Appendix 1

First draft

of

The State of the World’s
Animal Genetic Resources
for Food and Agriculture

November 2006
Citation: FAO 2006: The State of the World’s Animal Genetic Resources for Food and Agriculture – first draft, Rome.
## Contents

Acknowledgements ........................................................................................................... i

Preface ............................................................................................................................... iv

The reporting and preparatory process ................................................................. 1

### Part 1

The state of agricultural biodiversity in the livestock sector

**Introduction**

**SECTION A: ORIGIN AND HISTORY OF LIVESTOCK DIVERSITY**

| 1 Introduction ................................................................................................................... | 8 |
| 2 The livestock domestication process ............................................................................... | 9 |
| 3 Ancestors and geographic origins of our livestock ....................................................... | 12 |
| 4 Dispersal of domesticated animals ............................................................................... | 16 |
| 5 Transformations in livestock following domestication ............................................... | 19 |
| 6 Conclusions ............................................................................................................... | 20 |
| 7 References ................................................................................................................. | 21 |

**SECTION B: STATUS OF ANIMAL GENETIC RESOURCES**

| 1 Introduction ............................................................................................................... | 25 |
| 2 State of reporting ....................................................................................................... | 26 |
| 3 Species diversity ....................................................................................................... | 28 |
| 3.1 The big five .......................................................................................................... | 29 |
| 3.2 Other widespread species .................................................................................... | 32 |
| 3.3 Species with a narrower distribution ................................................................... | 32 |
| 4 Breed diversity ......................................................................................................... | 33 |
| 4.1 Overview ............................................................................................................... | 33 |
| 4.2 Local breeds ......................................................................................................... | 37 |
| 4.3 Regional transboundary breeds .......................................................................... | 38 |
| 4.4 International transboundary breeds .................................................................... | 39 |
| 5 Risk status of animal genetic resources ................................................................... | 39 |
| 6 Trends in erosion ....................................................................................................... | 45 |
| 6.1 Changes in the number of breeds in the different breed groups ................. | 45 |
| 6.2 Trends in erosion ............................................................................................... | 46 |
| 7 Conclusions .............................................................................................................. | 49 |

**SECTION C: FLOWS OF ANIMAL GENETIC RESOURCES**

| 1 Introduction ............................................................................................................... | 51 |
| 2 Driving forces and historical phases in gene flows ............................................... | 51 |
| 2.1 Phase 1: prehistory to the eighteenth century ................................................. | 52 |
| 2.2 Phase 2: nineteenth to mid-twentieth centuries ............................................ | 53 |
| 2.3 Phase 3: mid-twentieth century to the present ............................................. | 53 |
| 3 The “big five” ......................................................................................................... | 55 |
SECTION D: USES AND VALUES OF ANIMAL GENETIC RESOURCES
1 Introduction ................................................................................................................... 77
2 Contribution to national economies .............................................................................. 77
3 Patterns of livestock distribution .................................................................................... 80
4 Food production ............................................................................................................ 83
5 Production of fibre, skins, hides and pelts ....................................................................... 85
6 Agricultural inputs, transport and fuel ........................................................................... 86
7 Other uses and values ....................................................................................................... 89
  7.1 Savings and risk management .................................................................................... 89
  7.2 Sociocultural roles ..................................................................................................... 90
  7.3 Environmental services ............................................................................................. 93
8 Roles of livestock for the poor ........................................................................................ 94
9 Conclusions .................................................................................................................... 96
10 References .................................................................................................................... 96

SECTION E: ANIMAL GENETIC RESOURCES AND RESISTANCE TO DISEASE
1 Introduction ................................................................................................................... 98
2 Disease resistant or tolerant breeds ................................................................................... 99
  2.1 Trypanosomiasis ....................................................................................................... 101
  2.2 Ticks and tick-borne diseases ................................................................................... 101
  2.3 Internal parasites ...................................................................................................... 102
  2.4 Foot rot .................................................................................................................... 103
  2.5 Bovine leukemia ...................................................................................................... 104
  2.6 Diseases of poultry .................................................................................................. 104
3 Opportunities for within-breed selection for disease resistance ...................................... 105
4 Conclusions .................................................................................................................... 106
5 References .................................................................................................................... 106

SECTION F: THREATS TO LIVESTOCK GENETIC DIVERSITY
1 Introduction ................................................................................................................... 109
2 Livestock sector trends: economic, social and policy factors ............................................ 110
3 Disasters and emergencies ............................................................................................... 115
4 Epidemics and disease control measures ........................................................................ 120
5 Conclusions .................................................................................................................... 124
6 References .................................................................................................................... 125
Part 2
Livestock Sector Trends

Introduction

SECTION A: DRIVERS OF CHANGE IN THE LIVESTOCK SECTOR
1 Changes in demand.............................................................................................................. 131
  1.1 Purchasing power ......................................................................................................... 133
  1.2 Urbanization ................................................................................................................. 133
  1.3 Consumer taste and preference..................................................................................... 133
2 Trade and retailing............................................................................................................ 134
  2.1 Flows of livestock and their products........................................................................... 134
  2.2 The rise of large retailers and vertical coordination along the food chain .......... 136
3 Changing natural environment ....................................................................................... 137
4 Advances in technology.................................................................................................. 138
5 Policy environment........................................................................................................ 139

SECTION B: LIVESTOCK SECTOR’S RESPONSE
1 Landless industrialized production systems ....................................................................... 144
  1.1 Overview and trends..................................................................................................... 144
  1.2 Environmental issues.................................................................................................. 148
2 Small-scale landless systems............................................................................................. 151
  2.1 Overview ...................................................................................................................... 151
  2.2 Environmental issues.................................................................................................. 152
  2.3 Trends......................................................................................................................... 152
3 Grassland based systems.................................................................................................... 153
  3.1 Overview ...................................................................................................................... 153
  3.2 Environmental issues.................................................................................................. 154
  3.3 Trends......................................................................................................................... 155
4 Mixed farming systems..................................................................................................... 157
  4.1 Overview ...................................................................................................................... 157
  4.2 Environmental issues.................................................................................................. 159
  4.3 Trends......................................................................................................................... 159
5 Issues in mixed irrigated systems...................................................................................... 161

SECTION C: IMPLICATIONS OF THE CHANGES IN THE LIVESTOCK SECTOR FOR GENETIC DIVERSITY

References .......................................................................................................................... 164
Part 3
The state of capacities in animal genetic resource management

Introduction

SECTION A: INSTITUTIONS AND STAKEHOLDERS

1 Introduction ................. ................................................................. 170
2 Analytical framework .......... ............................................................. 171
   2.1 Stakeholders’ involvement and background at country level ............... 171
   2.2 Assessment of institutional capacities at country level ..................... 171
   2.3 Organizations and networks with a potential role in regional and international collaboration ......................................................... 173
3 Stakeholders, institutions, capacities and structures ......................... 173
   3.1 Stakeholder involvement in the State of the World process at country level 173
   3.2 Assessment of institutional capacities at country and regional level ....... 174
   3.3 Organizations and networks with a potential role in subregional, regional and international collaboration ........................................... 179
4 Conclusions ............... ................................................................. 183
5 References ........................ .............................................................. 185
6 Annex .............................................................................. 186

SECTION B: STRUCTURED BREEDING PROGRAMMES

1 Introduction ........................ .............................................................. 196
2 Species priorities and breeding objectives ........................................ 197
   2.1 Cattle ................................................................. 197
   2.2 Buffaloes ............................................................... 199
   2.3 Sheep and goats ........................................................ 199
   2.4 Pigs ................................................................. 199
   2.5 Poultry ............................................................... 199
   2.6 Other species .......................................................... 200
3 Organizational structures ................................................................. 200
4 Tools and implementation ................................................................. 202
5 Overview of breeding programmes by region ................................... 204
   5.1 Africa ................................................................. 205
   5.2 Asia ................................................................. 206
   5.3 Europe and the Caucasus ............................................... 208
   5.4 Latin America and the Caribbean ............................................. 209
   5.5 Near and Middle East .................................................. 211
   5.6 North America and Southwest Pacific ....................................... 211
6 Conclusions and future priorities ..................................................... 212
7 References ................................................................. 214
8 Annex .............................................................................. 214

SECTION C: CONSERVATION PROGRAMMES

1 Introduction ................................................................. 219
2 Global status ................................................................. 220
3 Stakeholders ................................................................. 221
   3.1 National governments ........................................... 221
   3.2 Universities and research institutes ................................... 221
   3.3 Civil society organizations and breeders’ associations ................. 222
   3.4 Farmers ............................................................... 222
   3.5 Part-time or hobby farmers ........................................... 222
   3.6 Breeding companies ................................................... 222
SECTION D: REPRODUCTIVE AND MOLECULAR BIOTECHNOLOGY

