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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

INTERGOVERNMENTAL TECHNICAL WORKING GROUP ON ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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STATUS AND TRENDS OF ANIMAL GENETIC RESOURCES – 2010[1]

TABLE OF CONTENTS

[1] Based on data reported by National Coordinators for the Management of Animal Genetic Resources to DAD-IS by 15th October 2010.

I. INTRODUCTION

1. In line with the request of the Twelfth Regular Session of the Commission on Genetic Resources for Food and Agriculture, this report follows the outline set out in the document *Format and content of future status and trends reports on animal genetic resources*[2]. The analysis is based on FAO's Global Databank for Animal Genetic Resources, backbone of the Domestic Animal Diversity Information System (DAD-IS). It updates the data published in the report *Status and trends of animal genetic resources – 2008*[3] and (in greater detail) in the third edition of the World Watch List for Domestic Animal Diversity (WWL–DAD:3)[4] published in 2000 and in *The State of the World's Animal Genetic Resources for Food and Agriculture*[5] published in 2007. All National Coordinators for the Management of Animal Genetic Resources were asked to update their national data as fully as possible prior to the analysis.

2. The document begins by describing the state of reporting on animal genetic resources, and the progress made during the reporting period. A description of the current regional distribution of livestock species and breeds is then presented, followed by an overview of the risk status of the world's livestock breeds. Finally, trends in risk status over the reporting period are assessed. The annexes to the document provide a detailed breakdown of the status of data entry by country and region. Countries can use this information to review their progress and assess where they stand in relation to other countries in the region.

II. STATE OF REPORTING

3. The Global Databank for Animal Genetic Resources currently contains data from 182 countries and 37 species. The total number of national breed populations recorded in the Global Databank for Animal Genetic Resources has increased greatly since the publication of the WWL–DAD:3 (Table 1). The total number of mammalian national breed populations recorded in October 2010 was 10 507 as compared to 10 550 in 2008 and 10 512 in 2006. The total number of avian national breed populations recorded in 2010 was 3 414, compared to 3 450 in 2008 and 3 505 in 2006. The number of reported national breed populations has fallen slightly during the 2008 to 2010 period. This decline has been caused by corrections made by National Coordinators to their national breed inventories in DAD-IS.

4. Since 2008, the percentage of avian breeds for which population data are available has remained at 47 percent, while in the case of mammals there has been an improvement from 52 percent to 54 percent (Table 1). The increase is less marked than in the preceding two years, when population data were reported for the first time for a large number of breeds from the Europe and the Caucasus region[6]. Twenty countries updated their national data in 2009 and 38 in 2010. For 91 percent of national breed populations, no data on population size have been reported for any of the last four years (2007, 2008, 2009 and 2010).

5. Figure 1 provides a regional breakdown of the reporting figures. It should be noted that between 2008 and 2010 corrections made by National Coordinators to national inventories in DAD-IS led to declines in the number of reported mammalian national breed populations in the North America region and in the number of reported avian national breed populations in the Europe and the Caucasus region. However, the proportion of national breed populations within the respective species groups and regions for which population-size data have been reported changed little between 2008 and 2010. Slight improvements in the state of reporting occurred in Africa, Asia, Europe and the Caucasus (mammalian species) and Latin America and the

[2] CGRFA/WG-AnGR-5/09/3.2. (http://www.fao.org/ag/againfo/programmes/en/genetics/documents/ITWG_AnGR_5_09_3_2.pdf).
[3] ftp://ftp.fao.org/docrep/fao/meeting/016/ak220e.pdf
[4] FAO/UNEP 2000. *World watch list for domestic animal diversity*, 3rd edition, edited by B.D. Scherf, Rome. (available at http://www.fao.org/docrep/009/x8750e/x8750e00.HTM).
[5] http://www.fao.org/docrep/010/a1250e/a1250e00.htm
[6] The regions used throughout this document correspond to those used in *The State of the World's Animal Genetic Resources for Food and Agriculture*.

Caribbean (mammalian species). Several previously unreported breeds have been added to breed inventories in Europe and the Caucasus.

