

CGIAR Mid-Term Meeting, May 24-28, 1999

**SCIENCE IN THE SERVICE OF HUMANITY
The Challenge to Agricultural Research in China and the World
Keynote Statement at Session on
“China and the CGIAR,” Tuesday, May 25 by
Ismail Serageldin, Chairman CGIAR**

1. Introduction: China Then and Now

Ladies and gentlemen, friends and colleagues.

A thousand years ago, the world was on the eve of a new millennium, as we are today. And, no less than in the world of today, there were concerns about the future, as well as hopes that what the human family had already achieved would endure.

In China, it was the period of the Song dynasty, a time of grandeur across this land. As Yale historian Jonathan Spence describes it:

“The Chinese of that time seemed to excel in virtually every sphere: in the visual arts, literature, government, civil society, the economy and technology. There was nowhere else on the planet -- especially not in the fragmented and self-destructive West that was just emerging from the Dark Ages – that one could find such richness both in mental and material life, and in the ways that those two aspects intersected.”¹

But time does not stand still for any civilization. Over the years, this country has experienced many transformations, some of them tumultuous. And, periodically, China has re-emerged, strengthened and ready for the future, learning from past weaknesses, and building on the foundation of past strengths.

Today, as President Jian Zemin puts it, this nation is poised to see the birth of a New China “with the people succeeding, through hard work, in building a strong and prosperous country, achieving national rejuvenation, and securing a happy life for themselves.”² The CGIAR is pleased to be China’s partner in this quest. The partnership between China’s scientists and the CGIAR centers began even before China formally joined the Group in 1984. It has grown steadily since then, and was reaffirmed at the China-CGIAR Forum (November 10-12, 1997, Beijing), which I was privileged to attend with several center representatives. More opportunities for joint action lie ahead. And we expect that China will play an increasingly strong role in the CGIAR.

Much has already been done, in pursuit of the goal of a New China. Perhaps most important, some 200 million people have been rescued from poverty.³ The contribution of agricultural research and agricultural transformation have been crucial. Much more remains to be done. Many issues demand resolution. We are concerned, however, only with those issues directly connected with the mission of the CGIAR: food security and sustainable agricultural development. Allow me, therefore, to explore three connected themes:

¹ “Paradise Lost” by Jonathan Spence, *Far Eastern Economic Review*, April 15, 1999

² Policy Statement issued during State Visit to the USA, 1997

³ *China 2020*, The World Bank, 1997

- Shared Challenges,
- The Role of Agricultural Research, and
- Dimensions of Partnership.

2. **Shared Challenges:**

A range of challenges confront China and the world: population, poverty, productivity, and the environment, for example.

The World

The global scale of demographic pressures in the new millennium will be unprecedented. The world's population is expected to exceed 8 billion by 2025, an increase of 2.5 billion in the next 25 years. Much, but not all, of the increase will occur in developing country cities, where urban populations will more than triple. There will be many more mouths to feed in complex circumstances. Nobel laureate Norman Borlaug calculates that "to meet projected food demands, by 2025 the average yield of all cereals must be 80 percent higher than the average yield in 1990."⁴ These increases must come primarily from increasing biological yields, not from area expansion and more irrigation, because land and water are becoming increasingly scarce.

Dramatic over-consumption and waste in the rich countries and population pressure in poor countries are placing enormous burdens on the eco-systems on which we all depend. The marine fisheries of the world are grossly over exploited. The soils are eroding. Deforestation is continuing. The global challenges of desertification, climate change and biodiversity demand redoubled efforts. Within the next 25 years, a quarter of the human family could be affected by severe water scarcity that will threaten food security, health, and environmental balance, unless corrective measures are taken soon.

Meanwhile, poverty remains pervasive in our world of plenty, despite the enormous burst of output and productivity, the dazzling changes wrought by science and technology, and the amazing achievements recorded on the social indicators for so many of the people on the planet. Let me remind you: in the 47 "least developed" countries of the world, 10 percent of the world's population subsists on less than 0.5 percent of the world's income. Some 40,000 people die from hunger related causes every day. A sixth or more of the human family has been marginalized.

China

Turn now to China's challenges. China today feeds some 22 percent of the world's population with 7 percent of the world's arable land. The demand for food will grow and change as the population increases and dietary patterns are altered by rising income. The prospect of China's demand for food grains increasing from 437 million tons in 1996 to 697 million tons in 2020 – when the population is expected to be more than 1.6 billion – poses a colossal challenge to farmers, scientists, and policymakers. The group of scholars who prepared the research compendium "Agriculture in China, 1949-2030"⁵ believe that yield increases in the order of 30-40 percent will be required to meet this challenge. Productivity, moreover, has to be increased without harm to natural resources that are already at grave risk.

⁴ "Feeding the World: The Challenge Ahead" by Norman Borlaug, paper delivered at the *Fourth World Bank Conference on Sustainable Development*, Washington DC.