1 Introduction .................................................................................................................. 237
2 Global overview .......................................................................................................... 237
  2.1 Africa ......................................................................................................................... 238
  2.2 Asia ........................................................................................................................... 239
  2.3 Europe and the Caucasus ......................................................................................... 240
  2.4 Latin America and the Caribbean ........................................................................... 242
  2.5 Near and Middle East ............................................................................................. 243
  2.6 North America ......................................................................................................... 243
  2.7 Southwest Pacific ................................................................................................... 243
3 Conclusions .................................................................................................................. 244
4 References .................................................................................................................... 244

SECTION E: LEGISLATION AND REGULATION

1 International legal framework – major instruments ................................................... 245
  1.1 Introduction .............................................................................................................. 245
  1.2 Legal framework for the management of biodiversity ............................................ 245
  1.3 Access and benefit sharing ..................................................................................... 247
  1.4 Legal framework for international trade ................................................................. 248
  1.5 Intellectual property rights ..................................................................................... 249
  1.6 Legal framework for biosecurity ............................................................................ 250
  1.7 Conclusions ............................................................................................................. 252
  1.8 References .............................................................................................................. 253
2 Emerging legal issues .................................................................................................. 253
  2.1 Patenting .................................................................................................................. 253
  2.2 Livestock Keepers’ Rights ....................................................................................... 258
3 Regulatory frameworks at regional level .................................................................... 259
  3.1 Introduction .............................................................................................................. 259
  3.2 European Union Legislation: an example of a comprehensive regional legal framework ........................................................................................................ 260
  3.3 Conclusions ............................................................................................................. 268
  3.4 Legislation cited ...................................................................................................... 268
4 National legislation and policy .................................................................................... 274
  4.1 Introduction .............................................................................................................. 274
  4.2 Methods .................................................................................................................. 274
  4.3 Implementation of AnGR legislation and programmes ........................................... 275
Part 4
State of the art in the management of animal genetic resources

Introduction

SECTION A: BASIC CONCEPTS
1 Animal genetic resources and breeds ................................................................. 300
2 Management of animal genetic resources ............................................................. 301
3 Risk status classification ....................................................................................... 303
4 References ............................................................................................................. 305

SECTION B: METHODS FOR CHARACTERIZATION
1 Introduction .............................................................................................................. 307
2 Characterization – as the basis for decision-making ............................................. 307
3 Tools for characterization ....................................................................................... 310
  3.1 Surveying .......................................................................................................... 310
  3.2 Monitoring ......................................................................................................... 313
  3.3 Molecular genetic characterization ................................................................. 314
  3.4 Information systems ......................................................................................... 314
4 Conclusions .......................................................................................................... 317
5 References ............................................................................................................. 317

SECTION C: MOLECULAR MARKERS – A TOOL FOR EXPLORING GENETIC DIVERSITY
1 Introduction ............................................................................................................. 319
2 The roles of molecular technologies in characterization ...................................... 320
3 Overview of molecular techniques ................................................................. 321
  3.1 Techniques using DNA markers to assess genetic diversity .......................... 323
  3.2 Using markers to estimate effective population size ...................................... 325
  3.3 Molecular tools for targeting functional variation ........................................... 325
4 The role of bioinformatics ..................................................................................... 330
5 Conclusions .......................................................................................................... 330
6 References ............................................................................................................. 333

SECTION D: GENETIC IMPROVEMENT METHODS TO SUPPORT SUSTAINABLE UTILIZATION
1 Introduction .......................................................................................................... 338
2 The context for genetic improvement .................................................................. 338
  2.1 Changing demand ............................................................................................ 338
  2.2 Diverse production environments ................................................................... 338
  2.3 Increasing recognition of the importance of genetic diversity ....................... 339
  2.4 Scientific and technological advances .............................................................. 339
  2.5 Economic considerations ................................................................................ 344
3 Elements of a breeding programme .................................................................. 344
  3.1 Breeding goals ................................................................................................ 346
  3.2 Selection criteria .............................................................................................. 347
  3.3 Design of the breeding schemes ................................................................. 348
SECTION E: METHODS FOR ECONOMIC VALUATION

1 Introduction .................................................................................................................. 382
2 Development of methodologies for economic analysis ................................................. 383
3 Application of economic methodologies in AnGR management .................................. 386
   3.1 Value of livestock genetic resources to farmers ................................................... 386
   3.2 Costs and benefits of conservation ........................................................................ 387
   3.3 Targeting of farmers for participation in in situ breed conservation programmes .... 388
   3.4 Priority setting in livestock conservation programmes ........................................... 389
   3.5 Priority setting in livestock breeding strategies .................................................... 390
   3.6 General policy analysis development ...................................................................... 390
4 Implications for policies and future research ................................................................. 391
5 References .................................................................................................................... 392

SECTION F: METHODS FOR CONSERVATION

1 Introduction ................................................................................................................... 394
2 Arguments for conservation .......................................................................................... 395
   2.1 Arguments related to the past ................................................................................ 395
   2.2 Safeguarding for future needs ................................................................................ 396
   2.3 Arguments related to the present situation ............................................................. 397
3 The unit of conservation ............................................................................................... 398
4 Conservation of plant versus animal genetic resources ................................................. 398
5 Information for conservation decisions ......................................................................... 401
6 In vivo conservation ...................................................................................................... 403
   6.1 Background ............................................................................................................ 403
   6.2 Genetic management of populations ...................................................................... 404
   6.3 Self-sustaining strategies for local breeds ............................................................... 405
   6.4 In situ versus ex situ approaches to in vivo conservation ....................................... 408
7 Current status and future prospects for cryoconservation ............................................. 411
   7.1 Gametes ................................................................................................................ 411
   7.2 Embryos ............................................................................................................... 412
   7.3 Cryoconservation of somatic cells and somatic cell cloning .................................. 413
   7.4 Choice of genetic material .................................................................................... 414
   7.5 Security in genebanks ......................................................................................... 415
8 Resource allocation strategies in conservation ............................................................ 415
   8.1 Methods for setting priorities ............................................................................... 415
   8.2 Optimization strategies for planning conservation programmes ................................ 416
9 Conclusions ................................................................................................................... 419
SECTION G: RESEARCH PRIORITIES

1 Information for effective utilization and conservation ..................................................... 425
2 Information systems ........................................................................................................... 425
3 Molecular methods ........................................................................................................... 425
4 Characterization .............................................................................................................. 426
5 Genetic improvement methods for low external input systems ....................................... 426
6 Conservation methods ..................................................................................................... 427
7 Decision support tools for conservation .......................................................................... 427
8 Economic analysis ........................................................................................................... 428
9 Access and benefit sharing ............................................................................................. 428

Part 5
Needs and challenges in animal genetic resources management

Introduction

1 Knowledge of animal genetic diversity: concepts, methods and technologies ............... 432
2 Capacity in animal genetic resources management ........................................................... 435
   2.1 Capacity in characterization, sustainable use and conservation of AnGR .................. 435
   2.2 Capacity in institutions and policy making ................................................................. 437
3 Major challenges for livestock development and animal genetic resources management ... 439
4 Accepting global responsibility ....................................................................................... 441

Abbreviations and Acronyms .............................................................443
BOXES