TABLE 1

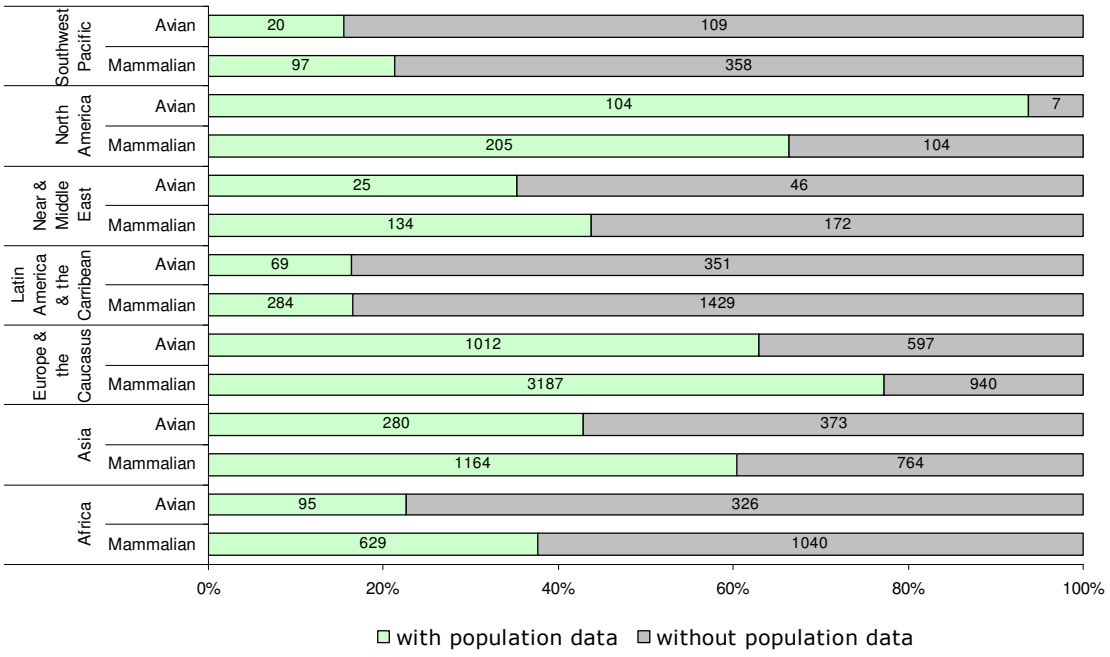
Status of information recorded in the Global Databank for Animal Genetic Resources

Year of analysis	Mammalian species		Avian species		Countries covered
	Number of national breed populations	% with population data	Number of national breed populations	% with population data	
1993	2719	53	-	-	131
1995	3019	73	863	85	172
1999	5330	63	1049	77	172
2006	10512	43	3505	39	181
2008	10550	52	3450	47	181
2010	**10507**	**54**	**3414**	**47**	**182**

No data recorded for Andorra, Brunei Darussalam, Gaza Strip, Holy See, Liechtenstein, Marshall Islands, Federated States of Micronesia, Monaco, Nauru, Qatar, San Marino, Singapore, Timor-Leste, United Arab Emirates, West Bank, Western Sahara.

FIGURE 1

Proportion of national breed populations for which population figures have been reported



III. BREED DIVERSITY

6. A global total of 8 054 breeds (compared to 8 091 in 2008 and 7 616 in 2006) have been reported; 7 001 are local breeds (compared to 7 040 in 2008 and 6 536 in 2006) and 1 053 are transboundary breeds (compared to 1 051 in 2006 and 1 080 in 2006). Among the transboundary breeds, 504 (compared to 500 in 2008 and 523 in 2006) are regional transboundary breeds (occur in only one region); and 549 (compared to 551 in 2008 and 557 in 2006) are international transboundary breeds (occur in more than one region). A total of 631 breeds (compared to of 695 in 2008 and 690 in 2006) breeds are classified as extinct, of which 7 (compared to 7 in 2008 and 9 in 2006) are transboundary breeds (6 regional and 1 international). The decline in the number of reported extinct breeds has occurred because of corrections made by National Coordinators to their national breed inventories in DAD-IS. In the following analysis of breed diversity, extinct breeds are excluded.

7. Figure 2 shows the share of local, regional transboundary and international transboundary breeds among the mammalian and avian breeds of the world. More than two-thirds of reported breeds belong to mammalian species. In mammalian species, the number of regional transboundary breeds is rather higher than the number of international transboundary breeds. Conversely, in avian species there are about twice as many international transboundary breeds as there are regional transboundary breeds.

8. In all regions of the world, mammalian breeds outnumber avian breeds (Figure 3). There is, however, considerable variation between regions in terms of the share of the three breed distribution categories in the total number of breeds. In Europe and the Caucasus, Asia, and the Near and Middle East, local breeds make up more than three-quarters of all breeds. In Africa, and Latin America and the Caribbean, the share of local breeds is smaller, but still exceeds 60 percent of all breeds. Conversely, international transboundary breeds make up more than 50 percent of the total in the Southwest Pacific and North America (Figure 3).

9. Regional transboundary mammalian breeds are relatively numerous in Europe and the Caucasus and Africa, and to lesser extent in North America, Asia, and Latin America and the Caribbean. Conversely, it is only in Europe and the Caucasus that there are a significant number of regional transboundary avian breeds.

