



## Short Article

## Biotechnology for the Poor?

Biotechnology consists of using living organisms or substances from living organisms to make or modify a product, improve plants or animals, or develop microorganisms for specific uses. The key components of modern biotechnology are: (i) Genomics: the molecular characterization of all species; (ii) Bioinformatics: the assembly of data from genomic analysis into accessible forms; (iii) Transformation: the introduction of single genes conferring potentially useful traits into plant, livestock, fish, and tree species; (iv) Molecular breeding: the identification and evaluation of desirable traits in breeding programs with the use of marker-assisted selection; (v) Diagnostics: the use of molecular characterization to provide more accurate and quicker identification of pathogens; and (vi) Vaccine technology: use of modern immunology to develop recombinant DNA vaccine for improving control of lethal diseases (IFPRI, 2001).

According to the "broad" definition above, biotechnology has a potential to answer poverty issues, such as alleviating hunger, diseases, and environmental stress. In Asia and the Pacific, research on the incidence of poverty in sixteen countries based on country specific or "national" poverty lines between 1990 and 2000 shows that while poverty has declined in Bangladesh, Cambodia, China, India, Malaysia, the Republic of Korea and Viet Nam, poverty has increased in other Asia Pacific countries such as Indonesia, the Philippines and Thailand (ESCAP, 2002).

In most countries within the ESCAP region, the incidence of poverty is higher in rural than in urban areas. Asia alone has two thirds of the world's rural poor, concentrated mainly in South Asia. One ESCAP study estimates that, in terms of numbers, there were 560 million rural poor people in the region in 1998 compared with 240 million urban poor (ESCAP, 2001).

There is controversy surrounding biotechnology. Research shows environmental benefits of biotechnology such as: (i) Improved water quality through reduced soil erosion and runoff; and (ii) Cleaner environment due to reduced use of agricultural chemicals. Biotechnology also offers world food supply benefits such as (i) Biotech foods can make it possible to grow more food on the same area of land, especially under difficult growing conditions; (ii) Biotech foods can reduce crop losses to pests and disease; and (iii) Biotech crops can be

Biotechnology can enhance agricultural productivity in poor countries in a way that further reduces poverty, improves food security and nutrition, and promotes the sustainable use of natural resources. Small farmers in poor countries face a variety of problems and constraints. Crop losses due to insects, disease, weeds, and drought threaten income and food availability. Acidic soils, low soil fertility and lack of access to reasonably priced plant nutrients, and other biotic factors also contribute to low yields. Poor infrastructure and dysfunctional markets for inputs and outputs, along with lack of access to credit and technical assistance, all add to the problems plaguing poor farmers.

Some key questions still shadow the use of biotechnology as far as environmental risks are concerned: (i) Could Genetically Modified (GM) crops become a weed or be invasive of natural habit?; (ii) Could genes from genetically modified organisms cross over to weeds and create herbicide resistant weeds?; (iii) Could GM crops transfer genes to non GM-crops?; and (iv) Could insects become resistant to pesticides? Biotechnology may also pose some human health risks, such as: (i) Increased health risks associated with allergenicity and toxicity in genetically modified foods; (ii) Why are antibiotic-resistant genes being used?; (iii) Horizontal gene transfer to other micro-organisms and become pathogen; and (iv) Possible unknown long-term or inter-generational consequences (Iamsupisit, N., 2002: Benefits and Risk of GMO).

Four sets of biotechnological policies are particularly important to pursue: (i) Policies to guide research for the poor. This could be through the allocation of additional public resources to agricultural research, or by converting some social benefits to private benefits, and protecting intellectual property rights; (ii) Policies to protect against health risks; (iii) Policies to address ecological risks; and (iv) Policies to regulate the private sector.

In the end, the key to biotechnological advancement is on consumers. Consumer attitudes are reflected in public perception. Unfortunately, consumers in poor countries are always the last to know about the potential benefits and risks of biotechnology ■

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*(References available upon request)*

## FlashBREAKING



## What are Pro-Poor Policies?

Despite being increasingly used, the term 'pro-poor policies' is frequently kept vague and general. Growth is pro-poor, if it uses assets that the poor own, if it favors sectors where the poor work and if it occurs in areas where the poor live. These obvious points, however, are seldom decoded into detailed reforms to make policy frameworks pro-poor in practice, not only in theory. Pro-poor policies imply that the social and economic indicators for disadvantaged people improve more rapidly than those for the rest of society. It is not sufficient that the indicators for the poor improve; they have to improve at a faster pace than for non-poor if one seeks to reduce not only the number of extremely poor people but also their share in the world population.

Vandemoortele, J., 2004. The MDGs and Pro-Poor Policies: Can External Partners Make a Difference? United Nations Development Programme, New York.

## Alleviating Poverty in Asia and the Pacific

Although the Asia and Pacific region is one of the fastest growing in the world, some 720 million people continue to live there on less than \$ 1 a day. With the Asia and Pacific region forecast to grow by 6.8 per cent in 2004, compared with 6.3 per cent in 2003, the questions of a single currency for East Asia, capital market development, corporate restructuring, challenges of infrastructure financing and the role of domestic credit rating agencies to reduce poverty in Asia are likely to generate much discussion in ADB's 37th Annual Meeting of the Board of Governors at Jeju Island, Republic of Korea from 15-17 May.