Box 1 The domestication process ................................................................. 10
Box 2 Molecular characterization – a tool to understand livestock origin and diversity .............. 12
Box 3 The history of African pastoralism ............................................................................. 17
Box 4 What is new compared to the World Watch List for Domestic Animal Diversity? ........... 25
Box 5 Glossary: populations – breeds – regions .................................................................. 26
Box 6 Glossary: risk status classification .............................................................................. 40
Box 7 Gene flows resulting from colonization ....................................................................... 53
Box 8 Nelore cattle ................................................................................................................. 61
Box 9 Continuous repackaging of genes – Dorper sheep .......................................................... 65
Box 10 Hybrid pigs ............................................................................................................... 69
Box 11 The chicken breeding industry ....................................................................................... 71
Box 12 Linguistic links between cattle and wealth ................................................................. 90
Box 13 The history of Hungarian Grey cattle – changing uses over time .................................... 94
Box 14 Mongolian reindeer under threat ................................................................................. 112
Box 15 Policy distortions influencing the erosion of pig genetic resources in Viet Nam .................. 113
Box 16 Which dairy breeds for tropical smallholders? .............................................................. 115
Box 17 War and rehabilitation in Bosnia and Herzegovina ...................................................... 120
Box 18 Sustainable utilization of the Iberian pig in Spain – a success story ................................ 134
Box 19 Overcoming constraints to the development of small-scale market oriented dairying .... 136
Box 20 Facts and trends in the emerging world food economy ................................................ 141
Box 21 Suggestions for strengthening national structures ...................................................... 184
Box 22 Research and breed development in Africa .................................................................... 205
Box 23 Sheep breeding in Tunisia .......................................................................................... 205
Box 24 Buffalo breeding in India .............................................................................................. 206
Box 25 Goat breeding in the Republic of Korea ......................................................................... 207
Box 26 Duck breeding in Viet Nam .......................................................................................... 208
Box 27 Pig breeding in Hungary ............................................................................................... 209
Box 28 Horse breeding – tradition and new requirements ......................................................... 209
Box 29 Beef cattle breeding in Brazil ......................................................................................... 210
Box 30 Breeding llamas in Argentina .......................................................................................... 210
Box 31 Influence of market forces on livestock breeding in the United States of America ........... 212
Box 32 Sheep breeding in Australia .......................................................................................... 212
Box 33 Mali – role of the government ....................................................................................... 221
Box 34 Ethiopia – in situ conservation ....................................................................................... 226
Box 35 Morocco’s Plan Moutonnier – designated breeding areas to sustain local sheep breeds ... 227
Box 36 Conservation strategies in China .................................................................................... 229
Box 37 Denmark – opportunities for in vivo conservation ........................................................ 230
Box 38 Brazil – implementation of a genebank ........................................................................ 232
Box 39 United States of America - priorities in conservation programmes .................................. 233
Box 40 Australia – involvement of diverse stakeholders ........................................................... 234
Box 41 Impact of international zoosanitary regulations on animal genetic resources management – the example of FMD .......................................................... 251
Box 42 The first patented animal ............................................................................................... 255
Box 43 The African Union Model Law ....................................................................................... 260
Box 44 Malawi’s Environmental Management Act .................................................................... 276
Box 45 Turkey’s Law on Pastures No. 4342 (1998) .................................................................... 278
Box 46 Slovenia’s Livestock Breeding Act (2002) ...................................................................... 278
Box 47 Mozambique’s Livestock Development Policy and Strategies ......................................... 279
Box 48 Slovenia’s regulation on Conservation of Farm Animal Genetic Resources ...................... 281
Box 49 Uganda’s National Animal Genetic Resources Programme ........................................ 282
Box 50 Ukraine’s Law About Animal Breeding ........................................................................ 283
Box 51 Turkey’s Regulation on Protection of Animal Genetic Resources (2002) ......................... 283
Box 52 Lesotho’s Importation and Exportation of Livestock and Livestock Products Proclamation 285
Box 104 Optimum allocation of conservation funds – an example featuring African cattle breeds... 418
Box 103 Glossary: objective decision aids...................................................................................... .... 417
Box 102 Revival of the Enderby cattle in New Zealand ..................................................................... 414
Box 101 Revival of the native Red and White Friesian cattle in the Netherlands .............................. 414
Box 100 Changes in production systems leading to replacement of local buffaloes
Box 99 Community based
Box 98 An index of economic development potential for targeting
Box 96 In situ conservation of the Norwegian Feral Sheep................................................................ 406
Box 94 Decision-making in conservation and utilization – use of genetic diversity data................... 402
Box 93 Red Maasai sheep – accelerating threats ................................................................................ 395
Box 92 Glossary: conservation.................................................................................................. .......... 394
Box 91 Economic values......................................................................................................... ............ 383
Box 90 A community-based and participatory dairy goat cross-breeding programme in a low input
Box 89 Nigeria's Village Poultry Improvement Scheme.................................................................... 372
Box 88 The cost of heterosis ............................................................................................................... 372
Box 87 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 369
Box 86 The Bororo zebu of the WoDaaBe in Nigeria - selection for reliability in an extreme
environment........................................................................................................................................ 367
Box 85 Pastoralists’ breeding criteria - insights from a community member ................................. 364
Box 84 A llama breeding programme in Ayopaya, Bolivia............................................................... 363
Box 83 Genetic improvement of an indigenous livestock breed – Boran cattle in Kenya ................ 363
Box 82 Community based sheep management in the Peruvian Andes ............................................... 362
Box 81 Norwegian Red cattle - selection for functional traits ........................................................... 355
Box 80 Cross-breeding to address inbreeding-related problems in Holstein cattle ......................... 353
Box 79 Calving problems in Belgian White Blue cattle ................................................................. 352
Box 78 The changing body size of beef cattle in United States of America....................................... 348
Box 77 Glossary: molecular markers ................................................................................................. 332
Box 76 Databases of biological molecules.......................................................................................... 330
Box 75 The population genomics approach ...................................................................................... 327
Box 74 QTL mapping ......................................................................................................................... 326
Box 73 Sampling genetic material .................................................................................................... 322
Box 72 Commonly used DNA markers............................................................................................... 322
Box 71 Extraction and multiplication of DNA and RNA .................................................................. 321
Box 70 Recent developments in molecular biology .......................................................................... 320
Box 69 The new “-omics” scientific disciplines.................................................................................. 320
Box 68 DNA, RNA and protein ........................................................................................................ 319
Box 67 Information systems at global level ....................................................................................... 316
Box 66 Production environment descriptors for animal genetic resources ..................................... 310
Box 65 Definition of breed adopted by FAO ................................................................................... 300
Box 64 The Islamic Republic of Iran’s Act of National Veterinary System (1971) ........................... 296
Box 63 West Africa – pastoralist crossing borders........................................................................... 294
Box 62 India - rules for transportation ............................................................................................... 294
Box 61 Russian Federation - Veterinary and Sanitary Requirements No. 13-8-01/1-8 (1999)...... 293
Box 60 The Philippine’s White Revolution ....................................................................................... 291
Box 59 Mongolia’s White Revolution Programme............................................................................. 291
Box 58 Guatemala – decentralization of the registration of pure-bred animals.................................. 289
Box 57 Uganda’s Animal Breeding Act (2001).................................................................................. 288
Box 56 Barbados’ incentive programme ............................................................................................ 287
Box 55 Botswana’s Stock Diseases (Semen) Regulations................................................................. 286
Box 54 Hungary’s Decree No 39 ....................................................................................................... 286
Box 53 Malaysia’s Animals Ordinance............................................................................................ 285
Box 52 Commonly used DNA markers............................................................................................... 285
Box 51 The changing body size of beef cattle in United States of America....................................... 282
Box 50 The Islamic Republic of Iran’s Act of National Veterinary System (1971) ........................... 281
Box 49 QTL mapping ......................................................................................................................... 281
Box 48 Extraction and multiplication of DNA and RNA .................................................................. 280
Box 47 Sampling genetic material .................................................................................................... 280
Box 46 Definition of breed adopted by FAO ................................................................................... 279
Box 45 The Islamic Republic of Iran’s Act of National Veterinary System (1971) ........................... 278
Box 44 Decision-making in conservation and utilization – use of genetic diversity data................... 277
Box 43 Red Maasai sheep – accelerating threats ............................................................................... 277
Box 42 Glossary: conservation.......................................................................................................... 276
Box 41 Economic values..................................................................................................................... 276
Box 40 A community-based and participatory dairy goat cross-breeding programme in a low input
Box 39 Smallholder system in the Eastern Highlands of Kenya......................................................... 273
Box 38 The cost of heterosis .............................................................................................................. 273
Box 37 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 272
Box 36 The population genomics approach ...................................................................................... 271
Box 35 QTL mapping ........................................................................................................................ 271
Box 34 Extraction and multiplication of DNA and RNA .................................................................. 270
Box 33 Sampling genetic material..................................................................................................... 270
Box 32 Definition of breed adopted by FAO .................................................................................... 269
Box 31 The Islamic Republic of Iran’s Act of National Veterinary System (1971) ........................... 268
Box 30 Cross-breeding to address inbreeding-related problems in Holstein cattle ......................... 267
Box 29 Calving problems in Belgian White Blue cattle ................................................................. 266
Box 28 The changing body size of beef cattle in United States of America....................................... 264
Box 27 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 263
Box 26 Norwegian Red cattle - selection for functional traits ........................................................... 262
Box 25 Community based sheep management in the Peruvian Andes ............................................... 261
Box 24 Genetic improvement of an indigenous livestock breed – Boran cattle in Kenya ................ 260
Box 23 A llama breeding programme in Ayopaya, Bolivia............................................................... 257
Box 22 Pastoralists’ breeding criteria - insights from a community member ................................. 254
Box 21 The Bororo zebu of the WoDaaBe in Nigeria - selection for reliability in an extreme
environment........................................................................................................................................ 250
Box 20 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 249
Box 19 The cost of heterosis .............................................................................................................. 249
Box 18 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 248
Box 17 Norwegian Red cattle - selection for functional traits ........................................................... 247
Box 16 Community based sheep management in the Peruvian Andes ............................................... 246
Box 15 Genetic improvement of an indigenous livestock breed – Boran cattle in Kenya ................ 245
Box 14 A llama breeding programme in Ayopaya, Bolivia............................................................... 242
Box 13 Pastoralists’ breeding criteria - insights from a community member ................................. 240
Box 12 The Bororo zebu of the WoDaaBe in Nigeria - selection for reliability in an extreme
environment........................................................................................................................................ 236
Box 11 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 235
Box 10 The cost of heterosis .............................................................................................................. 235
Box 9 Norwegian Red cattle - selection for functional traits ........................................................... 234
Box 8 Community based sheep management in the Peruvian Andes ............................................... 233
Box 7 Genetic improvement of an indigenous livestock breed – Boran cattle in Kenya ................ 232
Box 6 A llama breeding programme in Ayopaya, Bolivia............................................................... 230
Box 5 Pastoralists’ breeding criteria - insights from a community member ................................. 228
Box 4 The Bororo zebu of the WoDaaBe in Nigeria - selection for reliability in an extreme
environment........................................................................................................................................ 226
Box 3 Community driven breeding programmes for local pig breeds in north Viet Nam ............ 225
Box 2 The cost of heterosis .............................................................................................................. 225
Box 1 Norwegian Red cattle - selection for functional traits ........................................................... 224
TABLES

