Opening address by Samuel C. Jutzi

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1. Introduction

I am very pleased to have the opportunity to address this important animal biotechnology symposium on behalf of FAO's Division for Animal Production and Health. I am most grateful to the Joint FAO / IAEA Division of Nuclear Techniques in Food and Agriculture for having called this Symposium. We at the FAO in Rome look to our sister Division in Vienna when it comes to advice and support in biotechnology applications to agriculture and their transfer into practical use. This also involves a leading role of this Division in directing FAO's biotechnology work; my colleague Jim Dargie, Director of the Joint Division, is the accepted leader of the corporate FAO working group on biotechnology, and I wish to thank him here for his efforts in this function, but also for helping to profile the animal biotechnology agenda in FAO.

2. Focus on gene-based technologies

A deliberate effort was made to focus this Symposium on more recent 'Gene-based Technologies for Improving Animal Production and Health in Developing Countries'. More conventional biotechnology areas, some of which have had certain commercial success in developing countries, are therefore left aside.

3. Differentiation between biotechnologies in the plant and animal domains

Such focus is well justified in the attempt to advance the technical discussion. This focus also serves to differentiate the animal biotechnology work from the crops world which is strongly dominated by the transformation technology – to an extent which will possibly never be the case in the animal sector. Animal cells generally lack the totipotency of plant cells. This precludes the use of very low frequency transformation methods such as the ones used in plant transformation. In addition, reproduction technologies are less developed than in plants, Such characteristics restrict the potential for the rapid and large-scale market penetration by GM genotypes as it has occurred in crop systems. However, the way the world's animal agriculture is evolving and expanding, there are not only unprecedented challenges to deal with, but

there are also unprecedented opportunities to exploit, including in the biotechnology sphere.

4. Development of the livestock sector

Globally, livestock production currently accounts for about 43% of the gross value of agricultural production. In developed countries this share is more than half, while in developing countries it accounts for one-third of agricultural production. This latter share, however, is rising quickly following rapid increases in livestock production as a result of population growth, urbanization, changes in life styles and dietary habits, and increasing disposable incomes. The total demand for animal products in the developing countries is expected to more than double by 2030. As a result, the share of livestock production in total agricultural output is growing rapidly and is expected to have passed the 50% threshold by 2020. Important to note for the assessment of the market potential of new technologies in the animal sector is that the annual incremental output of the livestock sector is almost three times the one of the crop sector.

Satisfying the increasing and changing demands for animal food products, while at the same time sustaining the natural resource base, is one of the major challenges facing world agriculture today. Some of these challenges are singled out here:

- a geographic shift of livestock production from temperate and dry areas to warmer, more humid and disease-prone environments,
- a decreasing importance of ruminant vis-à-vis monogastric livestock species,
- a substantial rise in the use of grain-based feed,
- a change in livestock production practices from a local multi-purpose activity into a market-oriented and increasingly integrated process, and
- more large-scale, industrial production located close to urban centres, with associated environmental and public health risks.

Facing and managing these challenges raises a number of substantive global and national public policy issues that will have to be addressed. Broadly, these encompass issues associated with equity and poverty alleviation, the environment and natural resource management, and public health and food safety.

5. Biotechnology opportunities in animal agriculture

Agricultural biotechnology has long been a source of innovation in production and processing profoundly impacting the livestock sector; however, this impact has been and continues to be primarily notable on the animal agriculture in developed countries, while the adoption even of early generation biotechnology in the livestock sector of developing countries tends to be far lower. However, with the market demand for food of animal origin dynamically growing in many developing countries, there will be a commercial, often industrial livestock subsector emerging in many of these countries. This subsector is likely to more readily pick up modern biotechnology options than the traditional small-scale subsector.

