



Current status and options for livestock biotechnologies in developing countries

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Introduction

- Livestock make a critical contribution to livelihoods of members of rural communities
- “Livestock Revolution” expected to increase importance, especially in developing countries
- Numerous challenges exist
 - environmental interaction, biodiversity, disease
- Technology can help meet these challenges while increasing productivity



Stock Taking Learning from the Past

- Wide range of technologies
 - conventional
 - biotechnology
- Three Sectors
 - Animal reproduction and breeding
 - Animal nutrition and production
 - Animal health



Reproduction and Breeding

- Artificial insemination
 - dissemination of superior male germplasm
 - opportunity for increased productivity
- Complementary technologies
 - progesterone monitoring & oestrous synchronization
 - multiple ovulation and embryo transfer
 - sexing of semen and embryos
- Molecular Genetics
 - characterization
 - marker assisted selection



Nutrition and Production

- Use of micro-organisms
 - including recombinant DNA technology
- Fermentation
 - produce amino acids or proteins
 - improve feed quality
- Microbial cultures
 - ↑ quality of silage and digestibility of other feeds
 - pre- and probiotics
- Recombinant bacteria
 - enzyme and hormone production
 - increased productivity or decreased environmental impact



Animal Health

- Disease diagnosis
 - monoclonal antibodies: RIA and ELISA
 - molecular biology
 - more precision to distinguish infected from vaccinated
- Vaccination
 - conventional
 - recombinant
 - increased specificity, stability and safety
- Sterile insect technique
 - vector borne-diseases



Use:

Reproduction and Breeding

- AI most widely used
 - dairy cattle in peri-urban areas
 - lack of liquid N₂ for cryopreservation
 - exotic breeds rather than local
 - limited by lack of breeding programmes
- Limited Embryo Transfer
 - inability to identify superior females
- Molecular genetics
 - primarily characterization



Use: Nutrition and Production

- Limited documentation
- Amino acids and enzymes seem to be the most widely used
 - Local industries in China and India
- Limiting factors
 - Silage inoculants: little silage production
 - Somatotropin: public acceptance
 - Fermentation: ineffectiveness



Use: Animal Health

- Serological diagnosis widely used
- Molecular diagnosis increasing
 - specific institutions and laboratories
- Vaccination widely and successfully used
 - example: near eradication of rinderpest
 - largely conventional
- Sterile Insect Technique
 - Tsetse fly in Zanzibar
 - Screw worms in various countries



Reasons for Success

Complementary factors in place

- Technical capacity
- Institutional support and cooperation
- Other technologies
 - animal health and nutrition
- Availability to markets
 - sell increased production
 - support investment in the technologies



Looking Forward

Preparing for the Future

- New disease challenges
 - climate change and range of vectors
 - ↑ increased international trade
- Climate change and environmental degradation
 - biotechnologies can decrease impact
- Genetic diversity
 - characterize and improve local stocks
 - cryoconservation



Options for Developing Countries

- Biotechnologies should build upon existing conventional technologies
- Biotechnologies should be integrated with other relevant components of livestock production
- Application of biotech should be supported within a national livestock development programme
 - problem-based, not solution-based
- Appropriate models are needed to ensure accessibility by resource poor farmers



The Role of the International Community

- Framework for international cooperation
- Financial support for generation, adaptation and adoption of technologies
- Public-private partnerships to increase uptake
- Creation and maintenance of markets for end products



The Role of the International Community

- Provide support for management of animal genetic resources
 - including policy development
- Collaboration for improved disease diagnosis
 - zoonoses
- Establishment of disease reference laboratories



The Role of the International Community

- Integration of biotech within overall national livestock development programmes
 - with respect to wider development objectives
- Improved international cooperation
 - North-South
 - South-South
- Consistent and long-term funding
 - aim toward self-sustainability



The Role of the International Community

- Increased support for R&D in animal science
- Training of personnel in quality research
 - prerequisite for harnessing benefits
- Strengthen institutions of higher learning
 - improve intellectual basis for identifying problems and proposing solutions
- Public awareness of biotechnologies should be enhanced by providing science-based information regarding their efficacy, safety, costs and benefits in the development context



SHORT NAME OF SESSION

AGENDA

- 14.30 Welcome & introduction
- 14.40 Panel talk show
- 15.20 Discussion with audience
- 16.10 Closing
- 16.15 Coffee

ROLES

J.A.: Facilitator
E.G.: Host
T.N.: Panelist 1
W.D.: Panelist 2
C.R.: Rapporteur
All others: Participants

EXPECTED OUTCOMES

- To better understand the issue, identify gaps and needs...
- To identify options for the future...
- To have content for summary for next days plenary

RULES

- Participate and share experiences
- Keep focus on key issues
- No one dominates
- Respect the time