Table 1 Regional overview of Country Reports ................................................................. 1
Table 2 Country Reports received ..................................................................................... 2
Table 3 Reports from international organisations ............................................................ 3
Table 4 Origin and domestication of livestock species ....................................................... 10
Table 5 Status of information recorded in the Global Databank for Animal Genetic Resources .......... 26
Table 6 Distribution of mammalian species by region ..................................................... 28
Table 7 Distribution of avian species by region ................................................................. 29
Table 8 Proportion of the world’s population size (2005) and number of local and regional transboundary breeds (January 2006) of the major livestock species by region .................. 36
Table 9 Mammalian species – number of reported local breeds ....................................... 37
Table 10 Avian species – number of reported local breeds ................................................ 37
Table 11 Mammalian species – number of reported regional transboundary breeds ........ 38
Table 12 Avian species – number of reported regional transboundary breeds .................. 38
Table 13 Mammalian species - number of reported international transboundary breeds ....... 39
Table 14 Avian Species - number of reported international transboundary breeds ............. 39
Table 15 Number of extinct mammalian breeds .............................................................. 45
Table 16 Number of extinct avian breeds ........................................................................... 45
Table 17 Years of extinction .............................................................................................. 45
Table 18 Reclassification of regional and international transboundary breeds from 1999 to 2006 46
Table 19 Changes in risk status of transboundary breeds from 1999 to 2006 ..................... 47
Table 20 Risk status of transboundary breeds reported after 1999 ................................... 47
Table 21 Changes in risk status of local breeds (1999) reclassified as transboundary breeds (2006) 48
Table 22 Changes in risk status of local breeds from 1999 to 2006 ................................. 48
Table 23 Risk status of local breeds reported after 1999 .................................................. 49
Table 24 Workforce employed in agriculture and land area per agricultural worker ............ 79
Table 25 Number of animals by species/1000 human population .................................. 82
Table 26 Number of animals by species/1000 ha agricultural land ................................ 82
Table 27 Production of food of animal origin (kg/person/year) ......................................... 83
Table 28 Production of fibres skins and hides (1000 mt/year) .......................................... 85
Table 29 Trends in the use of animals for draught power ................................................ 87
Table 30 Roles of livestock by livelihood strategy ........................................................... 95
Table 31 Selected studies indicating breed difference in resistance/tolerance to specific diseases 99
Table 32 Mammalian breeds reported to DAD-IS as having resistance/tolerance to specific diseases or parasites .................................................................................................................. 101
Table 33 Breeds reported to DAD-IS as showing resistance/tolerance to trypanosomiasis .... 101
Table 34 Breeds reported to DAD-IS as showing resistance/tolerance to tick-burden .......... 102
Table 35 Breeds reported to DAD-IS as showing resistance/tolerance to tick-borne diseases 102
Table 36 Breeds reported to DAD-IS as showing resistance/tolerance to internal parasites/worms 103
Table 37 Breeds reported to DAD-IS as showing resistance/tolerance to foot rot ............... 104
Table 38 Cattle breeds reported to DAD-IS as showing resistance/tolerance to leukosis .......... 104
Table 39 Breeds reported to DAD-IS as showing resistance/tolerance to avian diseases .... 105
Table 40 Impact of recent disease epidemics .................................................................... 122
Table 41 Examples of breeds affected by the FMD outbreak in the United Kingdom in 2001 123
Table 42 Projected trends in meat consumption from 2000 to 2050 ................................ 132
Table 43 Projected trends in milk consumption from 2000 to 2050 ................................. 132
Table 44 Standards in the livestock market and implications for small scale producers ....... 137
Table 45 Trends in production of meat and milk in developing and developed countries .... 144
Table 46 Livestock numbers and production of the world’s livestock production systems – averages for 2001–2003................................................................. 145
Table 47 The developing countries with the highest meat and milk production (2004) ........ 145
Table 48 Agriculture’s contribution to global greenhouse gas and other emissions ............ 150
Table 99 Breeding objectives in ruminants

Table 98 Information recorded for avian species in the global databank for
resources

Table 97 Information recorded for mammalian species in the global databank for animal genetic
management

Table 96 Regulations in the field of animal health

Table 95 Instruments regulating import and export of genetic material

Table 94 Instruments regulating livestock movements and import and export of live animals and livestock products

Table 93 Instruments for promoting trade in livestock products

Table 92 Instruments in the field of standard setting

Table 91 Instruments related to institutions active in genetic improvement

Table 90 Instruments in the field of genetic improvement

Table 89 Instruments in the field of conservation

Table 88 Instruments for sustaining livestock production systems

Table 87 Use of biotechnologies by species

Table 86 Use of biotechnologies by region

Table 85 Conservation activities in the Southwest Pacific

Table 84 Conservation activities in North America

Table 83 Conservation activities in the Near and Middle East

Table 82 Conservation activities in Latin America and the Caribbean

Table 81 Conservation activities in Europe and the Caucasus

Table 80 Conservation activities in Asia

Table 79 Conservation activities at the global level

Table 78 Conservation activities in Africa

Table 77 Number of countries with conservation programmes

Table 76 Stakeholder involvement in structured pig breeding activities

Table 75 Stakeholder involvement in structured goat breeding activities

Table 74 Stakeholder involvement in structured sheep breeding activities

Table 73 Stakeholder involvement in structured cattle breeding activities

Table 72 Countries reporting structured breeding activities in minor animal species

Table 71 Strategies and tools used in chicken breeding

Table 70 Strategies and tools used in pig breeding

Table 69 Strategies and tools used in goat breeding

Table 68 Strategies and tools used in sheep breeding

Table 67 List of subsample countries used for analysis

Table 66 Importance of species and locally adapted versus exotic breeds in current policies

Table 65 Number of countries reporting the use of artificial insemination

Table 64 Stakeholder involvement in the development of animal genetic resources

Table 63 Training, research and farmers’ organizations in current policies

Table 62 Instruments in the field of standard setting

Table 61 Structured breeding activities for the main livestock species

Table 60 Countries prioritizing breeding activities (by species)

Table 59 List of international organizations and contributed reports on their activities

Table 58 Institutional assessment at country level

Table 57 Organizations and networks that play or may play a role in animal genetic resources

Table 56 Institutional assessment – state of policy development

Table 55 Institutional assessment – research and knowledge

Table 54 Institutional assessment – infrastructure and capacities and participation

Table 53 Sources of information (Country Report sections) for the national level assessments

Table 52 Shares of irrigated production in total crop production of developing countries

Table 51 Main crop–animal interactions in crop-based livestock systems

Table 50 Land with rainfed crop production potential

Table 49 Estimated number of pastoralists in different geographic regions

Table 48 Main crop–animal interactions in livestock-based crop production systems

Table 47 Estimated number of countries reporting structured breeding activities in minor animal species

Table 46 Estimated number of countries reporting the use of artificial insemination

Table 45 Number of countries with conservation programmes

Table 44 Countries prioritizing breeding activities (by species)

