

Japan-CGIAR Partnership: Working Together for Good News from the Field

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ABSTRACT

Agricultural scientists have achieved remarkable successes in developing new crop and farming technologies that have benefited millions of farmers in developing countries. These technologies, developed by mobilizing the best of science within a public goods' framework, have increased yields of basic crops, boosted farmer incomes, created a virtuous cycle of on-farm and off-farm benefits, and promoted the prudent use of vital resources such as land and water.

These successes notwithstanding, future challenges are daunting. The world population is expected to reach 9 billion people by 2050, and food demand is expected to double. Some 30% of irrigated lands are already degraded. And there are big changes taking place in the world of agricultural science. A new set of science-based solutions are urgently required for increasing the productivity (per area and per unit of input) of crops, livestock, fisheries and forests while reducing environmental degradation in industrial and developing countries. Developing countries need to mobilize resources in the broadest sense of the term – human, financial, scientific, and proprietary knowledge – to help meet the challenges of development.

Japan is a leader in supporting international science-for-development efforts. Japan joined the CGIAR in 1972, and the Japan-CGIAR partnership rests on a solid platform of scientific cooperation as highlighted in the Koizumi Initiative and Tokyo International Conference for African Development (TICAD 3). In partnership with JIRCAS and other advanced research institutes, CGIAR scientists and partners have conducted strategic and applied research that has led to the development of technologies and products of major relevance to agricultural development. For sustainable development to become a reality, these efforts must continue.

INTRODUCTION

The Consultative Group for International Agricultural Research is an informal alliance of 63 members providing support and guidance to 15 international agricultural research centers that work with public and private institutions throughout the world. As a basic provider of public goods research, CGIAR is co-sponsored by the World Bank, FAO, IFAD, and UNDP.

Thirteen out of the 15 Centers in operation today are headquartered in developing countries. More important, however, are the programmatic actions

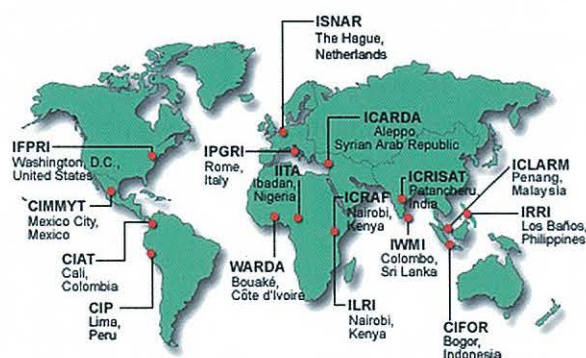


Fig. 1. Locations of CGIAR centers

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being taken jointly with national institutes, universities, and different partners in over 100 countries. The work of the CGIAR can be artificially placed in five research pillars:

- Increasing productivity
- Strengthening national agricultural research systems
- Protecting the environment
- Improving policies, and
- Saving biodiversity.

The CGIAR’s mission occupies a unique niche, creating a link between the world of high science and the world that needs this high science – the poor in the rural areas of developing countries. The group works assiduously to ensure that scientific knowledge, the global public goods dimension of its work, remains in the public domain. Agricultural development is critical for national development, and agricultural research is a critical pillar for agricultural development. CGIAR’s 2002 investment of \$357 million represents the single-largest public investment in mobilizing science for poor people.

BIG CHANGES

A series of major changes in the last ten years, the opening decade in the history of JIRCAS, has transformed the world in which the CGIAR operates. These include major changes in intellectual property rights, the regimes used by special developing countries, the legislations that have been approved, and the challenges of implementing these legislations.

Meanwhile, a number of strong national agricultural research systems (NARS) have emerged in developing countries, while some NARS in other countries have been dismantled. These changes have been accompanied by the dismantling of extension systems in the public domain, an outcome partially due to structural adjustment programs. Furthermore, there have been considerable changes in the ratios of private and public investments in agricultural research.

The changing roles of agricultural research will continue to have a profound impact on how the CGIAR conducts its business over the medium-term; say the next 10 to 20 years. Though public investments are declining, they still account for 60% of the global public agricultural R&D investments. While the growing private sector investments now make up 30 to 40% of the total, the outputs of these investments are localized. Though the investments by the CGIAR itself represent a very modest 2 to 4% of the total, the Group believes that through its networks, this small percentage can be a very important catalyst for sustaining the productivity of agriculture in subsistence farming systems.

