



A new social contract on biotechnology

The “molecular divide” between developed and developing countries threatens to aggravate current inequalities...

by **Louise O. Fresco**

Assistant Director-General, FAO Agriculture Department

Biotechnology provokes profound public mistrust. Governments, consumers, farmers and, to a lesser extent, scientists disagree fundamentally on its risks and benefits. The classical humanistic vision that science will naturally lead to social progress has been severely eroded, and scientists bear much of the responsibility. Rather than expanding the theoretical possibilities of biotechnology, they need to discuss more, and more concretely, "where we want to go" and what roads we should take.

FAO studies show that the pace of biotechnology advance in developing countries varies considerably, and that many countries are not exploring the full range of biotechnology tools. Globally, 85% of plantings of transgenic crops are herbicide-resistant soybean, insect-resistant maize and genetically improved cotton. These crops are designed to reduce input and labour costs in large scale production systems, not to feed the developing world or increase food quality. There are no serious investments in sorghum, pearl millet, pigeon pea, chickpea and groundnut, the five most important crops in the semi-arid tropics. This is largely because 70% of investment in agricultural biotechnology comes from the multinational private sector, with a focus on genetically modified organisms (GMOs) and biotic stresses. There are virtually no major public sector programmes that tackle the critical problems of the poor and the environment, or that target small ruminants or crops such as cassava.

What we are witnessing is a *molecular divide* between developed and developing countries, between rich and poor farmers, between research priorities and needs, between technology development and technology transfer - in short, between the promise of biotechnology and its real impact. As the gaps widen, will biotechnology aggravate current inequalities in the world?

Three principles. There is no shortcut to building the credibility and public acceptance of agricultural biotechnology, or to ensuring that it contributes to pressing social needs. A new contract



is needed between all stakeholders - between North and South, between public and private research, between scientists and citizens. Such a contract would be based on three principles:

► *Open dialogue on benefits and risks.* The borderlines between research, marketing, public relations and activism are increasingly hazy. In order to arbitrate between risks and opportunities, we need a wide-ranging dialogue guided by objective information, with multilateral organizations such as FAO playing a key role as honest brokers. Because scientific knowledge of possible risks lags behind technological capacities, FAO supports science-based evaluation procedures that objectively determine the benefits and risks of each individual GMO on a case-by-case basis, prior to its release. Well-functioning regulatory systems are the only way to regain public confidence in food safety, and regional and global harmonization of environmental risk analysis will be crucial.

► *Public and private research to respond to key challenges.* Biotechnology must be redirected to address the pressing needs of the poor and new demands for food quality and quantity and new agricultural products. It can do that by complementing existing techniques and holistic agronomic approaches in order to sustain production and manage risks.

Biotechnology is just one of many roads to sustainable intensification - which options are best suited to specific production bottlenecks in developing countries needs to be determined case-by-case, taking into account economic, technical, social, trade and safety considerations. Perhaps the greatest short-term potential of biotechnologies lies not in GMOs but in genetic markers, genomics and proteomics that complement conventional breeding strategies and enhance their efficiency.

Research priorities should also put emphasis on key challenges facing developing countries, such as abiotic stresses (e.g. drought, soil erosion and salinity). The point is harnessing genetic resources through biotechnology, not just manipulating them. For example, biotechnology tools can contribute to the conservation, characterization and utilization of biodiversity, through *in vitro* culture and maintenance of *ex situ* germplasm collections, and to embryo rescue and artificial insemination for breeding and preserving rare animal breeds.

Moving beyond biotechnology, the entire discipline of life sciences needs to be harnessed for natural resources management and for designing sustainable agricultural production systems. Agronomic research is becoming increasingly specialized and exclusively focused on the plant or cellular levels. In pest management, for example, the perceived profit potential of GMOs has moved investment away from systems-based approaches and towards a greater reliance on monocultures. The long-term environmental and economic costs of such strategies should not be overlooked.

The key to reorienting research for the benefit of developing countries is funding. We need to better exploit the comparative advantages of public and private research, recognizing that research in this field is an international public good. This means reversing the decline in funding for public research, and creating incentives for private/public sector partnerships while protecting the public interest.

► *Access and benefit-sharing.* The fact that many new technologies are held by the private sector raises concern over fair and equitable access, benefit sharing and the impact of current intellectual property rights (IPR) regimes. As the frontiers between discovery and invention become blurred, this issue has become particularly critical in the use of plant and animal genetic resources. The case of the "Golden Rice" - which saw various industries claim some 40 different patented steps at the time of release - is a clear example of barriers to access. On the other hand, we have to recognize that IPRs are vital to the growth of the biotechnology industry.

IPRs are not a good in themselves, but a tool that society uses to achieve certain objectives, such as placing information in the public sector and promoting innovation. Noteworthy steps towards the development of innovative IPRs have already been taken with the Uruguay Round agreements, the Convention on Biological Diversity and FAO's International Treaty on Plant Genetic Resources for Food and Agriculture, which recognizes Farmers' Rights as a complement to Plant Breeder's Rights.

The way forward. Achieving a new social contract requires, first, effective procedures - where possible, regionally or internationally agreed - in order to monitor where, how and when GMO products and processes have been introduced, as well as their post-release effects. Support should be given to developing countries in defining and implementing effective national policies on agricultural biotechnology.

Developing countries also need, urgently, to establish a capacity to assess and manage all aspects of risk throughout their food chain. A global research network is needed to broaden the use of biotechnologies for sustainable agriculture, matching the needs and demands from any part of the world with the vast expertise, technology and financial resources available. Such a network of knowledge and expertise could create a fair platform for developing countries to tackle crops of global significance.

Even in these times of financial stringency, resources must be directed towards public research producing public goods. FAO calls on private sector companies to share their technologies and information with developing countries free of charge or at minimal cost, particularly when no important market is lost by facilitating such access. We need to consider partnerships to constitute a public technology bank, which would put key technologies and products at the disposal of poor farmers in the developing world.

To begin, we must rise above prejudice and inertia. Biotechnology holds great promise, but involves new risks. In most countries, the scientific, political, economic or institutional basis is not yet in place to provide adequate safeguards for biotechnology development and application, and to reap all the potential benefits. Clearly the question is not what is technically possible, but where and how life sciences and biotechnology can contribute to meeting the challenges of sustainable agriculture and development in the 21st century. It is up to us to decide "the roads we take", and mobilize the political will to bridge the molecular divide.