultural Research Centers will soon refer to this year as to THE SPIRIT OF 1994. We believe that THE SPIRIT OF 1994 is producing major changes, and that this spirit will revitalize the CG system. Mr. Chairman, you have created and released the spirit and you have guided it so far. We are certain that we are on the right road, that we travel in the right direction and that the bumps, potholes and diversions will stop neither the leaders, nor the troops, from reaching the final goal. We all accept that "business as usual" cannot, and will not, continue.

Mr. Chairman, we have thanked you on a number of occasions for your leadership. Today the Center Directors want to thank you above all for having become one of us through your visits to our centers, through your meetings with our staff and through your willingness to listen and discuss our problems with us. You have offered to be with us when this is needed, and we have accepted the offer. We have had three meetings with you this year which have given us excellent opportunities to share our concerns with you.

It was very appropriate that we, the Center Directors, attended the MTM of the CGIAR in New Delhi to experience for ourselves the change and to take THE SPIRIT OF 1994 back to our centers. The results are clearly visible. There is hope where there was despair. There is much more collaboration than ever before. There are signs of many new activities, new approaches and new partnerships. The signals have spread to the NARS and their leaders, they are beginning to see some rays of light again for the future. As believers in the system, and convinced of the changing tasks we all have to perform, we plead with all donors to ensure that in one year's time we will have built, or rebuilt, a healthy and sustainable system.

Center Directors as a group had a busy year. We met among ourselves and also with you, Mr. Chairman, during the TAC meeting in Rome in March. We then met again in New Delhi in May where we had the chance to say thank you and fare well to our friend and colleague and this year's chairman of the Center Directors Committee, Gustavo Nores. We met again last week, we agreed on a number of actions, and we came to some important system-wide decisions. There is no doubt that in the future we, the Center Directors, will have to work much closer together than what we have done in the past.

The agendas of our meetings are getting longer, but our resolve to tackle problems in a more collaborative mode is noticeable and is bearing fruit. I want to highlight some developments and some work in progress, where we can report some achievements and some new approaches. Unfortunately, we did not have a chance to discuss the important papers prepared for this ICW. If our inputs as a group are still required, please let us know and we will find ways and means to provide them.

Last week we asked the DDGs to deal with a number of subjects of common concern and to prepare decisions for us. I want to acknowledge their valuable contributions. The DDGs have looked at operational and management aspects of the matrix and of ecoregional programs as well as other system wide initiatives. On these subjects, the Directors General recognized that a number of structural and operational issues need to be resolved to ensure effective management. These include the definition of program boundaries and focus, the roles and responsibilities of various CGIAR and non-CGIAR institutions, coordination and decision making mechanisms, resource allocation procedures and financial and programmatic accountability as well as governance.

It is clear that a variety of mechanisms will be required, and these need to be developed on the basis of specific center and program needs. The CGIAR centers have already gained some relevant experience in the management of inter-center initiatives, in the area of genetic resources and in certain eco-regions.

The CDC will lead the process of bringing the CGIAR's experience as well as outside experience to bear on these structural and operational issues. IPGRI and ILRI will organize a planning meeting in Rome in December to explore issues and options, in preparation for a larger stakeholder meeting to be held in the spring, possibly in February. We hope to have proposals in time for the TAC meeting in March. Final conclusions can then be reached during the MTM in May 1995.

Our CDC Sub Committee on Sustainability and the Environment invited Dr. Nyle Brady to inform us on the Tschortau workshop outcome. Acting on the report by our subcommittee, we applauded and endorsed the principle of a stronger, more coordinated effort on Soil, Water and Nutrient Management (SWNM) research. We are willing to get to work at once on the priority subject matter areas. We have appointed CIAT as the focal point on SWNM. We support the proposed Steering Committee to help guide the initial steps of this initiative. It could be composed of four CG Centers (CIAT, ICRAF, IITA, CIP), non-associated centers (like IBSRAM, TSBF and IFDC), and NARS. It should also include a TAC representative and interested donors as well as FAO and participants from advanced institutions in industrialized countries.

In this particular area, Center Directors urge all parties to focus on the substantive research agenda and on priorities, and to delay consideration of institutional and governance aspects. The latter can be considered in TAC's forthcoming stripe review on natural resources and the implementation of a system wide matrix. The Director General in the part and as a group have not dealt with either the conceptual or the priority issues of these new system wide or ecoregional initiatives.