ADB, 2004. Poverty Alleviation and Asian Economy Expected to be Issues at ADB 37th Annual Meeting, News Release (10 May 2004).

## Imbalanced World

Of the six billion people living in the world today, one billion receive 80 per cent of global income, while more than one billion barely survive on less than a dollar a day. While developed countries spend \$ 600 billion a year on defense, and incur \$ 300 billion in direct and indirect agricultural subsidies, they offer only \$ 56 billion a year in aid to developing countries.

Wolfensohn, J. D. 2004. Partnership in Development, Progressing the Fight Against Poverty, Foreword, The World Bank Group.

## FAO Trust Fund to Support Food Security and Safety

To reduce by half the number of hungry people by 2030, one of the goals of the World Food Summit, FAO has established the FAO Trust Fund for Food Security and for Emergency Prevention of Transboundary Pests and Diseases of Animals and Plants with an initial target of US\$ 500 million. This FAO Trust Fund will be an important source of demand-driven funding to supplement the present trust funds, which support key components of the Organization's Field Programme but which have recently developed a focus on emergency operations at the expense of catalytic projects addressing long-term structural needs of the poor (70 per cent of whom are in the rural sector) in the basic areas of employment creation and income generation.

FAO, 2004. FAO Trust Fund for Food Security and Food Safety, [http://www.fao.org/tc/Tca/trustfund\\_en.asp](http://www.fao.org/tc/Tca/trustfund_en.asp).

## Economic Growth, Inequality, and Poverty in China

Economic growth in the People's Republic of China (PRC) between 1985 and 2001 was effective in poverty reduction. However, rising inequality, limiting potential benefits to the poor, reduced the effectiveness of growth on poverty reduction. This should serve as a warning to policy makers. In a low-inequality economy, "letting some people get rich first" is necessary to provide incentives and stimulate growth, and effective poverty reduction could be achieved by maximizing economic growth, even if inequality worsens in the growth process.

The initial level of inequality becomes an important factor in determining growth policies for countries at different development stages. A development stage with low initial inequality will allow greater poverty reduction from economic growth, whereas a development stage with high initial inequality will require a deeper poverty focus to achieve greater poverty reduction from growth. In the current stage of economic development in the PRC, economic growth is still effective in reducing poverty. However, as inequality increases, economic policies that promote efficient agricultural growth and target regions with high concentrations of poor such as the infrastructure investment program in the western regions will be more effective in poverty reduction ■

Based on B. Lin, Q., 2003. Economic Growth, Income Inequality, and Poverty Reduction in the People's Republic of China, Asian Development

## More Highly Educated Women Have Less Children

Birth rates have been declining in almost all countries in Asia and the Pacific since 1960. Seven countries are still in the pre-transitional stage, that is, birth rates have just begun to decline or are not declining yet. There, rates remain above 5 children per woman. In 23 countries, the transition phase is evidenced by the fact that women are having children at a rate of between 5 and 2.1 births per woman. Sixteen countries have reached an advanced stage where the birth rate is at, or below, the replacement level, unheard of 50 years ago. Socio-economic development and improvements in the educational attainment of women have played a large role in this transition. As countries approach the advanced stage, low birth rates can be achieved and sustained through high levels of development that include improvements in women's education and social status ■

Based on Kandiah, V., 2003. Fertility Level and Trend, and Their Implications for Policies and Programmes, Fifth Asian and Pacific Population Conference.

## Small-Scale Farmers Competing with Subsidized Products

Small-scale farmers in developing countries have a hard time competing against subsidized products that are dumped on their local markets. The trade policies of industrialized countries cause great harm to the economies of many developing nations which depend heavily upon agriculture. A bale of subsidized cotton in the United States may mean less production in Mali or another ton of subsidized rice in Japan can have the same displacement effect in Viet Nam. Trade-distorting measures of industrialized nations displace more than US\$ 40 billion of net agricultural exports per year from developing countries. Elimination of these measures would triple developing countries' net agricultural trade. More than half of the displaced exports are caused by the policies of the European Union (EU); somewhat less than a third are due to US policies; Japan and other high-income Asian countries cause another 10 per cent. For the developing countries of Asia, liberalization in Japan and Korea would represent one-third of the total value of expanded trade from the elimination of subsidies and protectionism ■

*Based on Diao, X., Diaz-Bonilla, E. and Robinson, S., 2003. How Much Does It Hurt? The Impact of Agricultural Trade Policies on Developing Countries, IFPRI, Recent Research.*