It bears noting that from the 1970s to 1990s, public sector investment in agricultural research remained considerably higher in the industrialized countries, even though agriculture itself made up only 2% of their economies. Between 1976 and 1995, private sector investments in agriculture R&D in the industrialized countries increased more sharply than public sector investments. While public investment also increased in

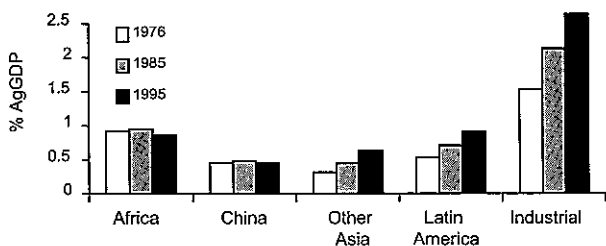


Fig. 2. Agricultural research intensity by regions: public sector

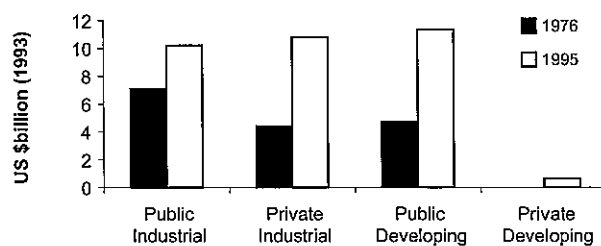


Fig. 3. Public and private agricultural research and development investment, 1975-95

the developing countries during the same period, private sector development was negligible.

The revolutions in biotechnology and information & communication technology have given new shape to agriculture, and the accelerating pace of scientific and technological change presents tremendous challenges to the developing countries.

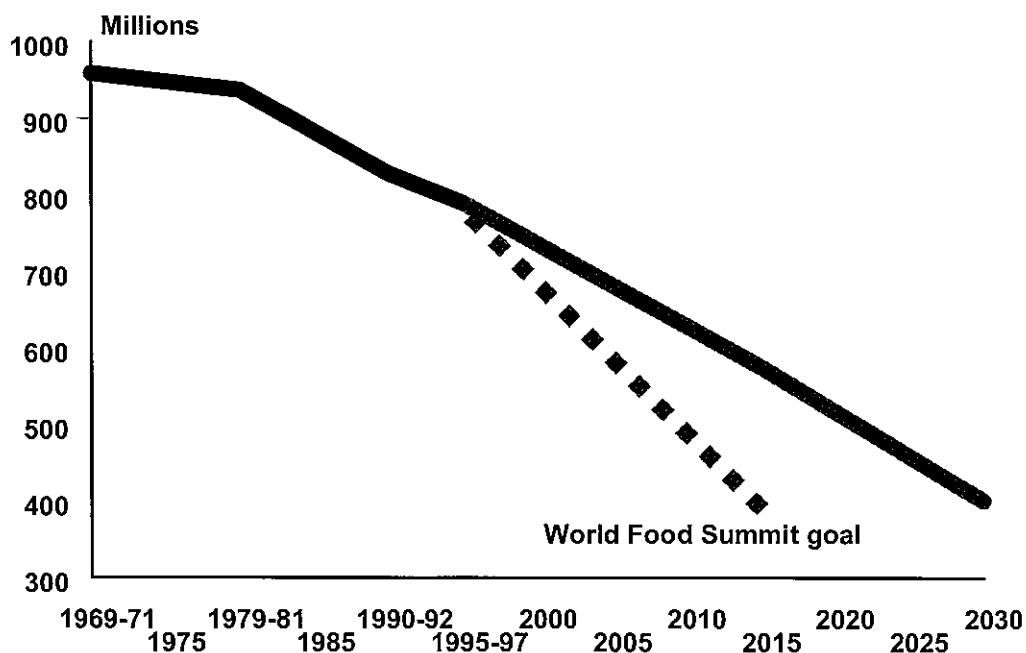
BIG CHALLENGES

As these changes continue to unfold, however, the CGIAR faces the continuing challenge of reducing poverty and assuring security in food supplies, conserving natural resources, and fostering fair market policies. In the field of agriculture, forces such as climate change, AIDS, and globalization present new threats but also new opportunities.

Poverty and Hunger. Poverty, a predominantly rural phenomenon, is multidimensional. It involves a lack of power, a lack of assets, and a lack of voice. In the world of science and technology, it is also about the lack of benefits gained by the developing countries from the knowledge revolution over the past decades.

The CGIAR has certainly made progress in reducing poverty, but the improvement has been uneven. While poverty was reduced in East Asia, this cannot be said for Sub-Saharan Africa, South Asia, or Latin America. A tremendous amount of work still lies ahead.

Statistics on world hunger are mixed. While recent data shows a continued decrease in hunger in the developing world from the 1980s to 2000, the improvement is only substantive and important if we include the tremendous achievements of China in tackling this scourge. Overall, global efforts to reduce world hunger are progressing more slowly than expected. The latest estimates from FAO show that 842 million people were undernourished in 1999-2001, including 10 million in industrialized countries, 34 million in transition economies, and 798 million in developing countries.