FIGURE 2

Number of local and transboundary breeds at global level

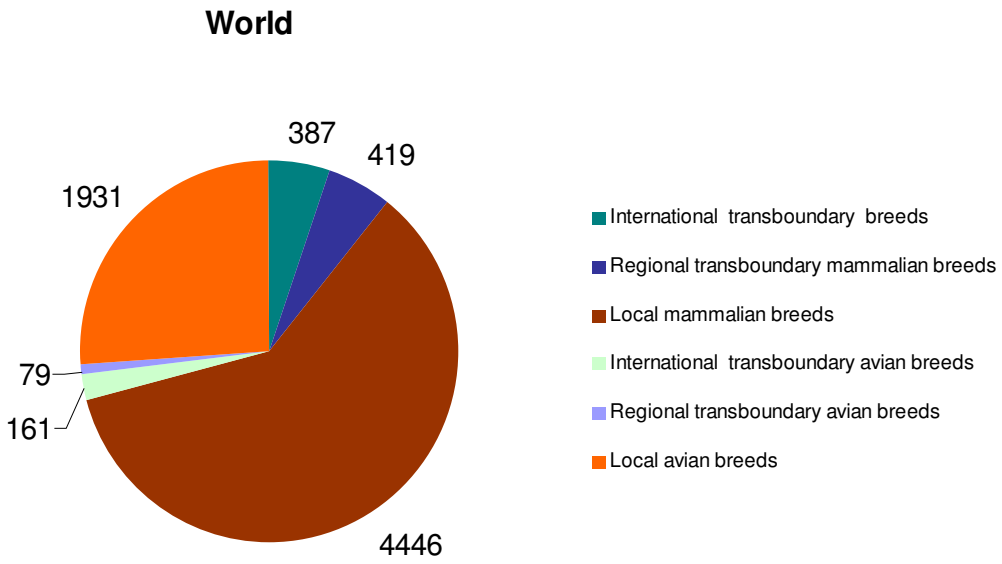
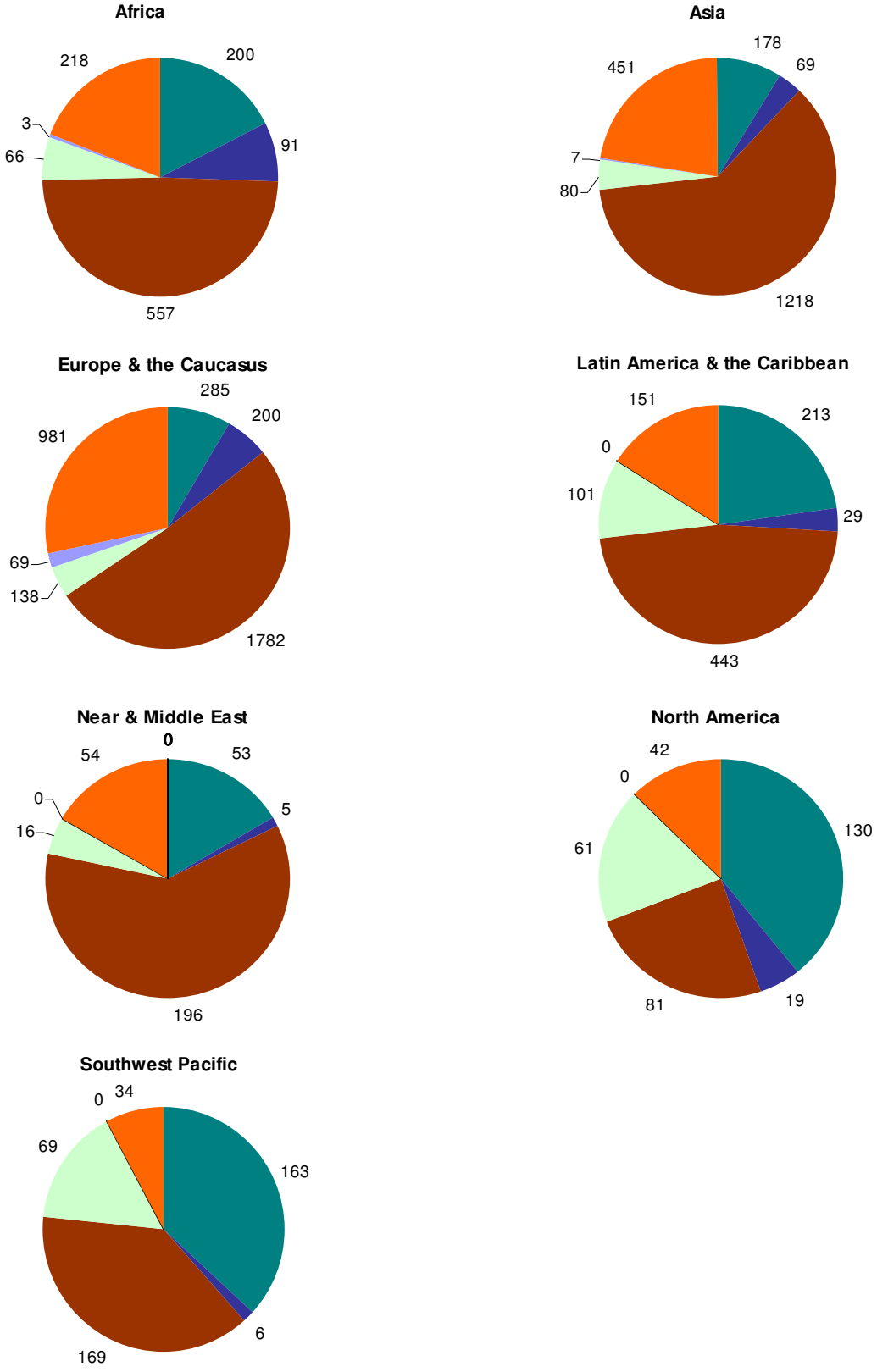