Table 43 Strategies and tools used in chicken breeding

Table 42 Strategies and tools used in pork breeding

Table 41 Strategies and tools used in goat breeding

Table 40 Strategies and tools used in sheep breeding

Table 39 Countries prioritizing breeding activities (by species)

Table 38 Strategies and tools used in cattle breeding

Table 37 Conservation activities at the global level

Table 36 Conservation activities in Africa

Table 35 Conservation activities in Asia

Table 34 Conservation activities in Europe and the Caucasus

Table 33 Conservation activities in Latin America and the Caribbean

Table 32 Conservation activities in the Near and Middle East

Table 31 Conservation activities in North America

Table 30 Conservation activities in the Southwest Pacific

Table 29 Estimated number of countries with conservation programmes

Table 28 Number of countries with conservation programmes

Table 27 Number of countries with conservation programmes

Table 26 Number of countries with conservation programmes

Table 25 Number of countries with conservation programmes

Table 24 Number of countries with conservation programmes

Table 23 Number of countries with conservation programmes

Table 22 Number of countries with conservation programmes

Table 21 Number of countries with conservation programmes

Table 20 Number of countries with conservation programmes

Table 19 Number of countries with conservation programmes

Table 18 Number of countries with conservation programmes

Table 17 Number of countries with conservation programmes

Table 16 Number of countries with conservation programmes

Table 15 Number of countries with conservation programmes

Table 14 Number of countries with conservation programmes

Table 13 Number of countries with conservation programmes

Table 12 Number of countries with conservation programmes

Table 11 Number of countries with conservation programmes

Table 10 Number of countries with conservation programmes

Table 9 Number of countries with conservation programmes

Table 8 Number of countries with conservation programmes

Table 7 Number of countries with conservation programmes

Table 6 Number of countries with conservation programmes

Table 5 Number of countries with conservation programmes

Table 4 Number of countries with conservation programmes

Table 3 Number of countries with conservation programmes

Table 2 Number of countries with conservation programmes

Table 1 Number of countries with conservation programmes
Table 100 Breeding objectives in pigs ................................................................. 358
Table 101 Breeding objectives in poultry ......................................................... 359
Table 102 Overview of valuation methodologies ........................................... 385
Table 103 Conservation benefits and costs under a range of valuation methodologies – the case of the Box Keken pig (Yucatan, Mexico) .................................................. 387
Table 104 Comparisons of biological, operational, and institutional factors influencing plant and animal genetic resources conservation .................................................. 400
Table 105 Current status of cryoconservation techniques by species ............ 413

FIGURES
Figure 1 Assignment of countries to regions and subregions in this report ......................... 6
Figure 2 Archaeological map of agricultural homelands and spread of Neolithic/Formative cultures, with approximate radiocarbon dates ....................................................... 9
Figure 3 Major centres of livestock domestication – based on archaeological and molecular genetic information ........................................................................................................ 13
Figure 4 Origin and migration routes of domestic cattle in Africa ......................... 18
Figure 5 Proportion of national breed populations for which population figures have been reported .......................................................... 27
Figure 6 Regional distribution of major livestock species in 2005 ......................... 30
Figure 7 Distribution of the world’s mammalian breeds by species ...................... 31
Figure 8 Distribution of the world’s avian breeds by species .............................. 32
Figure 9 Proportion of local and transboundary breeds at global level ............... 34
Figure 10 Proportion of local and transboundary breeds at regional level ........... 35
Figure 11 Proportion of the world’s breeds by risk status category ..................... 40
Figure 12 Risk status of the world’s mammalian breeds in January 2006: absolute (table) and percentage (chart) figures by species ............................................................ 41
Figure 13 Risk status of the world’s avian breeds in January 2006: absolute (table) and percentage (chart) figures by species ............................................................ 42
Figure 14 Risk status of the world’s mammalian breeds in January 2006: absolute (table) and percentage (chart) figures by region ..................................................... 43
Figure 15 Risk status of the world’s avian breeds in January 2006: absolute (table) and percentage (chart) figures by region ..................................................... 44
Figure 16 Local, regional and international breeds in 1999 and 2006 .................... 46
Figure 17 Changes in risk status of transboundary breeds from 1999 to 2006 ....... 47
Figure 18 Changes in risk status of local breeds from 1999 to 2006 .................... 48
Figure 19 Distribution of transboundary breeds .............................................. 56
Figure 20 Distribution of Holstein-Friesian cattle .............................................. 58
Figure 21 Distribution of Charolais cattle ......................................................... 58
Figure 22 Distribution of transboundary cattle breeds with Latin American, African or South Asian origin ................................................................. 60
Figure 23 Distribution of transboundary sheep breeds ...................................... 63
Figure 24 Gene flow of improved Awassi and Assaf sheep from Israel ................ 66
Figure 25 Distribution of Saanen goats ............................................................. 67
Figure 26 Distribution of Boer goats ................................................................. 67
Figure 27 Distribution of Large White pigs ...................................................... 69
Figure 28 Contribution of agriculture and livestock to total GDP by region ....... 78
Figure 29 Contribution of livestock to agricultural GDP ............................... 78
Figure 30 Percentage of permanent pasture in total agricultural land .......... 79
Figure 31 Livestock density in relation to human population ......................... 80
Figure 32 Livestock density per square kilometre of agricultural land ............ 81
Figure 33 Net exports – meat ................................................................. 84
Figure 34 Net exports – milk equivalent ...................................................... 84
Figure 35 Net exports – eggs ................................................................. 85
Figure 36 Number of disasters by type and year ........................................... 116
Figure 37 Changes in the meat consumption of developing and developed countries ........ 131
Figure 38 Distribution of livestock production systems ................................................................. 143
Figure 39 Meat production from ruminants versus monogastrics in developing and developed countries .......................................................................................................................................... 144
Figure 40 Changes in the quantity of cereals used as feed (1992/1994 and 2020) .............................. 146
Figure 41 Changes in the distribution of the size of pig farms in Brazil (1985 to 1996) ...................... 147
Figure 42 Estimated contribution of livestock to total phosphate supply on agricultural land in areas presenting a phosphate mass balance of more than 10 kg per hectare in selected Asian countries (1998 to 2000) ..................................................................................................................... 149
Figure 43 State of institutions – regional comparison ................................................................. 178
Figure 44 State of institutions - subregional comparison within Africa .............................................. 187
Figure 45 State of institutions – subregional comparison within Asia .............................................. 187
Figure 46 State of institutions – subregional comparisons within Latin America and the Caribbean 188
Figure 47 Information required to design management strategies .................................................. 308
Figure 48 Structure of the poultry breeding industry ........................................................................ 345
Acknowledgements

This Report could not have been prepared without the assistance of the many individuals who generously contributed their time, energy and expertise. FAO would like to take this opportunity to acknowledge these contributions.

The core of the information for the State of the World’s Animal Genetic Resources was provided by the 169 governments that submitted Country Reports; the first and most important acknowledgement therefore goes to these governments and to all those individuals in each country who contributed to these reports, in particular the National Coordinators for the Management of Animal Genetic Resources and the National Consultative Committees. The development of training materials the conduct of training workshops, the preparation and analysis of the Country Reports, the follow-up workshops and the various international, regional and national consultations were facilitated by the following team: Daniel Benitez-Ojeda, Harvey D. Blackburn, Arthur da Silva Mariante, Mamadou Diop, M'Naouer Djemali, Anton Ellenbroek, Erling Finland, Salah Galal, Andreas Georgoudis, Peter Gulliver, Sipke-Joost Hiemstra, Yusup Ibragimov, Jarmo Juga, Ali Kamali, Sergei Kharitonov, Richard Laing, Birgitta Malmfors, Moketa Joel Mamabolo, Peter Manuelli, Elzbieta Martyniuk, Carlos Mezzadra, Rafael Morales, Ruben Mosi, Siboniso Moyo, David R. Notter, Rafael Núñez-Dominguez, Dominique Planchenault, Geoffrey Pollott, Adrien Raymond, Peter Saville, Hermann Schulte-Coerne, Louise Setshwaelo, Paul Souvenir Zafindrajaona, David Steane, Arunas Svitjouš, Lutfi Tahtacioglu, Vijay Taneja, Frank Vigh-Larsen, Hans-Gerhard Wagner, Mateusz Wieczorek, Hongjie Yang and Milan Zjalic. An FAO – WAAP (World Association for Animal Production) agreement, implemented by Jean Boyazoglu, assisted a large number of developing countries in report preparation.