## Cereal 2004: Lower Stock, Higher Prices

Although cereal production is forecast to increase to 2,130 million tons, some 2 per cent up on last year, global cereal stocks will fall sharply again by the end of the 2003/2004 season. Closing inventories are expected to be down by 89 million tons, or 18 per cent from their opening levels. The anticipated sharp decline in cereal stocks from the previous season would be mainly due to China, although substantial reductions are also anticipated in India, Russia, the Ukraine and the European Union, mostly driven by the reductions in their 2003 cereal production. World cereal utilization in 2003/2004 is forecast at 1,971 million tons, up 1 per cent from the previous year, but still slightly below the 10-year trend. In spite of a significant increase in international cereal prices and major animal disease outbreaks in the second half of the season, global cereal utilization is expected to rise above that of the previous season because of strong demand for feed and industrial uses, especially in the United States. The continued tightening of global cereal supplies, for four successive years since 1999/2000, has brought international cereal prices under significant upward pressure ■

*Based on FAO, 2004. Cereal stocks to decline again in 2003/04, FAONewsroom, <http://www.fao.org/newsroom/en/news/2004/40087/index.htm>.*

## Flash EVENTS



### Seventh Annual Conference on Global Economic Analysis

17 - 19 June, 2004  
Washington, USA.

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<http://www.gtap.agecon.purdue.edu/events/conferences/2004/default.asp>

### International Conference on Policy Modelling

30 June - 7 July, 2004  
Paris, France.

Contact :

<http://www.ecomod.net/>

### Challenging Boundaries: Economics, Ecology and Governance

8th Biennial Scientific Conference ISEE  
11 - 14 July, 2004  
Montréal, Canada

Contact :

[http://www.iseemontreal2004.com/main\\_menu.htm](http://www.iseemontreal2004.com/main_menu.htm)

### Globalization, Risks and Resistance in Rural Economies and Societies

XI World Congress of Rural Sociology  
25 - 30 July, 2004  
Trondheim, Norway

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[Http://www.irsa-world.org](http://www.irsa-world.org)



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## Book Review

### Seeds that Give: Participatory Plant Breeding

Ronnie Vernooij, International Development Research Centre (IDRC), Canada,  
 ISBN 1-55250-014-4, January 2003

The aim of participatory plant breeding (PPB) is to ensure that the research undertaken is relevant to the farmers' needs. Most of the high yield varieties (the author calls "Mega-crops") require high-input and intensive use of irrigation water. However, only few farmers' fields can satisfy those ideal cropping conditions. It is normal to observe huge gaps between the yield in experimental conditions and in farmers' fields. For example, the research result of the CGPRT Centre's project, Soybean Yield Gap Analysis Project, showed only 50 to 72 per cent of the potential yield was realized on farmers' fields during the wet season in Thailand because of the impractical cultivating conditions that are required to maximize the yield of introduced varieties. To avoid these mismatches, farmers' knowledge and their active participation is indispensable to agricultural research, especially in the field of plant breeding. In PPB, instead of playing a supportive role in the research, the farmers are treated as equal partners in the process.

"Mega-crops" were the foundation of the Green Revolution and we cannot neglect their success story, which dramatically expanded major crop production in many developing regions. Yet the top-down system of agricultural research, where farmers are seen merely as recipients of research rather than as participants, has contributed to an increased dependence on relatively few plant varieties. Out of the roughly quarter-of-a million plant varieties available to agriculture, only about 7,000, or less than 3 per cent are in use today. In P.R.China, the second largest producer of maize in the world after the United States, 53 per cent of the maize-growing area is planted with just 5 dominant hybrid varieties. Don't you think our food production system is very fragile? Industrialization of agriculture is the key in "genetic erosion", which means loss of species and the reduction of variety.

This book builds on an internal review of 10 years of IDRC's support to agricultural biodiversity. It provides a brief examination of a decade of support for research targeted directly or indirectly at the field of PPB. It begins with a review of the approach and key research questions, illustrated by reports on six diverse projects around the world, that are supported by IDRC. Then it examines project results and formulates a series of recommendations for future activities, based on the lessons learned over the past decade.

The book concludes with a speculative look at future directions for research and policy on PPB as an integral part of a global agrobiodiversity agenda.

One of the most impressive suggestions in this book might be that more researchers should be involved with policy making and implementation debates, and process on biodiversity and PPB. Such necessity may also be important within other fields of agricultural policies. However, government policies have an enormous impact especially on efforts to conserve agrobiodiversity, as is shown by the current crisis of genetic erosion caused by biased policies to "mega-crops". Actually, in many countries the issue is not even considered by government agricultural officials. Plant breeders began to recognize from their experiences that farmers and the people of rural communities are the stewards of valuable agrobiodiversity. They realized they couldn't depend on farmers to retain sufficient crop diversity to provide new genetic material required if homogeneous modern agriculture continues to threaten the source of genetic diversity. Researchers need to impress their messages to the policy makers. The book stresses the importance of links between researchers and policy makers, and integration of research on policies and research that focuses on cropping systems and knowledge enhancement.

This book also serves as an introductory book to PPB. It examines key issues, from the design of on-farm research to farmers' and plant breeders' rights. The glossary of terms in the appendixes provides readers with a basic understanding of key words and the general concept of agricultural biodiversity issues. Reports on six case studies are so compact that some readers may feel the information is too limited to extract generalized lessons. Longer descriptions, which are available in respective project reports or the IDRC website may be useful to deepen understanding ■

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