FIGURE 3

Number of local and transboundary breeds at regional level



Note that for these figures international transboundary breeds are counted once in each region, where they occur. Thus, international transboundary breeds are counted more than once. The figures show the number of breeds belonging to each group present in the respective region.

10. Tables 2 and 3, respectively, show the number of reported local breeds of mammalian and avian species for each region of the world. For most livestock species, Europe and the Caucasus or Asia are the regions that have the highest number of local breeds. The dromedary, with most local breeds located in Africa and the Near and Middle East, and the guinea pig, with most local breeds located in Latin America and the Caribbean, are exceptions to this pattern. Between 2008 and 2010, some additional local breeds have been reported, the largest numbers being among sheep, rabbits, goats and pigs in Europe and the Caucasus. The totals in some categories have fallen because countries have corrected their inventories.

TABLE 2

Mammalian species – number of reported local breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	World
Ass	19	39	46	23	16	5	3	151
Bactrian camel	0	8	2	0	0	0	0	10
Buffalo	2	89	12	11	8	0	2	124
Cattle	172	237	316	143	43	15	27	953
Dromedary	46	13	1	0	23	0	2	85
Goat	95	176	195	28	34	4	11	543
Guinea Pig	4	0	0	12	0	0	0	16
Horse	38	139	283	76	14	22	22	594
Pig	51	208	195	67	1	13	63	598
Rabbit	11	16	150	17	5	0	0	199
Sheep	112	256	536	52	52	21	38	1067
Yak	0	25	2	0	0	0	0	27
Total	550	1206	1738	429	196	80	168	4367

Excludes extinct breeds. Not shown: alpaca, deer, dog, dromedary × Bactrian camel, guanaco, llama, vicuña.

TABLE 3

Avian species – number of reported local breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	World
Chicken	126	257	684	87	35	15	16	1220
Duck	14	79	88	22	4	1	7	215
Goose	10	40	105	5	2	0	2	164
Muscovy duck	5	9	6	1	1	0	2	24
Ostrich	6	2	4	0	0	0	1	13
Partridge	2	8	3	0	0	0	0	13
Pheasant	0	7	5	6	0	0	0	18
Pigeon	7	12	32	7	8	1	2	69
Turkey	11	11	31	11	3	11	3	81
Total	181	425	958	139	53	28	33	1817

Excludes extinct breeds. Not shown: cassowary, Chilean tinamou, duck × Muscovy duck, emu, guinea fowl, ñandu, peacock, quail, swallow.

11. For several mammalian species, including sheep, horses and pigs, Europe and the Caucasus, has the highest number of regional transboundary breeds. As Table 4 shows, Africa has a relatively large share of regional transboundary breeds in most of these species. Moreover, Africa is dominant in terms of the numbers of regional transboundary breeds of cattle and goats. Europe and the Caucasus, however, has by far the highest number of regional transboundary breeds among avian species (Table 5). The existence of significant numbers of regional transboundary breeds clearly has implications for management and conservation of AnGR, and highlights the need for cooperation at regional or subregional levels. Between 2008 and 2010 the number of reported transboundary mammalian breeds has increased slightly: the global total for mammalian species has increased by 4; there has been no change for avian species.

TABLE 4

Mammalian species – number of reported regional transboundary breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	World
Ass	3	3	1	1	0	0	0	8
Buffalo	0	8	1	1	0	0	0	10
Cattle	35	20	25	6	1	2	1	90
Deer	0	1	1	0	0	0	0	2
Dromedary	1	1	0	0	0	0	0	2
Goat	15	11	12	2	0	5	1	46
Guinea pig	0	0	0	1	0	0	0	1
Horse	7	10	37	4	0	4	0	62
Pig	2	2	17	5	0	2	1	29
Rabbit	3	0	32	1	0	0	0	36
Sheep	25	13	74	3	4	6	3	128
South American camelids	0	0	0	5	0	0	0	5
Total	91	69	200	29	5	19	6	419

Excluding extinct breeds.