The Report on the State of the World’s Animal Genetic Resources was prepared and coordinated by Barbara Rischkowsky with the assistance of Dafydd Pilling. The preparation was facilitated and supported by the Service Chief of Animal Production, Irene Hoffmann, and current and former officers of the Animal Genetic Resources Group: Badi Besbes, Ricardo Cardellino, Mitsuhiro Inamura, Pal Hajas, Keith Hammond, Manuel Luque Cuesta, Beate Scherf, Kim-Anh Tempelman and Olaf Thieme. Administrative and secretarial support was provided by Carmen Hopmans and Kafia Fassi-Fihri. The finalization, layout and printing was supervised by Beate Scherf.

The sections of the Report were prepared and reviewed by individual experts or expert teams who will be acknowledged below by section. This form of acknowledgement intends to thank the authors for contributing their time, expertise and energy, both in the process of writing and in reviewing and editing. It will also allow the interested public to identify resource persons for specific topics. This is facilitated by an alphabetical list of authors and reviewers on the attached CD-ROM [in preparation to be included in final version].


Additional material for the preparation of text boxes was provided by Brian Donahoe, Morgan Keay, Juhani Mäki-Hokkonen, Kirk Olson and Dan Plumley.

Data entry into the Global Databank was carried out by Ellen Geerlings and Lucy Wigboldus. Analysis of the Global Databank was performed by Mateusz Wieczorek, Alberto Montironi, Justyna Dybowska, Kerstin Zander and Beate Scherf. All maps (if not otherwise stated) were prepared by Thierry Lassueur with support from Tim Robinson and Pius Chilonda.

Thematic studies were coordinated by Beate Scherf and Irene Hoffmann and prepared by: Erika Alandia Robles, Simon Anderson, Kassahun Awgichew, Roswitha Baumung, P.N. Bhat, Stephen Bishop, Kwame Boa- Amponsem, Ricardo Cardellino, Arthur da Silva Mariante, Mart de Jong, Adam
Subregional fact sheets presented on the attached CD-ROM [in preparation to be included in final version] were prepared by Marieke Reuver, Marion De Vries and Salah Galal.

Listing every person by name is not easy, and carries with it the risk that someone may be overlooked. Apologies are conveyed to anyone who may have provided assistance whose name has been inadvertently omitted. Any errors or omissions in this work are the responsibility of those who compiled it. None of the contributors should be considered responsible for such defects. In this regard, FAO appreciates any corrections.

<table>
<thead>
<tr>
<th>Part / Section</th>
<th>Authors</th>
<th>Reviewers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PART 1: The state of agricultural biodiversity in the livestock sector</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Origin and history of livestock diversity</td>
<td>Olivier Hanotte</td>
<td></td>
</tr>
<tr>
<td>Status of animal genetic resources</td>
<td>Barbara Rischkowsky, Dafydd Pilling, Beate Scherf</td>
<td>Mateusz Wieczorek</td>
</tr>
<tr>
<td>Flows of animal genetic resources</td>
<td>Evelyn Mathias, Ilse Koehler-Rollefson, Paul Mundy</td>
<td>Beate Scherf, Annette von Lossau</td>
</tr>
<tr>
<td>Uses and values of animal genetic resources</td>
<td>Dafydd Pilling, Barbara Rischkowsky with Manuel Luque Cuesta</td>
<td></td>
</tr>
<tr>
<td>Animal genetic resources and disease resistance</td>
<td>Dafydd Pilling, Barbara Rischkowsky</td>
<td>Steve Bishop, Jan Slingenbergh</td>
</tr>
<tr>
<td>Threats to livestock genetic diversity</td>
<td>Dafydd Pilling, Claire Heffernan, Michael Goe</td>
<td>Anni McLeod, Simon Mack, Jan Slingenbergh</td>
</tr>
<tr>
<td><strong>PART 2: Livestock sector trends</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pierre Gerber, Dafydd Pilling, Barbara Rischkowsky</td>
<td>Hans Schiere</td>
</tr>
<tr>
<td><strong>PART 3: The state of capacities in animal genetic resource management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutions and stakeholders</td>
<td>Maria Brockhaus</td>
<td>Irene Hoffmann, Beate Scherf, Ricardo Cardellino, Jean Boyazoglu, Annette von Lossau, Ilse Koehler-Rollefson</td>
</tr>
<tr>
<td>Structured breeding programmes</td>
<td>Olaf Thieme</td>
<td>Juhani Mäki-Hokkonen</td>
</tr>
<tr>
<td>Conservation programmes</td>
<td>Kor Oldenbroek with Milan Zjalic</td>
<td></td>
</tr>
<tr>
<td>Reproductive and molecular biotechnology</td>
<td>Dafydd Pilling with Milan Zjalic</td>
<td>Salah Galal</td>
</tr>
<tr>
<td>Legislation and regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International legal framework - major instruments</td>
<td>Dafydd Pilling drawing on FAO legislative study No 89</td>
<td>Clive Stannard, Niels Louwaars</td>
</tr>
<tr>
<td>Patenting – an emerging legal issue</td>
<td>Dafydd Pilling with Claudio Chiarolla</td>
<td>Niels Louwaars, Morten Walløe Tvedt</td>
</tr>
<tr>
<td>Part / Section</td>
<td>Authors</td>
<td>Reviewers</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Regulatory frameworks at regional level</td>
<td>Dafydd Pilling drawing on FAO legislative study No 89</td>
<td>Olivier Diana, Sipke Joost Hiemstra, Danielle Manzella, Hermann Schulte-Coerne, Kai-Uwe Sprenger</td>
</tr>
<tr>
<td>National legislation and policy</td>
<td>Susette Biber-Klemm with Cari Rincker</td>
<td>Elzbieta Martyniuk, Lyle Glowka, Lothar Guendling</td>
</tr>
<tr>
<td><strong>PART 4: The state of the art in animal genetic resources management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic concepts</td>
<td>Barbara Rischkowsky, Dafydd Pilling</td>
<td>Beate Scherf, Ricardo Cardellino</td>
</tr>
<tr>
<td>Methods for characterization</td>
<td>Workneh Ayalew, Beate Scherf, Barbara Rischkowsky</td>
<td>Ed Rege</td>
</tr>
<tr>
<td>Molecular markers – a tool for exploring genetic diversity</td>
<td>Paolo Ajmone Marsan with Kor Oldenbroek</td>
<td>Han Jianlin, Paul Boettcher</td>
</tr>
<tr>
<td>Genetic improvement methods to support sustainable utilization</td>
<td>Badi Besbes, Victor Olori, Jim Sanders</td>
<td>Beate Scherf, Ricardo Cardellino, Keith Hammond</td>
</tr>
<tr>
<td>Methods for economic valuation</td>
<td>Adam Drucker</td>
<td>Gianni Cicia</td>
</tr>
<tr>
<td>Methods for conservation</td>
<td>Jean-Pierre Brillard, Gustavo Gandini, John Gibson, David Notter, Dafydd Pilling, Henner Simianer, Barbara Rischkowsky</td>
<td>Workneh Ayalew, Harvey Blackburn, Jean Boyazoglu, Ricardo Cardellino, Coralie Danchin, Sipke Joost Hiemstra, Elzbieta Martyniuk, Roger Pullin, Beate Scherf, Michele Tixier-Boichard</td>
</tr>
<tr>
<td>Research priorities</td>
<td>all authors</td>
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</tr>
<tr>
<td><strong>PART 5: Needs and challenges in animal genetic resources management</strong></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Barbara Rischkowsky, Irene Hoffmann</td>
<td>Animal Genetic Resources Group and CGRFA Secretariat</td>
</tr>
</tbody>
</table>
Preface

Agricultural biodiversity is the product of thousands of years of activity during which humans have sought to meet their needs in a wide range of climatic and ecological conditions. Well-adapted livestock have been an essential element of agricultural production systems, particularly important in harsh environments where crop farming is difficult or impossible.

The capacity of agro-ecosystems to maintain and increase their productivity, and to adapt to changing circumstances, remains vital to the food security of the world’s population. For livestock keepers, animal genetic diversity is a resource to be drawn upon to select stocks and develop new breeds. More broadly, genetically diverse livestock populations provide society with a greater range of options to meet future challenges.

The Food and Agriculture Organization of the United Nations (FAO) has, since the early 1960s, provided assistance to countries to characterize their animal genetic resources (AnGR) and develop conservation strategies. In 1990, FAO’s Council recommended the development of a comprehensive programme for the sustainable management of AnGR at the global level. A meeting of experts in 1992, and subsequent sessions of FAO’s governing bodies, provided impetus to the development of the Global Strategy for the Management of Farm Animal Genetic Resources, which was initiated in 1993. The Animal Production and Health Division of FAO was designated as the Global Focal Point for Animal Genetic Resources, and given the role of coordinating further development of the Global Strategy. In 1995, the Twenty-eighth Session of the FAO Conference took the decision to broaden the mandate of the Commission on Plant Genetic Resources to cover all aspects of agro-biodiversity of relevance to food and agriculture; (the Commission, originally established in 1983, was the first permanent intergovernmental forum dealing with agricultural genetic resources). Work on AnGR was the first element of this expanded role. The Commission was renamed the Commission on Genetic Resources for Food and Agriculture (CGRFA).

