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A Profit in Our Own Country

RECORD OF A SEMINAR CONDUCTED BY THE CRAWFORD FUND FOR INTERNATIONAL
AGRICULTURAL RESEARCH, PARLIAMENT HOUSE, CANBERRA, MAY 17 1994

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COSPONSORS:

Australian Centre for International Agricultural Research
Australian International Development Assistance Bureau
Department of Primary Industries and Energy

Canberra 1994



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International Agricultural Development and World Trade: an American View

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This is a special opportunity for me—to discuss the interests of the United States in this conference titled 'A Profit in Our Own Country: Benefits to Australia from International Agricultural Research'. Agriculturalists of your country and of mine helped guide the establishment of what is today a global network of agricultural research centres serving the people of developing countries of Africa, Asia, Latin America and the Caribbean.

The vision of the Australian people to be involved in international agriculture is personified in the life and legacy of Sir John Crawford. It is a personal privilege for me to represent Winrock International and the United States at this important meeting sponsored by the fund created in his honour.

The future of international cooperation in agricultural research, production, and trade will affect the welfare of billions of people in all countries and at all income levels. From an American view, the future for assistance and cooperation between the United States and developing countries in agricultural research and development is extremely important. The evidence from the past several years strongly suggests that effective development assistance in agricultural research and development can improve employment and incomes in lower income countries in a way that benefits vast numbers of poor people in those countries as well as American agriculture.

To analyse this evidence, the past, present, and projected future for agricultural production and trade will be briefly reviewed. Then the importance of agriculture and agricultural research in development will be discussed. Finally, the essence of these first two sections will be used to develop the rationale for U.S. assistance to agricultural research and development in lower income countries.

By the end of the 1980s, 75 developing countries were producing less food per person than they were a decade earlier.

Agricultural Production and Trade

Production

Per capita agricultural production in various world regions for the last decade is presented in Table 1. In developed countries and worldwide, there has been almost no growth in agricultural per capita production in the past 10 years. The developing countries of the Far East region—from India and Pakistan, on east through Indonesia and the Philippines—have made remarkable progress. Per capita agricultural production in the early 1990s was 23–25% higher in this region than in 1979–81. No other world region even approached this record. In contrast, per capita agricultural production fell in both Africa and the Near East from 1979–81 to the early 1990s. These regional growth rates mask some troubling country trends. By the end of the 1980s, 75 developing countries were producing less food per person than they were a decade earlier (Pinstrup-Anderson 1994).

Imports

There were some interesting trends in the changes in agricultural imports of various world regions since the 1960s (Table 2). First, agricultural trade increased rapidly in almost all world regions in the decade of the 1970s. Second, Asia was the only world region that substantially increased agricultural imports in both the 1970s and 1980s. Third, Western Europe, the Middle East, and the former USSR/Eastern Europe regions have become less important as importers of the world's agricultural products. Fourth, sub-Saharan Africa, a region of almost 600 million people and declining per capita agricultural production is now an insignificant commercial importer of agricultural products.

Production and import relationship

It is interesting to note the relationship between per capita agricultural production and agricultural imports in world regions in the 1980s (Tables 1 and 2). Asia had the highest growth rates of per capita agricultural production, and also had the most rapid increases in imports of agricultural products. Those regions with declining per capita agricultural production—Africa and the Near East—also had declining agricultural imports in the 1980s. It appears that the lower-income countries that experienced the most growth in agricultural production also had the most growth in their agricultural imports in the 1980s.

U.S. agricultural exports

Three periods have characterised the changes in the total value of agricultural exports in the United States over the past 15

Table 1. Indices of agricultural production per capita in world regions (1979-81=100).