TABLE 5

Avian species – number of reported regional transboundary breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	World
Chicken	3	3	43	0	0	0	0	49
Duck	0	2	12	0	0	0	0	14
Goose	0	1	7	0	0	0	0	8
Quail	0	1	0	0	0	0	0	1
Turkey	0	0	7	0	0	0	0	7
Total	3	7	69	0	0	0	0	79

Excluding extinct breeds.

12. Cattle, sheep, horses and chickens are the species that have the highest numbers of international transboundary breeds (Tables 6 and 7). Between 2008 and 2010, the global total for mammalian species increased by two. There was no change in the case of avian species.

TABLE 6

Mammalian species – number of reported international transboundary breeds

Species	Number of breeds
Ass	5
Bactrian Camel	2
Buffalo	5
Cattle	111
Deer	10
Dromedary	2
Goat	38
Horse	63
Pig	29
Rabbit	23
Sheep	99
Total	387

Excluding extinct breeds.

TABLE 7

Avian species – number of reported international transboundary breeds

Species	Number of breeds
Cassowary	1
Chicken	106
Duck	12
Emu	1
Goose	15
Guinea fowl	5
Muscovy duck	1
Ostrich	3
Pigeon	1
Turkey	16
Total	161

Excluding extinct breeds.

IV. RISK STATUS OF ANIMAL GENETIC RESOURCES

13. A total of 1 710 breeds (21 percent) are classified as being at risk (compared to 1 649 in 2008 and 1 491 in 2006). Figure 4 shows that for mammalian species, the proportion of breeds classified as at risk is lower overall (18 percent) than for avian species (31 percent). However, in absolute terms, the number of breeds at risk is higher for mammalian species (1 023 breeds) than for avian species (687 breeds). Figure 5 presents risk status data for mammalian species. It can be seen that cattle are the mammalian species with the highest number of breeds at risk. However, rabbits (38 percent) followed by horses (22 percent) and pigs (20 percent) are the species that have the highest proportions of breeds at risk. Figure 6 also indicates the large number of breeds

for which no risk status data are available. The problem is particularly significant in some species – 71 percent for deer breeds, 58 percent for asses and 58 percent for dromedaries. This lack of data is a serious constraint to effective prioritization and planning of breed conservation measures. Cattle are the species with the highest number of breeds (194) reported as extinct. Large numbers of extinct sheep (160), pig (110) and horse (91) breeds are also reported. There is, however, clearly a possibility that there were breeds that became extinct before they were documented, and which are therefore missing from the analysis.

14. Among avian species, chickens have by far the highest number of breeds at risk on a world scale (Figure 7). In the majority of avian species at least 24 percent of breeds are classified as at risk (guinea fowl and partridge are the only exceptions). In the case of chickens (32 percent), geese (34 percent), turkeys (32 percent), quail (31 percent), pigeons (36 percent) and ostrich (44 percent) the proportion is substantially higher. As in the case of mammalian species, there are a large number of breeds for which population figures are unavailable. Extinct breeds have mainly been reported among chickens. There are also a few cases among ducks, guinea fowl and turkeys. Figures 7 and 8 show the distribution of breeds at risk by region for mammalian and avian species, respectively.

15. The regions with the highest proportion of their breeds classified as at risk are Europe and the Caucasus (32 percent of mammalian breeds and 50 percent of avian breeds) and North America (32 percent of mammalian breeds and 81 percent of avian breeds). Europe and the Caucasus, and North America are the regions that have the most highly specialized livestock industries, in which production is dominated by a small number of breeds. In absolute terms, Europe and the Caucasus has by far the highest number of at-risk breeds. Despite the apparent dominance of these two regions, problems in other regions may be obscured by the large number of breeds with unknown risk status. In Latin America and the Caribbean 69 percent and 83 percent of mammalian and avian breeds, respectively, are classified as being of unknown risk status; the respective figures for the Southwest Pacific region are 75 percent for mammals and 68 percent for birds, and for Africa 57 percent for mammals and 60 percent for birds.