The international agenda

FAO’s commitment to maintaining agricultural biodiversity is consistent with the increasing prominence of biodiversity on the agenda of the international community. This development is the result of a recognition that threats to biodiversity are increasing, whether measured in terms of the extinction of species, the destruction of ecosystems and habitats, or the loss of genetic diversity within the species utilized for agriculture. The 1992 United Nations Conference on Environment and Development (Earth Summit) held in Rio de Janeiro was an important landmark. The Convention on Biological Diversity (CBD), signed in Rio by 150 governments, committed the nations of the world to conserve their biodiversity, to ensure its sustainable use, and to provide for equitable sharing of the benefits arising from its use. By 2005, 188 countries had become Parties to the CBD. The Conference of Parties (COP) of the CBD (the governing body of the convention) has specifically recognized the special nature of agricultural biodiversity and the need for distinctive solutions in this field (see for example decision V/5, taken at the Fifth Meeting of the COP in 2000).

Agenda 21, adopted by 179 governments at the time at Rio Earth Summit in 1992, is a plan of action to be undertaken at global, national and local levels by governments, the organizations of the United Nations System and other stakeholders, to address all areas of human impact on the environment. The Agenda’s Chapter 14, “Promoting Sustainable Agriculture and Rural Development”, addressed the question of increasing food production and enhancing food security in a sustainable way. It included programme areas related to the conservation and development of AnGR.

The threat to food security posed by the loss of biodiversity was noted in the Plan of Action adopted at the 1996 World Food Summit held in Rome. Under Objective 3.2(f) of the Rome Declaration, the governments of the world affirmed that they would “promote the conservation and sustainable utilization of animal genetic resources.”

Meeting the Millennium Development Goals, adopted by the United Nations in 2000, presents another great challenge to the international community. The adverse effects of biodiversity loss on progress
towards the achievement of these goals is a cause for concern (UNDP, 2002). As well as underpinning food security, biological diversity is the basis of many economic activities, and is vital to ecosystem functioning. Declining biodiversity tends to be associated with greater shocks and fluctuations in ecosystems, and it is the poor that are usually the most vulnerable to these effects. Many poor people are closely dependent on natural resources for their livelihoods, and frequently have a wealth of knowledge regarding the plants and animals with which they work. It has been suggested that this knowledge could be a source of income for the poor if it leads to the development and marketing of unique biological products. In reality, the extent to which the benefits of such developments actually accrue to the poor is often limited – highlighting the need not only for conservation of biodiversity, but for equitable frameworks for its utilization.

Within the international framework for the management and conservation of biological diversity, the work of CGRFA focuses on the particular features and problems associated with the management of agro-biodiversity, and the need for distinctive solutions for this field.

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The reporting and preparatory process

In 1999, the CGRFA during its Eighth Regular Session, agreed that FAO should coordinate the preparation of a country-driven first Report on the State of the World’s Animal Genetic Resources (SoW-AnGR Report)\(^2\). In 2004, the Inter-governmental Technical Working Group on Animal Genetic Resources (ITWG-AnGR) – a subsidiary body established by the Commission to address issues relevant to the conservation and sustainable use of AnGR, reviewed progress in the preparation of the first Report and endorsed a draft outline including a Report on Strategic Priorities for Action. The CGRFA subsequently endorsed this outline at its Tenth Regular Session. The agreed timetable for the Report’s preparation was that a draft would be available for review by the CGRFA at its Eleventh Regular Session in 2007, and that the Report would be finalized at the first International Technical Conference on Animal Genetic Resources.

Inputs to the first Report on the State of the World’s Animal Genetic Resources reporting process

The process of preparing the SoW-AnGR Report included a number of elements through which the information required was gathered and analysed.

Country Reports

In order to ensure the country-driven nature of the process, FAO in March 2001, invited 188 countries to submit Country Reports assessing their AnGR. Guidelines for the preparation of the Country Reports were produced, including a proposed structure. Regional training and follow-up workshops were conducted between July 2001 and November 2004. The overall objectives of the Country Reports were to analyse and report on the state of AnGR, on the status and trends of these resources, and on their current and potential contribution to food, agriculture and rural development; to assess the state of countries’ capacity to manage AnGR, in order to determine priorities for future capacity building; and to identify national priorities for action in the field of conservation and sustainable utilization of AnGR, and related requirements for international cooperation. The first Country Reports were received in the second half of 2002, with the majority being submitted during 2003 and 2004. The latest Country Report was submitted in October 2005, bringing the total to 169 (Tables 1 and 2).

The fact that the submission of the Country Reports was spread over several years meant that as the process of preparing the SoW-AnGR Report progressed, more information became available for analysis. For this reason, it should be noted that the latest arrivals among the Country Reports could not be fully included in the process of analysis and report preparation.

Table 1
Regional overview of Country Reports

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<td><strong>169</strong></td>
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</tr>
</tbody>
</table>

Reports received by 31 December 2005

\(^2\) The term animal genetic resources (AnGR) as applied throughout the report is an abbreviation of animal genetic resources used for food and agriculture and excludes fish.

\(^3\) Note that these regions do not correspond to the usual FAO regions; see below for further explanation.
Table 2
Country Reports received

<table>
<thead>
<tr>
<th>Region</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa (47)</td>
<td>Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Swaziland, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe</td>
</tr>
<tr>
<td>Asia (21)</td>
<td>Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Kazakhstan, Lao People’s Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Uzbekistan, Viet Nam</td>
</tr>
<tr>
<td>Europe and the Caucasus (41)</td>
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</tr>
<tr>
<td>Latin America and the Caribbean (30)</td>
<td>Antigua and Barbuda, Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Suriname, Trinidad and Tobago, Uruguay, Venezuela (Bolivarian Republic of)</td>
</tr>
<tr>
<td>Near East (16)</td>
<td>Afghanistan, Djibouti, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Kyrgyzstan, Lebanon, Libyan Arab Jamahiriya, Oman, Somalia, Sudan, Syrian Arab Republic, Tajikistan, Turkmenistan, Yemen</td>
</tr>
<tr>
<td>North America (2)</td>
<td>Canada, United States of America</td>
</tr>
<tr>
<td>Southwest Pacific (12)</td>
<td>Australia, Cook Islands, Fiji, Kiribati, Niue, Northern Mariana Islands, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu</td>
</tr>
</tbody>
</table>

Reports received by 31 December 2005

*Since June 2006 Serbia and Montenegro have become independent states. However, in the SoW-AnGR Report they are still treated as one country as in Country Report submitted to FAO.*
Reports from international organizations
Following a request from the ITWG, in August 2004, FAO invited 77 international organizations to submit a report of their work in the field of AnGR as a contribution to the first SoW-AnGR Report. These reports were to cover activities such as research, extension, education, training, public awareness, communications and advocacy, and also to include a description of the organization and information on institutional capacities which support activities in AnGR. Specific subjects to be described included (if applicable) inventory and characterization, sustainable use and development, conservation, valuation, policy and legislation, documentation and information databases, animal and human health, and food safety, as well as opportunities and proposals for interaction with other organizations and United Nations agencies. As of June 2006, nine organizations had submitted reports (Table 3). Reports were received from four international non-governmental organizations, three intergovernmental organizations, and two research organizations. A further three international organizations informed FAO that they were not engaged in AnGR-related activities.