We have not been asked and we await the decisions of the system. BUT we stand ready to interact in this important discussion.

With regard to intellectual property rights, developments are rapidly taking place around us. We must ensure that the system can actively participate in the debates and speak with one voice. The Center Directors are further reviewing issues of patenting improved materials and biotechnological products, as well as the appropriate use of material transfer agreements. IPGRI will act as the depository of such agreements from all centers. It has also been agreed to accelerate the consultations in the coming months which should allow us to update the guiding principles adopted earlier.

I am pleased to report that the Center Directors have endorsed a system-wide strategy to guide the future of information activities in the CGIAR. This strategy has been prepared in a bottom-up manner involving all the information staff of the CGIAR centers and in close consultation with other key stakeholders, including TAC and the two Secretariats. It is based on the premise that CGIAR centers need to change the ways they conduct information activities if they are to capitalize on changes taking place within the CGIAR and opportunities in the information world more broadly. The strategy calls for priority actions in electronic communications, databases, partnerships, common standards, acquisition of inputs, production of outputs, and staffing policies. A key element is the commitment to joint action in priority areas when there are widely shared goals.



To implement the strategy, the Center Directors have established a small Inter-Center Working Group on Information that will help ensure that activities required on the part of many actors are well coordinated. In the short term, the Working Group will strengthen the centers' common electronic communications system. A modern telecommunications network and data sharing capacity are essential for strong Inter-Center programs and initiatives. Then, the Group will study possible joint actions in other priority areas.

The Sub-Saharan Africa Sub-Committee has made considerable progress in strengthening IARC relationships with leaders of NARS in the following areas:

1. Ecoregional approaches to agricultural research.
2. Regionalization of agricultural research within the SPAAR initiatives of frameworks for action.
3. Information technology.
4. Mechanisms for consultations in priority setting.

The Africa Sub-Committee has also initiated activities also in the following areas: relationships with NGOs; harmonization of center training programs; phosphorus replenishment in African soils; and appropriate biotechnology policies and techniques.

The committee is strongly encouraging consultations and close collaboration of IARCs with major donors supporting agriculture research activities in Sub-Saharan Africa.

It will be recalled that last year the IARCs have established the Association of International Agricultural Research Centers which, in turn, established a service office in Washington, DC. This office undertakes certain common functions that in earlier years were contracted out to service providers. This initiative has been highly successful and has resulted both in better service and financial savings. This office is being considered as a possible home for other common services.

Center Directors have also dealt with a number of other important subjects - but these have been or will be reported to the group under other agenda items! I refer specifically to genetic resources and PARC and this morning's discussion.

Last, but certainly not least, the CDC addressed once again the different issues of improving spouse employment, noting national rules and regulations in host countries. The group also decided to discuss during its next meeting the important roles of locally recruited staff and how this can be better recognized in the future. In addition, the CDC is discussing ways and means of developing its relations with NGOs.

Finally, Mr. Chairman, ladies and gentlemen, time has come to say thank you and good bye to a number of colleagues who have served both their institutes and the system very well. At our next meeting new DGs will represent IIMI, ICARDA, CIMMYT and IRRI. ILRAD and ILCA will have ceased to exist and ILRI will have joined us. We as Center Directors, and as a vital part of the CG system, deeply appreciate the long services and many contributions of departing center directors.

We also want to publicly thank Alex McCalla for his service to the system and to the centers. It was always a good intellectual exercise to disagree with him. And even when we lost the argument we knew that he had the welfare of the system in mind. We will now support the new TAC chairman and we trust that under his leadership TAC will continue to serve the whole system as well in the future, as it did in the past.

At our next meeting we will be able to welcome a few new Dgs. Already now I welcome on behalf of the CDC, G. Rothschild and A. El Beltagi in our midst. We count on both of them to make valuable contributions both in their respective centers and in our group. As DG of ISNAR, I am especially pleased that after some time we will again have a NARS leader as one of us.

Finally, after my apprenticeship period acting for Gustavo Nores, the Center Directors have asked me to serve them as their Chairman for 1994/95, to be followed by Lukas Brader.

Mr. Chairman, colleagues, we are all learning to live with changes. We will stand together to solve problems at hand and new concerns. Together we can contribute to feed more people, reduce human suffering and safeguard our environment.

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