FIGURE 4

Proportion of the world's breeds by risk status category

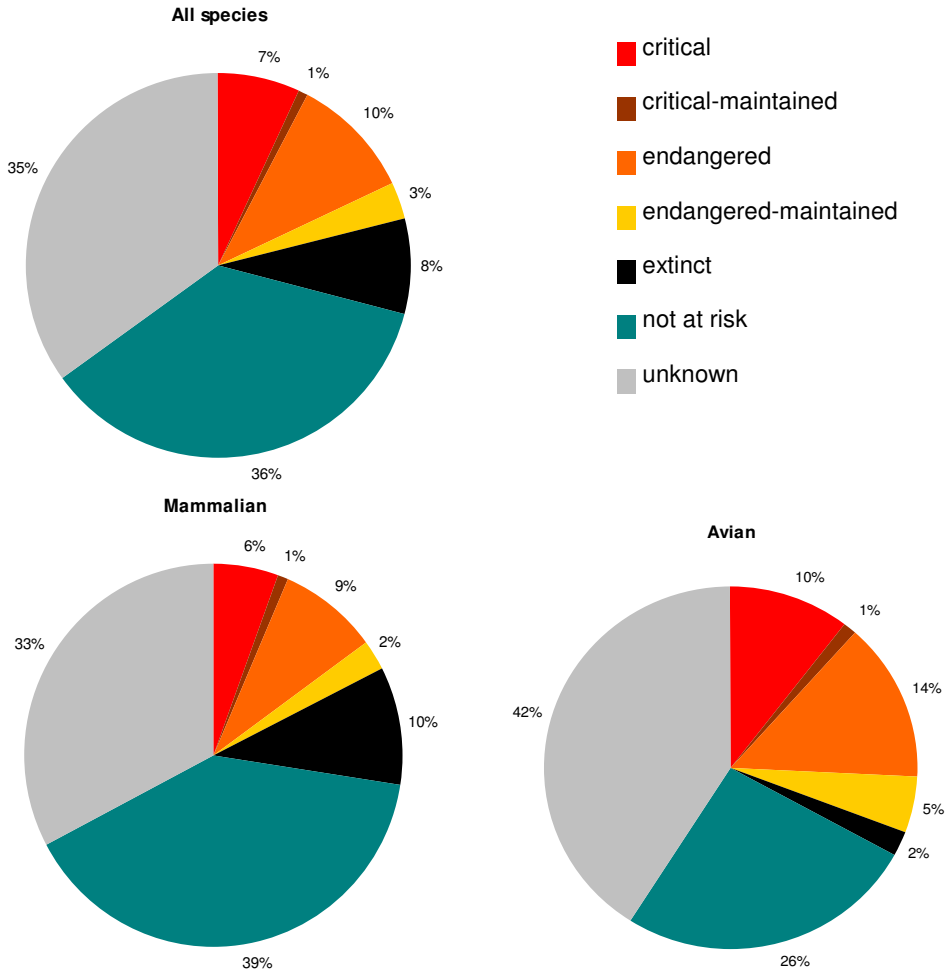
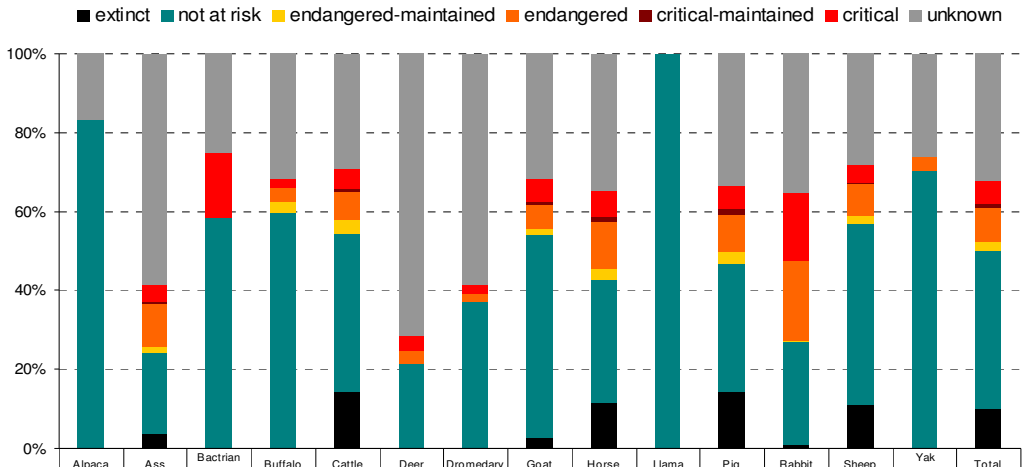


FIGURE 5

Risk status of the world's mammalian breeds in October 2010: absolute (table) and percentage (chart) figures by species