⁵ "Agriculture in China, 1949-2030," edited by T.C.Tso, Francis Tuan, and Miklos Faust, *IDEALS*, Beltsville, Maryland, USA, 1998

The dimensions of the environmental problems that threaten China have been spelled out in a report prepared by the World Bank in consultation with colleagues in China.⁶ Acid rain threatens to damage 10 percent of the land area, and may have reduced crop and forestry productivity by some 3 percent. Several contaminated river sections do not meet the lowest standards for irrigation water and are no more than waste sinks. Insufficient and unevenly distributed water supplies are a particular cause for concern. Water scarcity has, in fact, been described as “China’s most limiting agricultural production resource, particularly in northern corn and wheat-growing regions.” Improved water control and delivery systems are of the utmost importance. The economic costs of air and water pollution damage is estimated at around \$54 billion a year. The costs in human terms is incalculable. Pollution causes 178,000 premature deaths annually in urban areas. Indoor air pollution causes 110,000 premature deaths annually in rural areas. Tens of millions are at risk of losing future access to safe drinking water.

Failure to overcome these challenges could have disastrous consequences for China’s anti-poverty battle. Poverty has been dramatically reduced in China, primarily as a result of “soaring agricultural incomes,” but has not been abolished. Calculations of the extent of poverty in China range from 6 percent of the population (the government’s figure) to some 22 percent (based on the international poverty line of \$1 per day). The elimination of poverty is a fundamental goal, and an anti-poverty workshop held in this city last month was told of the need to work even harder to achieve the national target: eliminating poverty very early in the new millennium. At least half the poor live in “abject poverty, lacking even the basic resources to survive,” speakers at the workshop said. More than 20 million people in some 529 counties lack water. Women, who account for over half the poor, are particularly vulnerable. “More women are mired in poverty than men and find it more difficult to shake off the shackles of destitution.”⁷ Improvements in agricultural productivity and off-farm income are considered the most effective means of turning this situation around.

So the world, no less than China, is challenged to transform agriculture yet again, making it productive, sustainable, and functioning as an engine of growth. The challenges are both technological and political in nature. The political challenge is to ensure that international and domestic policies, institutional frameworks, and public expenditure patterns are conducive to cost-effective and sustainable agricultural development. The technological challenge is to develop, high-productivity, environmentally sustainable production systems.

3. The Role of Agricultural Research:

Analysts from CAAS, IFPRI, and the World Bank have suggested a combination of initiatives for continued growth in agriculture.⁸ These include the following:

- Improved agricultural research and extension,
- Balanced fertilizer application,
- Improved efficiency of water distribution and increased supplies of irrigation water,
- Land development and reclamation to maintain current levels of arable land, and
- Market-determined pricing policies.

⁶ *Clear Water, Blue Skies*, The World Bank, 1996

⁷ *South China Morning Post*, Internet Edition, April 9, 1999

⁸ *At China’s Table*, The World Bank, 1997

I will lay these on the table, but will not go into all of them in detail. Nor will I spend time exploring and explaining the importance of effective policies that remove a bias against agriculture, responsive institutions, an outreach program to provide the poor with access to financial services, and all the other factors that produce a vibrant rural sector, which is the foundation of environmentally sustainable and socially equitable development. I want to focus on one part of that complex picture: the challenge to agricultural research.

The policy reforms introduced from the end of 1978 resulted in a surge of productivity. China's agricultural scientists have been important partners in this effort. Despite the setback caused by political upheavals in the sixties, China's national agricultural research system is robust. Its impact has been assessed by several studies. A survey⁹ carried out under ISNAR's auspices found that 20 percent of the agricultural growth in the years from 1965 to 1993 can be attributed to research. This is second only to the contribution of increased inputs (39 percent). Some 85,000 researchers and technicians in 400 institutions and 70 agricultural universities comprise China's agricultural research complement. They were supported by increases in the amount of investment in agricultural research between the late 1970 and the early 1990s, but investment has since tapered off. This is one of the problems facing national agricultural research. The most appropriate utilization of funds, a decline in research intensity, the need for improved facilities and equipment, duplication of effort, conflicting priorities in the selection of the subject matter of research, and weak links between research and extension, are other issues waiting for resolution.

Despite the problems, China's agricultural scientists maintain high standards, have developed great skills, and have established close links with the rest of the global agricultural research system.

Their next big challenge is to combine conventional research with the promise of the genetic revolution. We are living in a time unmatched for the opportunities that it provides the biological sciences. It is an exhilarating time, similar to what physics experienced in the glorious 40 years between 1905 and 1945, when all the concepts were changed, from cosmology to quantum physics, from relativity to the structure of the atoms. Today we are decoding the very blueprints of life, we are learning to manage the deployment and expression of genes. We must utilize the most cutting edge work associated with genetic mapping, molecular markers and biotechnology to accelerate the breeding process and achieve the promise of all that science can do for the poor and the environment.

China has begun this process, and its biotechnology programs absorb some \$30 million of investment annually, and are therefore better funded than in many countries outside the industrialized North.