World Region	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
All Developed	97.48	103.70	104.41	104.03	102.53	99.43	102.91	103.21	99.32	98.95
North America	85.54	98.39	103.14	97.36	94.63	87.13	95.28	98.24	96.57	102.62
Europe	102.24	108.63	105.82	107.06	106.56	105.62	106.49	105.36	104.17	100.79
Oceania	104.31	100.20	102.31	101.60	99.27	101.80	96.52	97.16	96.47	98.35
Former USSR	107.14	105.20	105.71	111.66	109.82	107.90	111.46	110.59	95.84	91.30
Other Developed	92.98	95.68	98.00	96.44	96.84	95.03	96.43	93.75	91.10	84.47
All Developing	104.56	106.74	108.20	107.44	107.60	111.13	112.08	113.56	113.99	113.80
Latin America	98.08	98.65	101.48	97.08	99.51	102.20	102.70	101.29	100.91	100.36
Africa	95.54	93.66	98.23	100.23	96.07	99.53	100.33	97.61	98.65	93.14
Near East	98.54	95.56	98.16	99.96	97.15	99.04	91.30	97.48	94.75	96.22
Far East	109.31	113.53	113.75	113.45	114.03	118.16	120.67	123.36	124.53	125.35
Other Developing	94.97	100.02	99.52	96.91	95.74	94.03	96.37	95.60	91.94	91.19
World	100.14	103.90	104.66	103.77	102.85	102.97	104.74	105.36	103.58	103.05

Source: FAO Production Yearbook, Vol. 46, 1992. Table 10.

Table 2. Agricultural imports by world region excluding intra-regional trade.

	Agricultural imports (\$ billion)				Growth rates (%)			Share of world (%)			
	1962 -64	1969 -71	1979 -81	1988 -90	1960s	1970s	1980s	1962-64	1969-71	1979-81	1988-90
Asia	4	6	25	42	7.0	15.7	6.0	15	18	20	30
North America	4	6	20	24	4.1	13.1	2.2	18	18	16	17
Latin America	1	1	6	4	4.5	20.0	-5.5	3	3	5	3
Western Europe	14	16	51	52	2.3	12.2	0.3	57	51	40	38
Oceania	0	0	1	2	5.3	14.3	4.9	1	1	1	1
Africa	0	1	4	1	9.9	18.6	-13.8	1	2	3	1
North Africa/ Middle East	0	1	14	10	17.6	25.9	-4.2	2	4	11	7
USSR/ Eastern Europe	1	1	6	4	5.6	21.9	-4.0	2	3	5	3

Source: United Nations Trade Database.

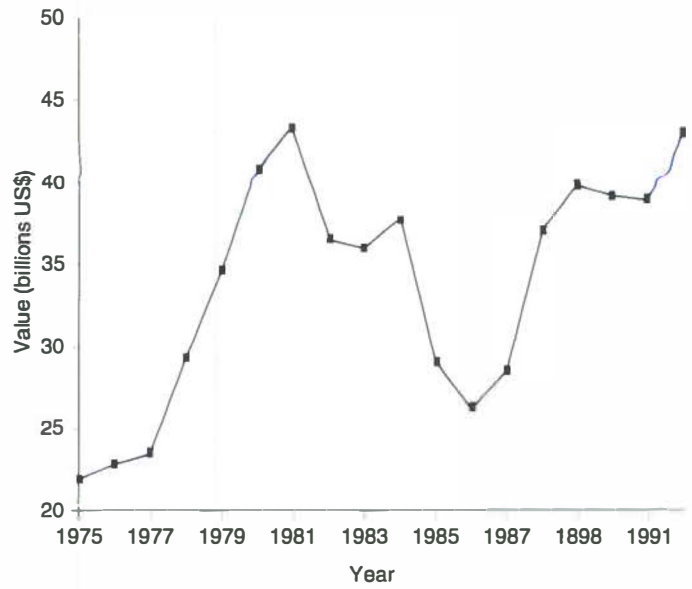


Figure 1. Value of U.S. agricultural exports, 1975–1992.