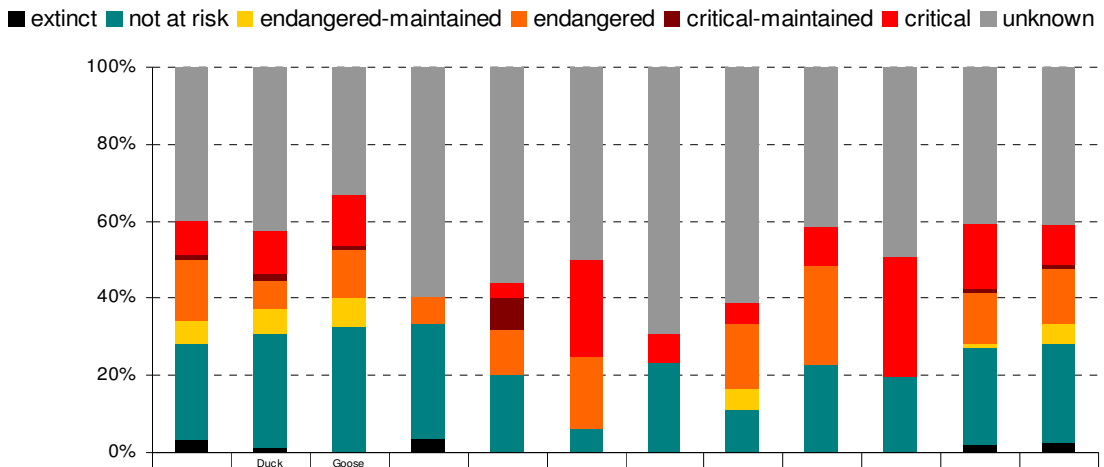


	Alpaca	Ass	Bactrian Camel	Buffalo	Cattle	Deer	Dromedary	Goat	Horse	Llama	Pig	Rabbit	Sheep	Yak (domestic)	Total
unknown	1	99	3	44	393	20	52	205	282	0	258	92	409	7	1865
critical	0	8	2	3	66	1	2	36	52	0	42	44	67	0	323
critical-maintained	0	1	0	0	13	0	0	6	11	0	12	0	4	0	47
endangered	0	18	0	5	95	1	2	39	96	0	74	53	116	1	500
endangered-maintained	0	3	0	4	46	0	0	10	21	0	23	1	32	0	140
not at risk	5	35	7	83	541	6	33	331	257	4	247	68	666	19	2302
extinct	0	6	0	0	194	0	0	18	91	0	110	2	160	0	581
Total	6	170	12	139	1348	28	89	645	810	4	766	260	1454	27	5758*

* The total number of breeds is actually higher than the number shown, as Bactrian camel × dromedary crosses, guanacos, vicuñas, guinea pigs and dogs (of which there are a total of 75 reported breeds) are not included.

FIGURE 6

Risk status of the world's avian breeds in October 2010: absolute (table) and percentage (chart) figures by species

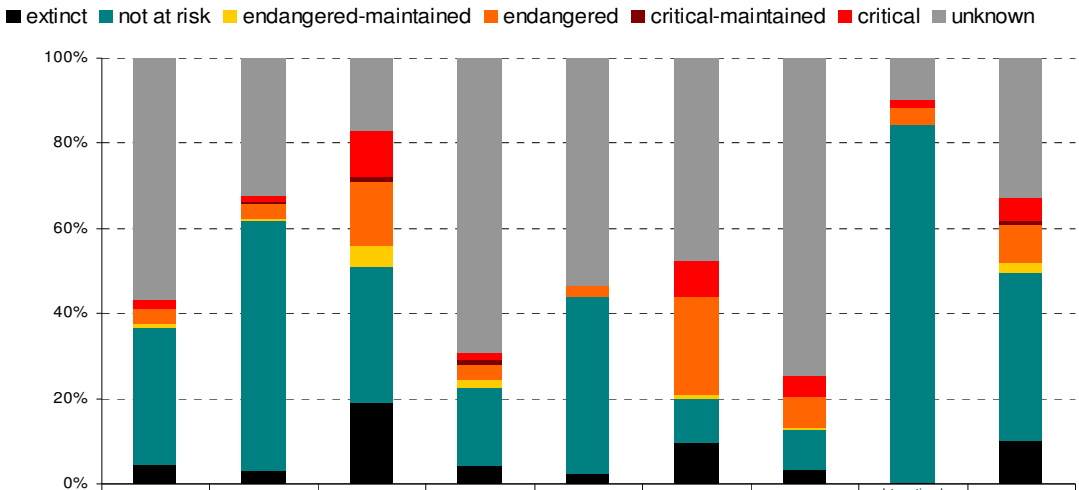


	Chicken	Duck (domestic)	Goose (domestic)	Guinea fowl	Muscovy duck	Ostrich	Partridge	Pheasant	Pigeon	Quail	Turkey	Total
unknown	563	104	62	32	14	8	9	11	29	25	43	900
critical	130	27	25	0	1	4	1	1	7	16	18	230
critical-maintained	16	4	1	0	2	0	0	0	0	0	1	24
endangered	226	18	24	4	3	3	0	3	18	0	14	313
endangered-maintained	83	16	14	0	0	0	0	1	0	0	1	115
not at risk	357	72	61	16	5	1	3	2	16	10	27	570
extinct	43	3	0	2	0	0	0	0	0	0	2	50
Total	1418	244	187	54	25	16	13	18	70	51	106	2202

* The total number of breeds is actually higher than the number shown, as duck × Muscovy duck crossings, Chilean tinamou, cassowaries, emus, ñandus, peacocks and swallows (of which there are a total of 19 reported breeds) are not included.