But the revolution in the biological sciences has both promise and problems. We are confronted by profound ethical and safety issues, complicated by the new issues of proprietary science. Some of the concerns come from scientists who fear that "novel" products will destroy agricultural diversity thus changing agricultural patterns into unrecognizable and uncontrollable forms. Many protests have been made by civil society institutions on ethical or ecological grounds. The dominance of the private sector has raised fears that this will create a new phase of comparative disadvantage and increased dependency in the South.

Very much at issue are patenting and intellectual property rights (IPR). Supporters of patenting point out that if the private sector is to mobilize and invest large sums of money in agrobiotechnology R and D, it has a powerful claim to protecting and recouping what it has put into the exercise. On the other side of the argument is the fear that patenting and the

⁹ *Agricultural Research in China* by Shenggen Fan and Philip G. Pardey, ISNAR, 1992

exercise of IPR will lead to a monopolization of knowledge, restricted access to germplasm, controls over the research process, a selectivity in the focus of research and, thereby, the increasing marginalization of the majority of the world's population.

These concerns cannot and must not be ignored. Effective regulatory mechanisms and safeguards need to be universally installed so that the impact of agrobiotechnology is both productive and benign. The critical issue is that every instrument of agricultural transformation should be mobilized in our efforts to feed the hungry, help the poor, and protect the environment. We must find ways of realizing the promise of biotechnology while avoiding the pitfalls. The CGIAR will be cosponsoring an international conference on the eve of International Centers Week this year to examine these issues; in particular, to discuss safeguards against the perceived hazards of biotechnology.

6. **Dimensions of Partnership:**

How can China and the CGIAR collaborate to their mutual benefit?

Substantial achievements have already resulted from several years of collaboration between CGIAR scientists and China's NARS. The specifics of collaboration compiled by China's Ministry of Agriculture¹⁰ are indeed impressive:

- Eleven of the 16 CGIAR centers have established formal links with Chinese research institutions, and five centers maintain offices in Beijing.
- Over 50 Chinese institutions have engaged in collaborative activities with CGIAR centers.
- CGIAR centers have provided Chinese scientists with 110,000 copies of scientific publications.
- Over 40 international conferences and workshops have been held in China and attended by over 4000 scientists, with the sponsorship of CGIAR centers.
- CGIAR centers have trained 3400 Chinese scientists ranging from short-term trainees to post-doctoral staff.
- CGIAR-trained scientists are senior project leaders, chiefs of research divisions, or senior fellows in their own institutions.
- Chinese nationals have served the CGIAR system as center scientists and board members.
- China has bred 252 crop varieties which contain genetic material from CGIAR centers (wheat, rice, corn, corn, peanut, potato, and sorghum). These varieties are grown on 5.6 million hectares.

The China-CGIAR Forum recommended further action in four areas:

First, increased support by China to both national and international agricultural research.

Second, increased capacity building efforts by the CGIAR for China's scientists, research managers, and policy makers.

Third, the provision of improved seeds to China's farmers at a reasonable cost.

¹⁰ Review and Future Prospects of China-CGIAR Collaboration, presentation by Gan Zufo, Deputy Director, Department of Foreign Cooperation, Ministry of Agriculture, at China-CGIAR Forum, 1997.

Fourth, enhanced exchange of germplasm between China and the CGIAR centers for the benefit of farmers and consumers in China and throughout the world.

We have accepted these proposals. There are other possibilities, particularly in the fisheries sector and in water management. Details will be forthcoming as today's discussion progresses. CGIAR centers will contribute their scientific strength, to work collaboratively with China's NARS, as well as with others in the global agricultural research system. We expect reciprocal collaboration from China as well.

Today, China is an acknowledged world leader. The potential for China to expand its economy is universally acknowledged. It exerts influence on the international scene. From such a powerful country, we expect to hear an ever-stronger voice on behalf of the South in the international agricultural research system. From the CGIAR perspective, we would welcome:

- enhanced investment in agricultural research, national and international.
- greater activity in decision making bodies,
- strong participation by China's delegation in CGIAR committees,
- substantial participation in designing research programs, and
- greater collaboration between China's NARS and the CGIAR centers.

I submit these suggestions for consideration by our Chinese colleagues.

7. **Envoi:**

My friends.

As we contemplate the triple challenge of abolishing hunger, eliminating poverty, and protecting the environment, we can all take comfort in the knowledge that neither China nor the world is in crisis. Clearly, however, both could be, if we do not act boldly and decisively. The "danger signals" are all around us. But the opportunities to overcome potential danger are more abundant than they have ever been.

Science has already contributed to undreamt of changes in human life. It has more contributions to make for the well-being of our generation, for the well-being of the planet, and for the generations of the future. If that is actually to happen, we must have the courage of our convictions and the wisdom to act with sagacity.

So I say to our Chinese colleagues and to ourselves: Let us grasp the opportunities and bend them to our will.

Thank you.