Source: FAO (2000), "Agriculture: Towards 2015/30", Technical Interim Report, Rome.

Fig. 4. Food security forecast

Natural Resource Security. Natural resource security is another challenge well known to all. Issues include the tremendous degradation of croplands, the clearing of forests, particularly tropical forests, over-fishing and resulting collapse of fish stocks, and the huge and ongoing impact of agriculture on natural resources. These are resources that must be conserved not only for our children but also our children’s children.

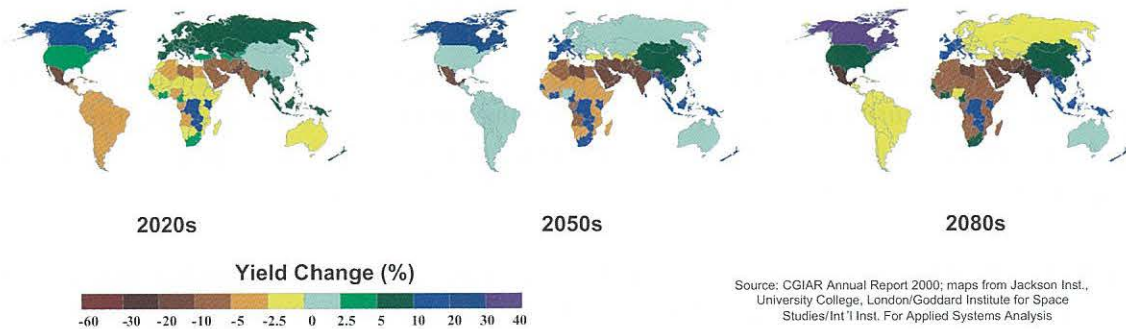


Fig. 5. The impact of Global warming on major cereal crops

Challenges to Agriculture. Agriculture is facing multiple challenges. According to different models, food production will have to double over the next 40 years. How can this be achieved? How can the increasing dietary needs of a growing population be satisfied without imposing an even greater burden on the earth’s already fragile natural resources? How can we consider the environmental elements together with the social elements so critical for achieving balanced development? Again, technological changes are of great help, but this is just one of several issues that must be addressed.

Agriculture in the African Context. The importance of agriculture in the African economies is amazing, accounting for 35% of GNP, 40% of exports, and 70% of employment. The Green Revolution that benefited the Asian countries has bypassed most parts of Sub-Saharan Africa, and new visions and strategies are urgently needed. Agriculture is central to the development of Africa, and more concentrated attention and efforts will have to be focused on this continent. In this regard, the focus on agriculture contained in the New Partnership for Africa’s Development (NEPAD) and the Third Tokyo International Conference on African Development (TICAD 3) are particularly noteworthy.

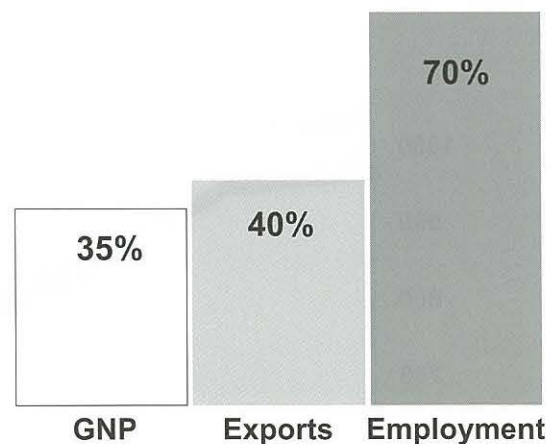


Fig. 6. Agriculture in African economies

Return on Investment. Is it really worth investing in agricultural research for development? Relatively recent data from India and China suggest that it is. Judging by the numbers of persons removed from poverty by specific public investments, agriculture proves to be a good use of resources when compared to roads, education, irrigation, or rural development as a whole.

The estimated rates of return to investment in agricultural research are also high. Studies conducted over the last several decades have indicated an average reduction in hunger of about 34%. With adequate policies and adequate technologies, very substantive progress is possible in Sub-Saharan Africa over the next 30 to 50

years. Yet the tasks will be tremendously challenging.

On top of all the demands imposed by the need to increase food production, a number of partial unknowns are also likely to have a major impact. The effects of the changing climate, climbing temperatures, and new patterns of climate variability on tropical agriculture and agricultural yields are well known. It is clear that tropical agriculture will be adversely affected. The problem of climate shifts and negative effects on agricultural productivity will be further compounded by the HIV AIDS pandemic, causing tremendous social disruption and depriving small farmers of the knowledge and management skills they need to survive.