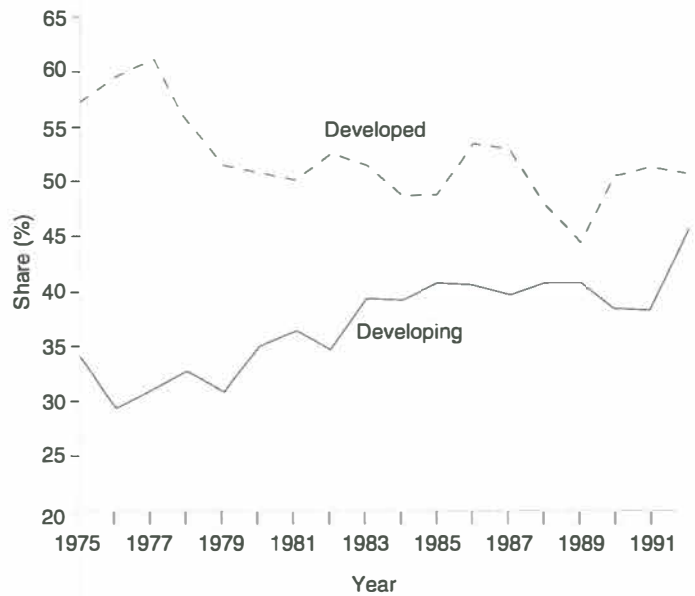


Figure 2. Share of the U.S. agricultural exports to developing and developed countries, 1975–1992 .

years (see Figure 1). U.S. agricultural exports increased by 83% from 1977 to 1981, declined by 39% from 1981 to 1986 and increased again by 64% from 1986 to 1992.

During this 15-year period, however, the proportion of U.S. agricultural exports to developing countries increased steadily from 31.7% in 1975–77 to 44% in 1990–92 (see Fig. 2). Developing countries have been, and continue to be, the most rapidly expanding markets for U.S. agricultural exports.

Future demand

The future demand for agricultural production will likely be quite different between developing countries and developed countries. Crosson and Anderson (1992) have carefully projected the anticipated demand for agricultural products in 2030—only 36 years from now (Table 3). For this analysis, they used grain as a proxy for all agricultural products. Almost all of the projected increase in grain consumption will be in developing countries.

The combination of population growth and increased per capita income in these countries indicates that their demand for agricultural products will be 2.7 times more in 2030 than in 1989. The consumption of wheat and rice will grow more slowly than that of coarse grains. The rapid increase in coarse grains demand will be due largely to increasing consumption of poultry, swine, beef, and other livestock. The consumption growth of coarse grains is expected to almost double, going from an increase of 1.7% annually in the 1980s to 3.2% annually in the four decades between 1988–89 and 2030.

Table 3. Annual grain consumption in the less-developed and more-developed countries, 1979–81 to 2030.

	Quantity (million tons)			Annual increase (%)	
	1979–81	1988–89	2030	1979–81 to 1988–89	1988–89 to 2030
Less-developed countries					
Wheat	195.6	265.6	770	3.7	2.3
Rice	249.4	309.2	634	2.6	1.3
Coarse grains	260.8	299.7	946	1.7	3.2
Total	705.8	874.5	2350	2.6	2.3
More-developed countries					
Total (all grains)	—	802.5	947	—	0.4

Source: Crosson and Anderson 1992.

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Past versus the future

It is often instructive to compare what we have accomplished in the past with what we need to achieve in the future. In the 12 years from 1980 to 1992, world agricultural production increased at slightly less than 2% annually, but in developing countries agricultural production increased 3% per year (Food and Agriculture Organization 1992). To meet growth in demand estimated by Crosson and Anderson throughout the next 40 years, world and developing country agricultural production must increase annually about 1.7 and 2.5% respectively. This means that the world farmers must double their agricultural production by 2030 to meet the demand for agricultural products that will nearly triple in developing countries by 2030.

Most experts agree that it will not be possible to economically add significant amounts of land to agricultural production in the next 40 years, so all of this increased production must be accommodated on land now devoted to agriculture. Therefore, future increases in agricultural production must come largely from increased yields. Brown (1994) argues it is not realistic to assume that yields will increase 2–3% annually in the next three to four decades, pointing out that corn, wheat, and rice yields have increased a mere 1% annually between 1984 and 1993.

Most experts of international agriculture will argue that continued and increased investments in agricultural research are vital to producing the research results and the economic policy and extension systems that can sustain 2–3% annual increases in yields in developing countries.

Accomplishing these increases in agricultural production in developing countries will be a greater challenge for agricultural research than in the past. There are several reasons for this.

- More research attention will be focused on rainfed agriculture and the less-favoured agroclimatic regions.
- Significant agricultural research effort must be oriented to maintaining the current yield levels. With constant to declining financial support for agricultural research, this means fewer resources will be available for developing new technologies for further yield increases.
- As environmental pressures grow, agricultural research must be increasingly oriented to respond to environmental concerns rather than to short-term production gains.
- We seem to be in a period when crop yields, even in experimental locations, are not increasing very much. To make significant yield increases presents difficult challenges to international agricultural research.

