

2003–04

THE STATE OF FOOD AND AGRICULTURE

The State of Food and Agriculture 2003–04 explores the potential of agricultural biotechnology – especially transgenic crops – to meet the needs of the poor. It is found that agricultural biotechnology can help the poor by reducing reliance on toxic agricultural chemicals, lowering production costs for farmers, enhancing the nutritional content of foods and improving the control of plant and animal diseases. These gains can boost agricultural productivity and reduce food prices, but the benefits may not reach the poor. The report also presents an analysis of the socio-economic impacts of technological change in agriculture and surveys the current evidence regarding the safety of transgenic crops for human health and the environment. It recommends targeted investments in agricultural research, extension and regulatory capacity to ensure that the potential of agricultural biotechnology is brought to bear on the needs of the poor.

FURTHER INFORMATION

The State of Food and Agriculture 2003–04 is published by the Agricultural and Development Economics Division (ESA) on behalf of the Economics and Social Department, Food and Agriculture Organization of the United Nations. The full report, together with ESA Working Papers and other publications of the Division, is available electronically at www.fao.org/es/esa.

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With special contributions by Norman Borlaug and M.S. Swaminathan

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THE STATE OF FOOD AND AGRICULTURE

Agricultural biotechnology: meeting the needs of the poor?

The State of Food and Agriculture 2003-04 explores the potential of agricultural biotechnology to help the poor.

Biotechnology encompasses a set of tools that scientists use to understand and manipulate the genetic make-up of living things. As with any tool, the impact of biotechnology depends on how it is used.

Biotechnology can help the poor – by raising their incomes and lowering food prices – but these gains are not guaranteed. The international community must act decisively to ensure that the poor benefit from the “Gene Revolution”.

Bringing the Gene Revolution to the poor

- Biotechnology should be an integral part of a comprehensive agricultural research and development programme that focuses on the problems of the poor.
- The public sector should direct more resources to agricultural research, including biotechnology, to provide the public goods that the private sector neglects.
- Governments should provide incentives and an enabling environment for private-sector agricultural biotechnology research, development and deployment. Public-private partnerships and other innovative strategies to mobilize research efforts for the poor should be encouraged.
- Regulatory measures should be reviewed to ensure that the environment and public health are protected and that the regulatory process is transparent, predictable and science-based.
- The international community should prioritize capacity building for agricultural research and regulatory issues related to biotechnology.

Health and environmental safety concerns

Many developing countries lack the regulatory frameworks and technical capacity needed to evaluate transgenic crops and the conflicting scientific claims surrounding them.

- The international scientific community agrees that foods derived from the transgenic crops currently on the market are safe to eat and have been appropriately evaluated. However, new crops involving multiple transgenes may require additional food-safety risk-analysis measures.
- Scientists generally agree on the types of environmental hazard that transgenic crops pose, but disagree on their likelihood and potential impacts. So far, no negative consequences have been observed in farmers' fields and some benefits are accruing.
- Scientists agree that transgenic crops should be evaluated against the hazards associated with conventional agriculture, on a case-by-case basis taking into account the specific crop, trait and agro-ecological system.
- Few transgenic crops have been evaluated for their ecological impacts in tropical regions; thus a major research effort is required in this area.
- The adoption of international standards and risk analysis procedures through the Codex Alimentarius Commission and the International Plant Protection Convention can help bridge international regulatory differences.

Is biotechnology “pro-poor”?

A pro-poor agricultural technology has three characteristics: it can be used by small farmers as well as larger ones; it does not require large capital investments or costly external inputs and it is relatively simple to use. Biotechnologies that are embodied in a seed, such as transgenic insect resistance, are scale neutral and may be more affordable and easier to use than other crop technologies. Some biotechnology packages, however, require a sophisticated institutional and managerial environment that many poor farmers cannot provide.

Economic impacts of transgenic crops

Transgenic crops were grown on 67 million ha in 18 countries around the world in 2003. Despite their rapid spread, just six countries, four crops and two traits account for 99 percent of global transgenic crop area. Insect resistance and herbicide tolerance are the most important traits, and soybeans, maize, cotton and canola are the biggest crops.

Transgenic crops, especially insect-resistant Bt cotton, are yielding significant economic gains to small farmers in developing countries as well as important social and environmental benefits. Studies conducted in five developing countries have found marked gains in crop yields and reductions in chemical pesticide use for Bt cotton. Reduced chemical use also lowers the exposure of farmers and their families to the health and environmental dangers associated with pesticides. Prices for Bt cotton seed tend to be higher than for conventional seed, but higher yields and lower pesticide costs more than compensate farmers for the more expensive seed.

Small farmers are as likely as larger farmers to benefit from the adoption of transgenic cotton. So far, farmers and consumers are reaping a larger share of the economic benefits of transgenic crops than the companies that develop and market them. Whether these benefits will continue in the future remains to be seen.

World and regional review: facts and figures

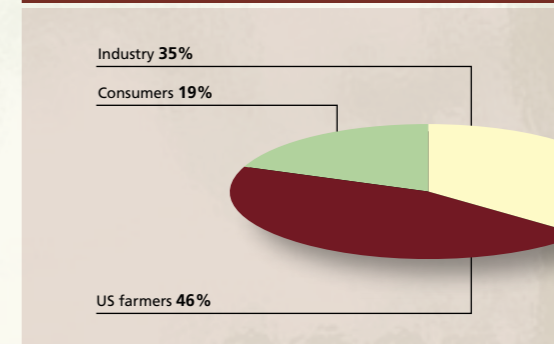
The State of Food and Agriculture 2003-04 contains an overview of the current global agricultural situation, including the latest figures on undernourishment, food emergencies, agricultural production, commodity prices, international trade and other indicators. Summary data for the fisheries and forestry sectors are also provided.

Farm-level performance advantages of Bt over conventional cotton

	ARGENTINA	CHINA	INDIA	MEXICO	SOUTH AFRICA
Yield, kg/ha	531 (33%)	523 (19%)	699 (80%)	165 (11%)	237 (65%)
Chemicals, \$/ha	-\$18 (-47%)	-\$230 (-67%)	-\$30 ...	-\$106 (-77%)	-\$26 (-58%)
Seeds, \$/ha	\$87 (+530%)	\$32 (95%)	...	\$58 (165%)	\$14 (89%)
Profits, \$/ha	\$23 (31%)	\$470 (340%)	...	\$295 (12%)	\$65 (299%)

Source: see Chapter 4

Benefits from adopting Bt cotton in the United States, 1996-98



Source: see Chapter 4

Statistical annex and CD-ROM

A statistical annex and CD-ROM provide country-level data for a range of key agricultural indicators.