Market Security. The last of the big challenges is market security, or more accurately, market insecurity. The discrepancy in agricultural subsidies between the developed and developing worlds illustrates the case. Each day, the industrialized countries spend roughly \$1 billion to subsidize their farmers. In contrast, the level of agricultural development assistance corresponds to a mere 2.5% of that figure. This is a clear indication that the challenges ahead cannot be solved in isolation. Strong and effective partnerships are crucial.

THE JAPAN-CGIAR PARTNERSHIP

The Japan-CGIAR partnership has been a strong and fruitful one. Though Japan did not officially join the CGIAR until 1972, the seeds of the partnership were formed beforehand through interactive work in agricultural production by a number of international agricultural centers. The Japanese contribution to the CGIAR over the past 30 years has exceeded \$500 million, and the alliance has been strategic as well as technical. The strategic element is key if the CGIAR is to make a difference in developing countries and improve the lives of poor people. The recent discussions in Japan on TICAD-3 clearly identify and recognize the strategic nature of the CGIAR.

The Robert McNamara Seminars serve as a good example of this strategic alliance at work. The seminars basically highlighted the critical role of agriculture for development, and emphasized the elements of strategic partnership critically important for the developing countries.

The Japan-CGIAR partnership is a strategic partnership that has been able to mobilize substantive resources. A people-focused partnership, it has benefited from the enormous capacities – financial, intellectual, scientific, and technical – of Japan.

Japanese scientists have played key roles, providing scientific, technical, and managerial leadership. Professor Kenzo Henmi has been a pillar stone of the Group for many years; Dr. Iwamoto, a key player in selecting the new Science Council; Dr. Keiji Kainuma, one of the chief proponents of the new reform program now underway within the Group and an expert advisor on science and technology for the future; Dr. Iwanaga, a former JIRCAS member now serving as director-general of the International Maize and Wheat Improvement Center (CIMMYT), one of the largest CGIAR Centers; Dr. Otsuka of the International Rice Research Institute (IRRI), an incoming board member in 2004; and numerous other Board members and staff from Japan who have made invaluable contributions to the system.

Like the people themselves, Japanese institutions too have contributed tremendously to international



Fig. 7. Participants of 2003 McNamara Seminar

agricultural research in the Japan-CGIAR partnership, including the Tokyo, Kyoto, and Sophia Universities; the Ministries of Agriculture and Foreign Affairs, JICA; JIRCAS; the Japanese Overseas Cooperation Volunteers (JOCV); the Nippon and Sasakawa Foundations; and many, many more. This partnership with the CGIAR is both internal (within centers) and external. It has already delivered many important results directly benefiting farmers and the environment. Based on the strength of the Japan-CGIAR partnership, more positive results can be expected in the future.

Rice Research and the Green Revolution. Japanese scientists, resources, and joint strategies have all been crucial to the progress of the CGIAR, but the contributions from Japan go further. When the Green Revolution is plotted on a world map, the important role of daruma a variety of semi-dwarf wheat developed by Japanese rice researchers working within the Japan-CGIAR partnership, becomes clear.

Japanese research conducted under the partnership in recent decades has reaped tremendous results. In South and Southeast Asia, about 50% of the new rice varieties introduced since 1970 have had input from the CGIAR Centers and partners. The economic benefits have been immense, reaching upwards of \$10 billion, a level far exceeding the annual budgets for rice research invested by national agricultural research systems and the International Rice Research Institute itself.

This is not to say that the resources outlaid for rice research have been insubstantial. The commitments in the form of human effort, money, knowledge, and technology have in fact been tremendous, and all are expected to increase.

WHAT LIES AHEAD?

CGIAR scientists, working with their partners, have made notable progress in creating farming solutions directed at the needs of poor farming communities worldwide.

New Rices for Africa (NERICAs). NERICAs are the products of a gene pool derived from crossed rice varieties from Asia and Africa. The genes at hand make it possible to derive new varieties adapted to the diverse ecosystems found in Sub-Saharan Africa, particularly in West Africa. Again, Japan has been a crucial contributor to the development of NERICAs.

The African Rice Initiative (ARI) has been launched in seven pilot countries based on the NERICA platform. The initiative is fully aligned with the New Partnership for African Development (NEPAD) as a follow-up to the TICAD-3 meeting. The NERICAs are spreading to Eastern Africa, and represent a symbol of hope for achieving sustainable food security in Sub-Saharan Africa.