All of this calls for greater emphasis on agricultural research, not less.

Another important consideration with regard to the potential of the future versus the record of the past relates to agricultural policy in the developed countries. Since the middle of this century, North America, Europe, and Japan have implemented policies that stimulated agricultural production. These policies have included price supports, input investments, and export subsidies. Now these policies are changing, giving way to pressures to reduce public expenditures for agriculture.

Trade negotiations have also required that nations reduce many of these agricultural production subsidies and incentives. As a result, agricultural production in many developed countries may decline or, at best, be stable in the foreseeable future. The large surpluses that developed countries have used for concessionary shipments and emergency supplies may decline significantly. The loss of this 'safety net of food' argues for developing countries to increase their investments in agricultural research, thus improving their own food security.

To double agricultural production in the next 40 years could place heavy strains on our natural resources, especially with respect to soil erosion, forest cover and water quality. It is clear the nexus between agricultural production and environmental quality is becoming increasingly important and controversial.

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Relationships between Agricultural Production and Development in Developing Countries

To understand why it is in the best interests of U.S. agriculture to support agricultural research and development, we must understand the relationship between agricultural production and development in developing countries. In this regard, six characteristics of developing countries are important.

- In most developing countries, agriculture accounts for a significant proportion of total economic activity. Up to 70% of the people live in rural areas and more than 40% of their work force is employed in agriculture.
- As people's incomes rise, they spend significantly more on both the quantity of food and on diet diversification in developing countries. Food expenditures may increase by 5–6% for each 10% increase in income. In many developing countries, 40–60% of income is spent on agricultural products. As incomes rise, more is spent to consume

animal products, which increases the demand for feed grains. Primarily because of this, per capita grain consumption in developed countries is typically 2.5–4 times more than in developing countries.

- In general, people working in agriculture in developing countries have lower incomes than those who are employed elsewhere in the economy. An increase in the income for agricultural workers creates a greater demand for agricultural products than the same increase would cause in the non-agricultural sector.
- Although declining, population growth rates in developing countries are still relatively high and will remain higher than those in developed countries for many decades. Nearly 90% of the world population growth in the next 40 years will occur in developing countries. The majority of these people will be in Asia, and they will be poor.
- In developing countries, the performance of the agriculture sector is often an important determinant in how rapidly the non-agricultural sector grows. This is because of the size of the agricultural sector and its positive development linkages to the non-agricultural sector.
- Growth in the non-agricultural sector can be quite high. In many developing countries, this contributed to rapid increases in the demand for imported agricultural products that occurred in the 1970s and 1980s.

These six characteristics indicate there are strong possibilities for relatively high growth rates in the demand for agricultural products in developing countries. For the 4.3 billion people in developing countries, the demand for agricultural products can increase rapidly if they can achieve economic development. But to achieve economic development, most developing countries must increase their domestic agricultural production.

Many studies have shown that the returns to investments in agricultural research are very high.

Importance of agricultural research

The quality and quantity of agricultural research is one of the most important determinants of the level of agricultural development in developing countries. Many studies have shown that the returns to investments in agricultural research are very high. Agricultural research often produces new techniques and technologies that reduce the real cost of producing agricultural products, enabling farmers to increase their incomes and consumers to spend relatively less on agricultural products. This increased agricultural efficiency particularly benefits poorer people, some of whom are agricultural producers and workers and all of whom spend large proportions of their

incomes on food and fibre products. Investments in agricultural research oriented to food grains and fibre products can be a great benefit to the poor in developing countries.

Good agricultural research can also contribute significantly to agribusiness development by:

- improving the quality of raw agricultural products;
- developing new uses for agricultural products;
- reducing prices for agricultural products;
- improving the management of production, marketing, and input systems.

Without continued and increased emphasis on agricultural research, we cannot hope to achieve the production gains that are required to meet the demands for agricultural products in the future in an environmentally sustainable manner. Also, without continued investments in agricultural research, we cannot provide the jobs and increased purchasing power that is desperately needed by poor people in the developing world.

A strong and viable agricultural research system is critical to the prosperity and environmental soundness of this planet during the next 40 years.

