

# *In situ* conservation strategies

A quick scan of SOW-AnGR country reports

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# Contents

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- Material and methods
- Trends in livestock systems
- Trends in species
- Methods for *in situ* conservation (position of stakeholders)
- Effectiveness of *in situ* conservation strategies
- Conclusions

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# Material and methods

- 148 country reports
- *In situ* conservation (73 countries)
- *Ex situ in vivo* conservation (31 countries)
- Four regions: Europe, Africa, Asia and The New World
- Six species: cattle, pig, sheep, goat, chicken and horse

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# Drivers for changes in livestock systems (1)

- Extreme bad weather conditions (storms, draughts)
- Outbreaks of infectious diseases (FMD, ASF, AF)
- International trade regulations (WTO)
- Liberalization of markets (Russia, Africa)
- Political instability (Rwanda, Yugoslavia)

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# Drivers for changes in livestock systems (2)

- Europe: environmental and production restrictions
- Africa and Asia: strong population growth
- Africa: chronic poverty and high incidence of AIDS
- New World: economic growth and export possibilities

>>> Livestock systems are variable and dynamic

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# Trends in livestock systems

- Intensification of food production > food security
  - Emphasis to future: sustainability and food safety
  - Increase in development of new functions of farm animals
- >> Massive movements and developments in livestock systems
- >> Severe impact on the use of animal genetic resources
- >> Trends in livestock systems require conservation strategies

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# Dairy cattle specialization



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# Functions of cattle and trends(1)

- In low input systems: milk, beef and draught (-)
- Africa and Asia: dowry, savings, gifts and ceremonies
- In high input systems: specialization in milk (Holstein Friesian) and in beef (French breeds)
- Crossbreeding to improve performance native breeds

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# Dark red cattle



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# Functions of cattle and trends (2)

- Dual purpose breeds are (can be) used for organic farming
- New function: nature and landscape management
- New function: suckler cow for hobbyists

>>> Conservation programs for dual purpose breeds

>>> Conservation programs for native breeds

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# Nature management



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# Functions of pigs and trends (1)

- Forbidden to use this species in some religions
- In Africa and Asia: small scale farming systems
- In Asia: industrialization starts with exotics
- In Europe and the New World: highly industrialized with few breeding companies dominate in the pork chains

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# Functions of pigs and trends (2)

- Breeding companies develop a limited number of lines
- Many lines out of production due to concentration
- Only some lines are preserved *ex situ*
- No new functions for pigs (not used by hobbyists)
- Genetic diversity in pigs can be found in East Asia

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# Heath sheep



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# Functions of sheep and trends

- Small scale farming > meat and ceremonies
- Change in function wool > meat > nature management
- Not used in high input systems
- In Europe and The New World the number of sheep reduces drastically

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# Landrace goats



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# Functions of goats and trends

- Very important for meat production in small scale farming
- Productive in harsh conditions
- In Africa and Asia: milk production for children
- In Europe and The New World: used for niche markets
- Many native breeds; only a few are developed by breeding

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# Functions of chickens and trends (1)

- Very important producer of eggs and meat in small scale farming
- Most specialized and industrialized species
- Only three global players are left
- Number of chickens increases very fast
- Active marketing by the industry

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# Dutch native chicken (Chaam)



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# Functions of chickens and trends (2)

- In a few countries small breeding companies are active
- Many institutes conserve locally developed (dual purpose) breeds
- In East Europe highly selected lines are still available
- In Europe and in The New World many people keep chicken as a hobby

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# Ardenner horse



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# Functions of horses and trends

- Change in function: draught, transport and meat > leisure purposes
- Still kept for draught and transport in East Europe
- Many horses are kept by hobbyists for a variety of purposes
- International breeding activities: Icelandic horse and the Friesian Horse

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# Methods for *in situ* conservation (stakeholders)

- Breeding companies conserve variation within breeds
- Intense selection and exchange might result in low  $N_e$  in farmer's populations
- Governments in Africa and Asia (nucleus farms) sell breeding stock of native breeds
- Governments in Europe keep sheep, cattle and horses in nature areas
- In Europe dual purpose breeds can be used in organic farming
- In Europe and The New World native breeds are used for niche markets

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# *Ex situ in vivo* conservation

- Socio economic and cultural historic purposes:

In Europe: prisons, health care farms, demonstration farms, farm parks and museums

- In Europe and The New World hobbyists keep native breeds

- Hobbyists (ngo's) play a role in conservation of horses, chicken, sheep, goat and cattle

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# Dutch belted cow



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# Effectiveness of *in situ* conservation strategies

- Only qualitative analyses possible
- Optimization of progress and inbreeding by companies: ok
- Related populations; founders in gene banks can be used
- Crossbreeding may be applied at production level for more species
- Nature management, organic farming and niche markets are opportunities; genetic management required
- Special farms and hobbyists: collaboration and training is needed!

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# Conclusions

- Massive changes in livestock systems take place
- In poultry, pigs and cattle many breeds are set aside
- In sheep and horses main functions changed
- Many opportunities for *in situ* conservation are available
- Education in genetic management should have priority

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# Heath sheep



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