Sustainable use and genetic improvement of Animal Genetic Resources

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Sustainable use

Sowing with Khilar bullocks in Maharashtra, India
Maintenance of diversity

Pastoralists in Mongolia
Livelihood support
Rural development
Socio-cultural dimensions

Khilar bullocks get a rest day on Bendur in Maharashtra, India

Ethiopian horsemen like to decorate their horses
Continued use in native environment

Jodipi sheep,
Andhra Pradesh, India

Mithun, North-Eastern India
Movement of AnGR promotes sustainability

Indian Gir cow at a stud farm in Brazil
Facilitating sustainable use

• Increasing profitability by enhancing market and non-market values

• Range of alternatives and opportunities
  – Strengthening production systems
  – Promoting organizations of livestock keepers
  – Improving market access and promoting novel uses
  – Research and its dissemination

• Encouraging livestock rearing to become self-sustained in the long term
Targeting breeds that require intervention

Trypano-tolerant N’dama cattle
Ensuring resource availability
Raising awareness
Development of niche markets
Novel uses for animals and animal products

Innovative buck cart, Maharashtra, India

Products from Damara sheep skins, South Africa
Use of AnGR in landscape conservation
Genetic improvement

• Systematic exploitation of genetic variation in important traits among individuals within or between breeds

• Breeding programmes generally undertaken to
  – improve productivity of AnGR and quality of food and products from them
  – ensure their availability at affordable prices
  – make available genetically superior animals to farmers
Some achievements of genetic improvement

• High input production systems
  – Feed conversion efficiency of modern chicken and pig hybrids more than doubled in 50 years

• Improved genetics imported along with associated production systems into developing countries
Steps in genetic improvement

• Understanding production and marketing systems

• Choice of appropriate breeds or strains

• Establishing a pure or crossbreeding system

• Further selection of superior genotypes that best suit the production and marketing conditions
Within-breed improvement
Subsistence-oriented systems

Yak provide protein and draught power in high altitude areas
Some achievements of genetic improvement

Tzozil shepherdesses select their sheep in Chiapas, Mexico
Within-breed improvement in indigenous populations

Nguni cattle of South Africa
Within breed improvement in indigenous populations

- Murrah buffalo of India
Selection and diversity

- Breeds keep changing although retain same name
- Intensive selective breeding will result in some reduction in genetic diversity
- Efficient systems available to minimize inbreeding while optimizing genetic progress
Choice of breeds and crossbreeding

• Developed world
  – Major benefits from matching of appropriate breeds to production systems
  – Possible because breeds characterized and accessible

• Developing world
  – most AnGR inadequately characterized and access to AnGR from other developing countries difficult or impossible
Breed choice dominated by developed world breeds
Some achievements of genetic improvement

Use of improved dairy genotypes in Kenyan highlands
Sunandini composite breed of Kerala
Judicious use of crossbreeding

- Local breeds that underpin the crossbreeding programme must not be lost
- Crossbreeding to prevent long-term reduction of genetic diversity
- Crossbreeding successful where followed by rigorous selection and technical support
Current use of technology in genetic improvement

• Technology-intensive breeding programmes in industrial production systems

• Developing countries: difficult to implement advanced technologies but heavy use of molecular technologies in research

• Emerging technology: Use of sexed semen
Progress with simple technology

• Low use of advanced technologies does not prevent effective improvement.

• The sophistication adopted depends on local infrastructure, product market, available technical expertise and institutional arrangements.
Conclusions I

• Food security
• Poverty alleviation
• Maintenance of diversity
Conclusions II

- Incremental improvements in productivity and correspondingly in environment most promising
- Continued use of traditional breeds
- Improvement of local breeds
- Limited and carefully managed introduction of exotics
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