Rationale for Supporting Agricultural Research and Development

There are many reasons why it is in the best interests of the United States to encourage broad-based economic development by supporting agricultural research and development in low-income countries.

Humanitarian and geopolitical rationale

It is in the best interests of everyone that we encourage a stable, peaceful and just world. In 1994, 78% of the world's population lived in developing countries. By 2030, over 84% will live in these countries. Sound broad-based development, supported by agricultural research in developing countries, can provide hope and a more secure future for people in developing countries. Improved food security, increased employment opportunities and higher incomes for a broad segment of the people in these countries will lead to increased stability and prosperity for us all.

The poverty and hunger we see in many of these countries are not consistent with our sense of how human beings ought to live. It is estimated that more than 700 million people in developing countries are under- or malnourished. In South Asia and Africa, 50% of all the people live in poverty (Pinstrup-Anderson 1994). The infant mortality rate in developing

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countries of 77 deaths per 1000 live births is 5.5 times higher than in the richer countries where per capita incomes are 15–20 times higher. The hunger, poverty, and poor health conditions in developing countries can be addressed by sound broad-based development programs supported by effective agricultural research and development. It does not seem to be fashionable today to talk about the humanitarian rationale for agricultural research and development. Nevertheless, I believe that humanitarian concerns are one of the strongest reasons that many people in the U.S. support investments in agricultural development in low-income countries.

Economic self-interest rationale

Increased agricultural exports Another convincing rationale for the United States to support agricultural research and development is that it is in our own economic self-interest. We know that broad-based growth in developing countries increases agricultural imports as people in these countries increase their per capita incomes, become more urbanised, increase employment for women, and generate a demand for convenience foods. Because the agricultural sector is a large segment of the economy of most developing countries, particularly with respect to employment and income generation, it must grow and become more efficient for there to be sustained, broad-based growth in these countries.

What is the evidence of the relationship between agricultural growth and agricultural imports in developing countries? A few years ago, I did a study to rank developing countries by the growth of their domestic per capita agricultural production from 1970–82, then divided them into four categories (Kellogg 1985). The quartile of developing countries that had made the most rapid increases in per capita agricultural production also had increased total agricultural, corn, and soybean and soybean products imports at respective rates of 34, 97, and 257% faster than the quartile of developing countries with the slowest growth in per capita agricultural production.

Somewhat more recently, I analysed 65 developing countries and found that increases in per capita incomes of these countries were strongly and positively correlated with increases in their imports of agricultural good and services (Kellogg et al. 1986). A 10% increase in their per capita incomes was associated with a 7.3% increase in per capita agricultural imports. For the lowest-income developing countries, an increase in per capita agricultural imports of 9.7% was associated with a 10% increase in per capita incomes. Therefore, it is clear that increasing per capita incomes in these

countries leads to growth in agricultural imports. This analysis also shows the positive and strong correlation between per capita agricultural production and per capita income in developing countries.

For those developing countries where per capita agricultural production is growing, there is also a positive and significant correlation between such production and per capita agricultural imports. The study found no evidence that increasing agricultural production in developing countries negatively affected their agricultural imports.

This evidence indicates that it may be necessary for developing countries to increase their agricultural production to get the widespread income growth that leads to increased agricultural imports. Because of this, developing countries with the faster-growing agricultural sectors were the faster-growing markets for U.S. agricultural exports. Thus, American agriculture has much to gain from improving agricultural and overall development in developing countries.

Regardless of whether or not one agrees with that conclusion, it is clear that U.S. Government expenditures to assist agricultural development in developing countries are relatively small. Our country's domestic agricultural commodity price and farm income support expenditures typically are 25 times larger than our expenditures for agricultural, rural development, and nutrition assistance for developing countries. Or, to put it another way, the U.S. Government spends only 4% as much on agricultural development assistance as it does to support domestic agricultural programs.

There are exceptions to this general proposition that agricultural development boosts broad-based income growth and thus the demand for imported agricultural products. For example, some developing countries have adopted policies that force reductions in their imports and increases in their exports of agricultural products, regardless of the current situations they face. In other countries, unequal income distributions, poverty, and poor performance in the non-agricultural sector substantially constrain any increases in demand that results from increased agricultural production.