Table 3
Reports from international organisations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Title of the submission</th>
<th>Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGIAR Centres</td>
<td>Consultative Group on International Agricultural Research (CGIAR) Centres Report to FAO for input into the SoW and the draft report on strategic priorities for action on FAnGR Section I: Description of the CGIAR Institutes and Programmes</td>
<td>May 2004</td>
</tr>
<tr>
<td>SAVE Foundation</td>
<td>SAVE Foundation (Safeguard for Agricultural Varieties in Europe) Brief Portrait April 2004</td>
<td>May 2004</td>
</tr>
<tr>
<td>LPP</td>
<td>League for Pastoral Peoples Report on Activities of the League for Pastoral Peoples</td>
<td>November 2004</td>
</tr>
<tr>
<td>OIE</td>
<td>World Organisation for Animal Health (OIE) Oral presentation to the Commission on Genetic Resources for Food and Agriculture, 10th Session (to be used thereafter as the OIE input in reply to the FAO AN21/47 request)</td>
<td>November 2004</td>
</tr>
<tr>
<td>ACSAD</td>
<td>Arab Center for the Studies of Arid zones and Dry lands (ACSAD) The Activities of the Arab Center for the Studies of Arid zones and Dry lands concerning the Animal Genetic Resources</td>
<td>December 2004</td>
</tr>
<tr>
<td>IAMZ</td>
<td>The Mediterranean Agronomic Institute of Zaragoza (IAMZ) Report on Training activities</td>
<td>January 2005</td>
</tr>
<tr>
<td>EAAP</td>
<td>EAAP (European Association for Animal Production) Report of the Working Group on Animal Genetic Resources</td>
<td>February 2005</td>
</tr>
</tbody>
</table>
Thematic Studies

In addition to the Country Reports and the reports from international organizations, a number of thematic studies were commissioned by FAO. These studies were intended to contribute to the understanding of specific topics likely not to be covered in Country Reports, but relevant to the preparation of the SoW-AnGR Report. During the period 2002 to 2006, 12 thematic studies were prepared:

- **Opportunities for incorporating genetic elements into the management of farm animal diseases: policy issues.** A review paper on the potential of genetic elements in the management of disease, technical opportunities, and benefits arising from the incorporation of these elements in effective disease management\(^5\) (2002);

- **Measurement of domestic animal diversity (MoDAD) – a review of recent studies.** A survey evaluating the current status of molecular genetic research in domestic animal species, with emphasis on characterization of AnGR\(^6\) (2004);

- **The economics of farm animal genetic resource conservation and sustainable use: why is it important and what have we learned?** A study on the valuation of AnGR, summarizing methodological approaches and knowledge gaps\(^7\) (2004);

- **Conservation strategies for animal genetic resources.** A study contrasting opportunities, challenges, biological characteristics, institutional infrastructure and operational considerations influencing management of plant and animal genetic resources\(^8\) (2004);

- **The legal framework for the management of animal genetic resources.** An introductory study of policy and legal frameworks for the management of AnGR including a survey of countries in different world regions\(^9\) (2004, printed revised version 2005);

- **Environmental effects on animal genetic resources.** An evaluation and synthesis of the evidence available on a spectrum of environmental factors and their effects on AnGR at the individual animal and the breeding population levels\(^10\) (2006);

- **People and animals. Traditional livestock keepers: guardians of domestic animal diversity.** A documentation of 13 case studies from all over the world on how communities manage their local AnGR, demonstrating the value of local knowledge in preserving the equilibrium between farmers, animals and environment\(^11\) (2006);

- **The state of development and potential of biotechnologies related to the management of animal genetic resources and their potential application in developing countries.** An introductory study of biotechnology applications and their use in developing countries, which includes information provided in Country Reports (2006);

- **Gene flow in animal genetic resources. A study on status, impact and trends.** A study providing analysis of the magnitude and direction of movement of genetic material of the four major farm animal species: cattle, pigs, goats, and sheep. Determining factors are identified and selected, examples of impacts on economic development, poverty reduction and biodiversity in developing countries are presented (2006);

- **Exchange of animal genetic resources – current practices and their effect on stakeholders in the livestock sector.** A study which identifies how exchange practices related to AnGR affect the various stakeholders in the livestock sector (2006);

\[^5\] Background Study Paper No. 18
\[^6\] CGRFA/WG-AnGR-3/04 inf. 3
\[^7\] Background Study Paper No. 21
\[^8\] Background Study Paper No. 22
\[^9\] Background Study Paper No. 24
\[^10\] Background Study Paper No.28
\[^11\] FAO Inter-Departmental Working Group on Biological Diversity for Food and Agriculture
• *A conceptual approach to the conservation and utilization of farm animal genetic resources.* A study which outlines patterns of change in AnGR use and their impact on conservation. It summarizes current experience, and the capacity of alternative conservation measures, considering the needs and aspirations of the various stakeholders whose livelihoods depend on animal production\(^{12}\) (2006);

• *The impact of disasters and emergencies on animal genetic resources.* A study which provides an overview of potential disasters and their possible impact on AnGR. It also provides an analysis of the effects of emergency responses. It proposes decision support guidelines for disaster management (2006).

**Preparation of the report**

**Sources of information**

Different sections of the SoW-AnGR Report required different approaches. Some sections were largely based on the information provided in the 148 Country Reports available by June 2005. Other sections drew heavily on the wider literature or on expert knowledge rather than on the information gathered specifically for the SoW-AnGR process. FAO’s Domestic Animal Diversity Information System (DAD-IS)\(^{13}\) and the FAOSTAT\(^{14}\) statistical database were also utilized. Regional e-mail consultations, organized by FAO in late 2005 to review the draft Report on Strategic Priorities for Action, provided an additional source of information, particularly on institutional capacities.

**Part 1** describes the state of agricultural diversity in the livestock sector. The chapter draws on a number of sources. The description of AnGR inventory and of the extent of genetic erosion is based on information drawn from DAD-IS. This information system, which was launched in 1996, enables National Coordinators to update their national breed databank via the Internet. The guidelines for the development of Country Reports encouraged countries to report breed-related data and information directly to DAD-IS, and not to include details on breeds in the Country Reports. Nonetheless, the Country Reports contained a wealth of breed-related information that was not reported to DAD-IS. As a result of this development, and in order to ensure that the analysis for the SoW-AnGR Report was based on the most up-to-date information available, FAO provided for the extraction of these data from Country Reports and their entry into DAD-IS. National Coordinators were then requested to validate and further complete their national breed databanks. It was also thought desirable to enable the analysis for the SoW-AnGR Report to be based on breeds and not only on national breed populations; i.e. so that populations of the same breed in different countries were not counted as separate breeds. To this end, linkages between breed populations in different countries were introduced into the Global Databank, based on information on names, origin and development, importation and geographic location. Lists of all national breed populations and their proposed linkages were sent to National Coordinators for review. The analysis of the data for the purposes of the SoW-AnGR Report was carried out in January 2006, by which time data from all 169 Country Reports had been entered into the system.

The section on uses and values of AnGR is based on FAOSTAT for population and production statistics, and on the Country Reports for more qualitative information on livestock functions. The section on genetic resistance to disease draws on DAD-IS and the wider scientific literature. Broader sources were also used to describe the origin and domestication of AnGR, sharing and exchange of AnGR, and threats to AnGR.

**Part 2** describes livestock sector trends and their implications for AnGR, and draws on a wide range of literature and statistics.

**Part 3** describes the state of human capacity, breeding and conservation strategies, legislation and the use of biotechnologies. This part of the report is largely based on the information in the Country

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\(^{12}\) CGRFA/WG-AnGR-4/06/Inf.6

\(^{13}\) [http://www.fao.org/dad-is/](http://www.fao.org/dad-is/)

Reports. However, the sections on regional and international legislation, and emerging legal and policy issues draw on wider sources.

**Part 4** on the state of the art in AnGR management is largely based on the wider scientific literature. For the preparation of the section on the state of the art in the AnGR conservation, an expert meeting was convened at FAO in Rome, in July 2005. The participants discussed the approach to the section and allocated writing tasks. The first draft was reviewed by all members in the writing group in October 2005. In November 2005, a workshop “Options and Strategies for the Conservation of Farm Animal Genetic Resources” took place in Montpellier, France. The participants at this workshop were given the opportunity to review the revised version of the conservation section.

**Part 5** analyses the needs and challenges for AnGR management, based on the evidence provided in the other chapters of the Report. This analysis relates the current state of erosion and threats to AnGR to current capacities in AnGR management, and the state of knowledge regarding methodologies and their application.

**Regional classification of countries**

The assignment of countries to the regions and subregions used for the purposes of the SoW-AnGR Report was based on a number of factors that influence biodiversity, including production environments, cultural specificities and the distribution of shared AnGR. Future collaboration in the establishment of Regional Focal Points was also considered, as was the experience gained from the process of convening SoW-AnGR subregional follow-up workshops in 2003 and 2004. Thus, the assignments do not follow exactly the standard FAO regions used in FAO statistics or for FAO election purposes (although for most countries the assignment does not differ from the standard classification). The proposed classification was reviewed at a meeting of Regional Facilitators on “Strategy for Regional Consultations” held in August 2005. The resulting classification distinguishes seven regions, of which three regions were further subdivided: Africa (East Africa, North and West Africa, Southern Africa); Asia (Central Asia, East Asia, Southeast Asia, South Asia); Europe and the Caucasus; Latin America and the Caribbean (Caribbean, Central America, South America); the Near and Middle East; North America; and the Southwest Pacific.

**Figure 1**

Assignment of countries to regions and subregions in this report