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THE PONTIFICAL ACADEMY OF SCIENCES

VATICAN CITY 2008
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Study Week

Transgenic Plants for Food Security in the Context of Development

15-19 May 2009 • Casina Pio IV

INTRODUCTION

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Transgenic Plants for Food Security in the Context of Development

CONSTRAINTS TO BIOTECHNOLOGY INTRODUCTION FOR POVERTY ALLEVIATION

Poverty in developing countries is usually linked to low agricultural productivity. Inadequate quantity and quality of food impacts human development potential, physically and mentally. Reduced immunity to disease due to poor nutrition increases the burden, and kills. Current technologies (fertiliser, improved seed, irrigation, pesticides) correctly applied can sustainably and safely increase crop yields. Purchase cost and infrastructural issues (lack of roads, credit, market access and market affecting trade-distortions), however, severely limit small-scale farmers' ability to adopt these life-sustaining and lifesaving technologies.

Plant Biotechnology has a great potential to improve the lives of the poor. Delivery of the technology in the seed largely overcomes the logistical problems of distribution involved with packaged products: farmers can pass seed to one another. Once the initial research is completed the 'cost of goods' (that is, of a biotechnologically-delivered trait carried in a

seed) is zero. Total time to market is comparable between biotechnology products and conventionally bred seed. For some traits conventional breeding is not an option: the only way to introduce a trait is by genetic modification. In developing countries, in pro-poor agriculture, intellectual property issues are not usually a constraint. It is worth noting that agricultural biotechnology uptake has been extremely rapid, for commercially introduced traits, even in developing countries (James, 2007).1 However, for products from the public sector, despite much research in developing countries (Cohen, 2005),2 this potential has not materialized.

The politicisation of the regulatory process is an extremely significant impediment to the use of biotechnology by public institutions for public goods (Taverne, 2007).3 Costs, time and complexity of product introduction are severely and negatively affected. Pro-poor projects are significantly impeded in delivering their benefits, especially in a developing country context. (Without such political impediment the technology is very appropriate for adoption by developing country scientists and farmers: it does not require intensive capitalisation). **The regulatory process in place is bureaucratic and unwarranted by science: despite rigorous investigation over more than a decade of commercial use of Genetically Modified Organisms (GMOs), no substantiated environmental or health risks have been noted. Opposition to biotechnology in agriculture is usually ideological.**

The huge potential of plant biotechnology to produce more, and more nutritive, food for the poor will be lost if GMO-regulation is not changed from being driven by 'extreme precaution' principles to being driven by 'science-based' principles. Changing societal attitudes, including the regulatory processes involved, is extremely important if we are to save biotechnology, in its broadest applications, for the poor, so that public institutions in developing as well as industrialised countries can harness its power for good.

The programme is organized into eight sessions. The **Introduction to the Study Week** will present the problem of increasing food insecurity in developing countries, the need for continued improvement of crop plants and agricultural productivity to address the problem, the track record and perspective of transgene technology, **and the roadblock to efficient use by the established concept of 'extreme precautionary regulation'**. **Contributions from Transgenic Plants** will highlight what important contributions in the areas of tolerance to abiotic stress, resistance to biological stress, improved water use efficiency, improved nutritional quality, inactivation of allergens and reduction in toxins, and on nutritionally improved agricultural crops in general, are already in use or in the R&D pipeline. Following an account of the state-of-the-art of the technology and the worldwide, radical opposition to the use of the technology in agriculture, this session will continue with the question

of whether or not GMOs diminish or promote biodiversity, and will describe all that is necessary to achieve a sustainable yield, including contributions from the private sector, presenting examples of how the private sector supports humanitarian projects. In the session on the **State of Application of the Technology** concrete examples from India, China, Africa, and Argentina will show which products have overcome the hurdles of the regulatory regimes. **This session will end with a lecture on the problems and possible solutions with regards to intellectual property rights attached to the use of the technology,** and with a discourse on the ethics of the use and non-use of transgenic plants in the context of development. Finally, it will be shown how altruistic foundations are increasingly filling the gap in support of humanitarian projects, where the public sector fails to fulfil its vital role. The session on the **Potential Impact on Development** will highlight what an important role transgenic plants could play – were they not considered so highly risky by the public, the politicians, and the regulatory authorities.