In order to arrive at some meaningful conclusions with respect to possible policy guidance for the deployment of animal biotechnologies in support of the overall development objectives, it may be useful to go a little more into the analysis of the forces driving design and use of such technologies:

Investments in animal biotechnology research are determined largely by market demand or market size, by technology opportunities and by the ability of a research establishment to capture the economic benefits from research, the so-called "appropriability". This appropriability is determined by the use of patents, trademarks and trade secrets, and by exerting market power, all mechanisms for protecting intellectual property. Private, but increasingly also public research tends to be biased toward those production systems, commodities or technologies that favour such appropriation opportunities. In international livestock development these are the intensive, increasingly industrialized poultry and swine production systems which offer huge returns to investments because of their amenability to such profit appropriation. High growth rates and reproductive efficiencies are factors which give poultry and swine a decisive edge when it comes to investment decisions. As much of the expansion of the world's poultry and swine production is located or even transferred to developing countries due to the easy opportunity to externalize environmental costs, profit opportunities are further enhanced in the frequent absence of respective policy enforcement.

The anticipated much expanded application of molecular technological products and processes will contribute to much enhanced livestock productivity and production in the commercial, fast expanding, capital-intensive subsector in developing countries. The traditional livestock subsector and particularly the livestock-dependent poor are likely to benefit much less from the output of such investments. The current dichotomy between the modern and the traditional subsectors is therefore likely to be exacerbated.

6. Opportunities to steer developments in favour of small and poor farmers

The challenge therefore is how to make sure that modern biotechnology, applied to livestock, can help enhance agricultural productivity in developing countries in a way that reduces poverty, improves food security and nutrition and promotes sustainable use of natural resources and rural development, while we know that most of the biotechnology R&D activities are conducted by large private companies for commercial exploitation and are designed to meet the requirements of developed markets; while we also know that the gap between the industrialized and developing countries in technical expertise and relevant capacities is widening.

Two areas of policy design and enforcement in support of the desired outcomes are singled out: (a) biotechnology specific, (b) livestock sector development oriented policies.

(a) Biotechnology specific

There are perhaps only two ways to expand biotechnology R&D for the benefit of the poor: First, allocate additional public resources to biotechnology research that promises large social benefits, i.e. with focus on "commercially orphaned" products, traits and processes. Second, expand private sector research for the poor by converting some of the social benefits of research for the private sector, in the form of innovative public-private partnerships. The public sector can entice the private sector to develop technologies for the poor by offering up-front to buy the exclusive rights to newly developed technology and make it available either for free or for a nominal charge to small farmers [similar to J. Sachs' proposal for developing vaccines for tropical diseases]. A variant thereof might also be the philanthropy oriented donation of private sector resources for such research and development work.

Such biotechnology specific interventions need to be enhanced by the design and implementation of coherent national strategies and capacity building plans for biotechnology development, and by the enforcement of enabling trade policies with respect to biotechnology products and processes.

(b) Livestock sector development policy

Agricultural problems are multidisciplinary in nature and biotechnology in isolation is unlikely to solve them. Agricultural bio-technology is only one tool in addressing poverty and food security. Ultimately the reduction of poverty and related malnutrition and hunger requires political solutions. Technology applications by developing country farmers are often hampered by limited access to appropriate capacity building, delivery systems, extension services, productive resources and markets as well as by poorly developed rural infrastructure. Biotechnology is no "quick fix" for the infrastructural, political and institutional constraints and policies that facilitate the incorporation of smallholders into commercial production are required. This implies the fundamental revision of policies that tend to favour large-scale, industrial livestock production through artificial economies of scale which are enabled by the externalization of negative environmental impacts. Linking small-scale producers vertically with larger-scale marketers and processors would combine the environmental and poverty-alleviation benefits of small-scale livestock production with the economies of scale that derive from larger-scale processing. Regulatory systems compatible with international best practices to ensure compliance with agreed bio-safety and food safety standards are required for consumer protection.

And finally, as for the public concerns expressed on potential negative consequences of biotechnology in general and of genetic engineering products and processes in particular on human and animal health and welfare, and on the socio-economic and the bio-physical environment, procedures for risk assessment, management and communication need to be observed insofar as they exist or need to be designed and negotiated where incremental guidance is required. With respect to the assessment of products and processes of gene technology, FAO supports a science-based evaluation that would objectively determine benefits and risks of each product or process. To quote FAO's Statement on Biotechnology: "This calls for a cautious case-by-case

approach to address legitimate concerns for the bio-safety of each product or process prior to its release".

I am convinced that this conference will enhance our collective knowledge on how gene-based technologies can best help improve animal production and health in developing countries, and I would like to thank all those who will contribute to this effort.