The evidence is conclusive: total agricultural exports to developing countries are not, in general, harmed by increased agricultural production in those countries. While increasing production of specific commodities will likely reduce imports of those commodities, imports of other agricultural commodities are likely to rise. It is these mixed results regarding specific commodities that cause conflict between some interests in U.S. agriculture and those promoting development assistance.

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Developing countries are the best hope for expanded markets for the world's agricultural exporters.

U.S. soybean farmers have expressed substantial concern about the possible impact U.S. development assistance may have had in increasing soybean production in Brazil. Increased soybean production and exports by Brazil, causing increases in income and foreign exchange, may have stimulated additional imports of U.S. corn and wheat into that country. Even with this benefit, few American wheat and corn farmers expressed their support for the development assistance that may have helped to expand Brazilian soybean production that stimulated wheat and corn imports. U.S. commodity groups are often more vocal in protesting potential negative impact on their commodity than the support heard from other commodity groups that may stand to gain.

Many developing countries that have had economic difficulties in the past will need to improve their foreign exchange positions and income growth records if they are to continue to be growing markets for agricultural imports. This means agricultural development must be an important part of their development plans.

Finally, macroeconomic forces—such as interest rates, foreign lending, currency values, developing countries' export performances, trade barriers to exports from developing countries, oil prices, and other variables—have major impact on the ability of developing countries to import agricultural products. In addition, the trade and domestic policies adopted by both developed and developing countries will greatly influence the size and composition of developing countries' agricultural imports in the future. If a lack of export opportunities and reduced assistance for agricultural research and development assistance force developing countries to turn inward, they may adopt import substitution and self-sufficiency policies that will constrain their agricultural imports.

Developing countries are the best hope for expanded markets for the world's agricultural exporters. But, for this hope to be realised, developing countries must generate employment opportunities and significantly increase incomes for the billions of their people who now live at or near poverty levels. This will require agricultural research and development that improves the welfare of these people.

Effective development assistance in agriculture (including agricultural research) that improves employment and income in developing countries can bring far-reaching benefits to countless numbers of impoverished people as well as those involved in American agriculture. Thus, the broader picture is one of mutual benefit, both for agriculture in the United States and for agricultural development in poor countries.

Reverse technology flow Sound investments in international agricultural research can produce new agricultural technologies and techniques that benefit farmers and agribusiness in developing and developed countries. While they are properly oriented to the needs of developing countries, international agricultural research centres and national agricultural research systems in developing countries have and will continue to produce technology that often has application to improving agricultural profitability and efficiency in developed countries. The extent and substance of this reverse technology flow to American agriculture is too large to describe completely in this presentation. However, there are numerous examples in the literature.

Improved semi-dwarf wheat and rice varieties developed at international agricultural research centres have made significant contributions to increasing grain production in the United States. Varieties and lines developed at the International Maize and Wheat Improvement Centre (CIMMYT) in Mexico have been used to breed improved spring wheat bread varieties that have been directly planted in southwestern states of the U.S. In 1984, 36% of the U.S. wheat area was sown to varieties with CIMMYT germplasm in their ancestry. The area has undoubtedly expanded since then, but more precise figures are not available. The semi-dwarf varieties imported from Japan in the 1950s were used to breed varieties that are grown on 60% of the wheat area in the U.S.

Rice varieties and lines developed at the International Rice Research Institute (IRRI) in the Philippines are widely used in the United States. There was IRRI ancestry in about 66% of the rice planted in the U.S. in 1992.

Farmers in the states of Idaho and Washington are planting 'crimson', a new lentil variety developed from germplasm originating in Egypt and supplied by the International Centre for Agricultural Research in the Dry Areas (ICARDA).

American researchers are multiplying a new chickpea variety from ICARDA that contains resistance to a blight disease found in the U.S. It also has the potential to increase yields by 50% compared to chickpea varieties now grown in Idaho and Washington.

The International Plant Genetic Resources Institute (IPGRI) has made significant worldwide contributions to agriculture. The most significant impact IPGRI has made on U.S. agriculture has been the shipment of a large number of germplasm accessions from IPGRI collecting missions to gene banks in the U.S. Out of approximately 206 000 accessions collected by IPGRI, at least 20 621 samples are now stored in gene banks in the U.S. available to American plant breeders.