The question of whether or not there is any scientific base for this attitude will be analysed in the **Putative Risk and Risk Management** session. In the introduction to this session a comparison between molecular alterations to the genome by natural genetic variation and genetic engineering will show that there is little reason to be concerned about genetic engineering. Detailed case studies will analyse putative risks to the environment and the consumer to explore whether, in the history of its use, there has been any case for concern. This will be followed by the lessons we should have learned from 25 years of use, biosafety studies and regulatory oversight, and by an overview comparing GMO myths and realities. A brief session on **Biofuels Must Not Compete with Food** will indicate the novel problem arising from the concept of biofuel production from agricultural products, which is seriously affecting food security already, and the novel concepts under study aiming at biofuel production from biological materials which will not compete for food sources, agricultural land and freshwater. **Hurdles Against Effective Use for the Poor** will describe which hurdles under the presently established regulatory regime (established without any scientific justification as has been demonstrated in the previous session) prevent using the technology to the benefit of the poor. This session will also examine: the political climate surrounding GMOs which has spread from Europe to the rest of the world; the legal and trade consequences connected to regulation and political climate; GMO-over-regulation which makes the use of GMOs for the public sector inaccessible for cost and time reasons; the financial support from governments to professional anti-GMO lobby groups; the poor support for agricultural research in general and a ban on GMO work in public institutions which depend upon financial support from donor countries in Europe, such as the Consultative Group for International Agricultural Research. The last session is the most important: entitled **Ways to Overcome these Hurdles**, it will aim at developing strategies to reach the conclusion expected from the entire study week: **Adjusting Regulation to Accumulated Experience and Knowledge to free the technology from the unhealthy constraints of 'extreme precautionary regulation'**, in order to enable the public sector in both developing and developed countries to use their R&D potential to take advantage of the potential of transgenic plants as a contribution to food security and development.

As is obvious from the programme, this is not a standard 'science' meeting. It is designed to present the potential of plant genetic engineering and to analyse the hurdles responsible for the fact that, so far, product applications to benefit small-scale farmers have mostly excluded the public sector. If we are to rescue agricultural biotechnology in its broadest form for the underprivileged, we have to change social attitudes including regulatory attitudes to GMOs. **This seems an impossible task: extreme precautionary regulation has been established as a legal requirement in most countries around the world. It finds strong support from politics, the media, and the public, and numerous NGOs are making sure it is applied with rigor and would even welcome stricter regulations. However, because of its negative impact and lack of scientific justification**, changing the system should be tried seriously at least once. The idea of the study 'week' is to explore what is necessary to make this possible. We need to harness arguments:

• as to why food security for the poor needs efficient access to GM-technology,

• **as to why 'extreme precautionary regulation' is unjustified,**

• **to show the social and economic consequences of over-regulation,**

• **on how to change regulation from ideology-based to science-based.** We also need to develop ideas for what 'sciencebased' regulation would mean and to develop strategies to inform the media, the public, the regulatory authorities and governments that it is unjustified, even immoral, to continue with current attitudes and processes.

A necessary follow-up global or regional implementation programme will probably require a further meeting subsequent to this study week since time will not be sufficient to discuss all the problems in detail and design a solid programme for implementation. Completion of the task will probably be assisted by current highlighted global interest in food production and food affordability issues, even for the poor.

…**Dr. Channapatna S. Prakash**, Professor at Tuskegee University (USA), has been actively involved in enhancing the societal awareness of food biotechnology issues around the world. His Internet website www.agbioworld. org has become an important portal disseminating information and promoting discussion on this subject among stakeholders such as scientists, policy makers, activists and journalists. Dr. Prakash has actively worked to promote biotechnology research and policy in developing countries of Asia and Africa through training of students and scholars, research

collaboration and lectures. See his website. He has earlier served on the USDA's Agricultural Biotechnology Advisory Committee and the Advisory Committee for the Department of Biotechnology for the government of India. His outreach activities include writing commentaries, delivering public lectures, providing media interviews, and moderating daily Internet discussion group and newsletter 'AgBioView' which is read by more than 5000 experts in 65 countries. The AgBioView is widely recognized as a premier news outlet on agbiotech issues because of its broad focus on technical, societal and ethical issues. Dr. Prakash, through his efforts has been successful in impacting decision makers, the media and consumers in creating awareness of agbiotech issues especially on technology development and biosafety issues. He been instrumental in catalyzing the scientific community in many countries to be more proactive in the biotechnology debate.

Dr. Prakash's contribution to agricultural biotechnology outreach was recognized by the magazine Progressive Farmer who awarded him the 'Man of the Year' award 'in service to Alabama Agriculture'. He was recently named as one of a dozen 'pioneers, visionaries and innovators behind the progress and promise of plant biotechnology' by the Council for Biotechnology Information. He was chosen by his peers as among the "100 Top Living Contributors to Biotechnology" (October 2005) while the prestigious 'Nature' magazine readers' short listed him for "Who's who in biotech some of biotech's most remarkable and influential personalities from the past 10 years" (March 2006). Dr. Prakash has a bachelor's degree in agriculture and a masters in genetics from India, and obtained his Ph.D. in forestry/genetics from the Australian National University, Canberra. His research interests include studies on transgenic plants, gene expression, tissue culture and plant genomics. Dr. Prakash's group at TU has led the development of transgenic sweetpotato plants, identification of DNA markers in peanut and the development of a genetic map of cultivated peanut. **He serves on the scientific advisory board of** American Council on Science and Health (NY), BioScience Policy Institute (New Zealand), Norman Bolaug Institute of Plant Sciences (UK), **Institute for Trade, Standards and Sustainable Development**, Lifeboat Foundation, Policy Network (UK) and Life Science Foundation India.

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