Quality Protein Maize. Quality protein maize (QPM) was developed by the International Maize and Wheat Improvement Center (CIMMYT) in partnership with the Nippon Foundation and other research

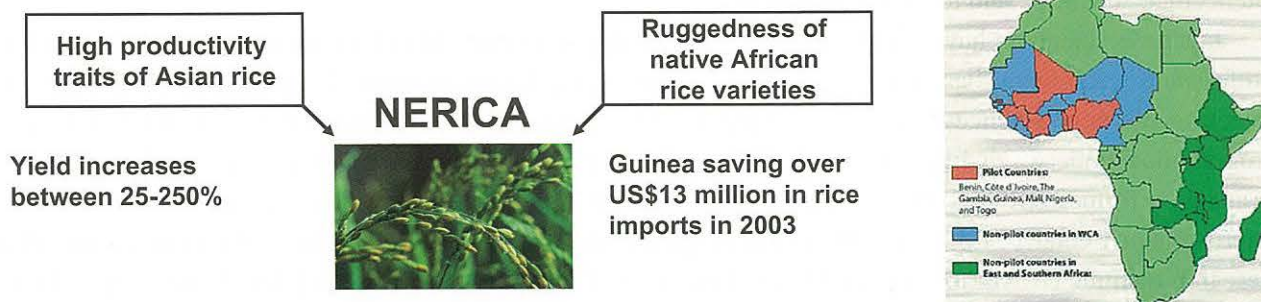


Fig. 8a and 8b. The concept of New rice for Africa (NERICA) and African Rice Initiative

organizations. This remarkably successful crop is now planted in over one million hectares in more than 20 countries, mostly in Africa, boosting food availability not only in terms of quantity but also quality, including income security as well.

Global Public Goods. The CGIAR and its partners produce what basically amount to “global public goods.” Prime examples are the CGIAR gene banks, collectively the largest collection of plant genetic resources in the world, with over 530,000 accessions. These are extremely important global public goods linked to the recently signed International Treaty on Plant Genetic Resources for Food and Agriculture. A number of Japanese institutions have provided strong support in the form of funding and technical and scientific expertise.

A caveat is in order. Though the term “global public goods” may seem conceptually easy, these three simple words actually hide an extremely complex situation that deals with rivalry and the excludability of the goods under question. The topic of intellectual property rights in industrialized and developing countries is enormously complex. Even as we witness increased participation of the private sector in agricultural research and the development of agriculture as a whole, increasingly complex methods must be adopted in handling these public goods – public goods that are sometimes national, sometimes regional, and sometimes global.

Linking mobilization of resources. Realistically, organizational resources have to be considered on a platform of partnership. In achieving its mission, the CGIAR must consider human resources and the mobilization of knowledge, technology, and products. It must join the private sector in mobilizing proprietary technology and be a strong advocate in this area together with Japan. During the World Summit for Sustainable Development in Johannesburg, the need for public-private partnerships was highlighted and helped bring agriculture back onto the map, to clearly indicate the critical importance of agriculture to all those involved in the sustainable development arena.

But we must recognize that the challenge involves far more than just the CGIAR and agricultural research. Rather, it has to do with all of agriculture in the broadest sense and the critical importance of agricultural development for national development.

JIRCAS-CGIAR PARTNERSHIP

Looking back, much has been accomplished over the last decade by the JIRCAS-CGIAR partnerships including:

- Research to combat East Coast fever and develop a vaccine against this disease;
- Maize and wheat developed through the genomic work on Japanese wheat varieties;
- Specific crop and farming improvements geared toward arid and semiarid ecosystems;
- Use of geographic information systems to map soil degradation and vegetation resources;
- Studies on the genetics of yield potential in rice;
- Development of NERICAs.

THE WAY FORWARD

A new CGIAR is emerging for the future. Responding to the challenges, the Group has embarked on a substantive reform program. This new CGIAR is an agile, world-class knowledge network that responds rapidly to new challenges. CGIAR continues its work at the frontier of science, notwithstanding the tremendous speed with which the science frontier of today is now advancing. It also has to provide the public

goods that will not be addressed by private sector research. The CGIAR modus operandi will continue to be based on partnerships: internal partnerships within the Group itself, South-North partnerships, and partnerships between the public and private sectors.

The CGIAR believes that agricultural development is critical for economic growth, the reduction of poverty, and food insecurity. International agricultural research is a central pillar for gains in productivity, for the proper management of our natural resources, and for properly addressing the social concerns that are so evident today.

In looking at the patterns in developing and industrialized countries, the CGIAR is convinced that public goods research will continue to be vital. While the CGIAR, like others, plays only a small role individually, together we can make a difference. This is why partnerships are essential.