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Other examples of technology from international research being used in the U.S. include:

- the genetic source for golden nematode resistance in potatoes discovered in germplasm from Peru;
- the source of modern resistance to rust in wheat discovered in genetic material from Kenya;
- improved productivity of dairy goats in the U.S. through the disease and production system research of Kenya;
- new varieties of soybeans for American farmers from 535 breeding lines and varieties from Brazil received between 1973 and 1986.

The sources of origin of most agricultural products are in developing country areas. It is in developing countries that most genetic diversity exists for many of our important crops and animal species. For example, only five food crops are native to the continental United States, and these are minor berries and nuts (IFPRI 1992). As scientists of the developed world search for genetic materials to fight disease and pests and improve tolerance for drought and toxicities, they need access to the germplasm in these centres of origin in developing countries.

The discovery and sharing of this germplasm is becoming an issue of considerable public concern in many developing countries. Some countries now view this germplasm as a national resource or treasure that must be controlled, particularly regarding export. There are some persons involved in this issue who maintain that these germplasm 'rights' should include payment to farmers in developing countries as compensation for their maintaining this basic genetic resource over time.

No matter how one views these current developments, it is clear that unless developed countries assist and participate in international agricultural research with financial resources and scientists, access to important germplasm in developing countries will become more difficult.

Improving our scientists Another important part of the economic self-interest argument for participating in international agriculture research involves educating and improving the human resource in the scientific community of developed countries. Producers, business people, educators and scientists in the agricultural sector in developed countries must have the ability to operate effectively in an increasingly interdependent world. In the U.S. we cannot be successful teachers, researchers, agricultural policy-makers and agribusiness personnel without a deeper understanding of the global dimension of our

agriculture. One of the best ways to gain this understanding is for our agricultural personnel to participate in international agricultural research and development programs.

Sustainable environment rationale Finally, the rationale that may be the most important long-run reason for supporting agricultural research in developing countries relates to the environment. We all know that many environmental problems are not confined by national boundaries. Greenhouse gas emissions, carbon sequestering, water pollution, fish harvesting, pesticide poisoning, forest degradation, soil erosion and other environmental concerns affect each of us in one way or another. Imagine the loss of forests, deteriorated soil quality, human hunger and disease that would have occurred if international agricultural research had not helped develop new technologies and new institutional and economic policies that allowed us to develop more productive crops and livestock, improved land management practices, and more effective input and output marketing systems.

If we were confined to the agricultural technology of the 1950s to produce and distribute the food and fibre for the needs of the 1990s, environmental problems would be much more severe. And, I am certain, millions more people in the world would be suffering from the effects of these environmental problems. Similarly, without continuing agricultural research investments in developing countries in the future, we will find significantly more land being devoted to agricultural production to meet rising demands. This will cause substantial environmental problems, such as loss of forests and soil degradation.

We have to make the same progress in agriculture from the 1990s to 2030 as we did from the 1950s to 1990s if we are to feed and clothe the additional 2–3 billion people expected in 2030 and do it in an environmentally sustainable manner. This will require that all countries participate in agricultural research and development in developing countries. We must do this for the benefit of our own economic and environmental interests, and also because we all want this to be a more just and peaceful world.

Agriculture of Australia and the United States has contributed much and has benefited greatly from investments in international agricultural research. This includes our farmers and agribusiness personnel, our universities, our scientific institutions, our public and private funding agencies, and our people. During the next three decades, there will be major changes in the developing countries of the world. What happens as a result will in many ways depend on the effectiveness of

To feed and clothe the additional 2–3 billion people expected in 2030 will require that all countries participate in agricultural research and development in developing countries.

agricultural research and development. One billion more people in the next 12 years—mostly Asians and Africans—to feed, shelter and employ is a massive challenge. It will affect the quality of life in those countries. It will also affect how we live in the United States and Canada, Australia, Japan, and western Europe.

We must commit the resources necessary to put agricultural research to work for the national development of the developing countries. Our leaders of a generation ago—Sir John Crawford, George Harrar, Robert Chandler, Winthrop Rockefeller, and many, many others—set the course for us. Let's not lose sight of the goal, for the needs of the 21st Century are even greater than those of the 1940s. It is to our own best interests to support international agricultural research, but it is also our greatest contribution to the future of our children and grandchildren, and to all of humankind.

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