FIGURE 7

Risk status of the world's mammalian breeds in October 2010: absolute (table) and percentage (chart) figures by region

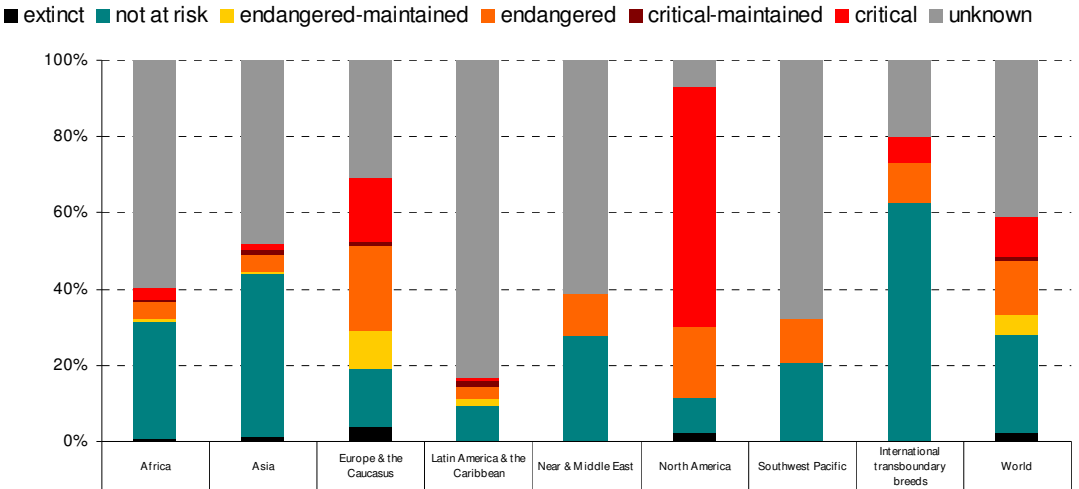


	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	Southwest Pacific	International transboundary breeds	World
unknown	386	431	420	341	110	53	135	38	1914
critical	13	17	259	9	0	9	9	7	323
critical-maintained	1	9	33	4	0	0	0	0	47
endangered	25	44	365	19	5	26	13	15	512
endangered-maintained	5	8	118	8	0	1	1	0	141
not at risk	218	778	787	91	86	11	17	327	2315
extinct	32	42	463	21	5	11	6	1	581
Total	**680**	**1329**	**2445**	**493**	**206**	**111**	**181**	**388***	**5833**

*African Aurochs, which once lived in parts of both the Africa and the Near and Middle East regions.

FIGURE 8

Risk status of the world's avian breeds in October 2010: absolute (table) and percentage (chart) figures by region



	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	Southwest Pacific	International transboundary breeds	World
unknown	133	223	338	126	33	3	23	32	911
critical	7	7	180	1	0	27	0	11	233
critical-maintained	1	7	14	2	0	0	0	0	24
endangered	10	20	245	5	6	8	4	17	315
endangered-maintained	2	3	107	3	0	0	0	0	115
not at risk	68	198	166	14	15	4	7	101	573
extinct	2	5	42	0	0	1	0	0	50
Total	**223**	**463**	**1092**	**151**	**54**	**43**	**34**	**161**	**2221**

16. Tables 8 and 9 present the number of extinct mammalian and avian breeds by species and region. Europe and the Caucasus has by far the largest number of extinct mammalian and avian breeds – 13 percent of all reported breeds are extinct. The dominance of Europe and the Caucasus in terms of the numbers of extinct breeds, may relate to the greater levels of breed recording that have taken place in this regions. The year of extinction has been reported for only 27 percent (171) of extinct breeds. Eight breeds are reported to have become extinct before the year 1900, 105 between 1900 and 1999, and 58 after 1999 of which two became extinct during the last two years (Table 10).

TABLE 8

Number of extinct mammalian breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	International transboundary breeds	World
Ass	1	0	4	0	1	0	0	0	6
Cattle	20	18	132	19	1	1	2	1	194
Goat	0	2	15	0	0	1	0	0	18
Horse	6	1	75	0	0	8	1	0	91
Pig	0	15	92	2	0	0	1	0	110
Rabbit	0	0	0	0	2	0	0	0	2
Sheep	5	6	145	0	1	1	2	0	160
Total	32	42	463	21	5	11	6	1	581

TABLE 9

Number of extinct avian breeds

Species	Africa	Asia	Europe & the Caucasus	Latin America & the Caribbean	Near & Middle East	North America	South west Pacific	World
Chicken	0	5	37	0	0	1	0	43
Duck	0	0	3	0	0	0	0	3
Guinea fowl	2	0	0	0	0	0	0	2
Turkey	0	0	2	0	0	0	0	2
Total	2	5	42	0	0	1	0	50

TABLE 10

Years of extinction

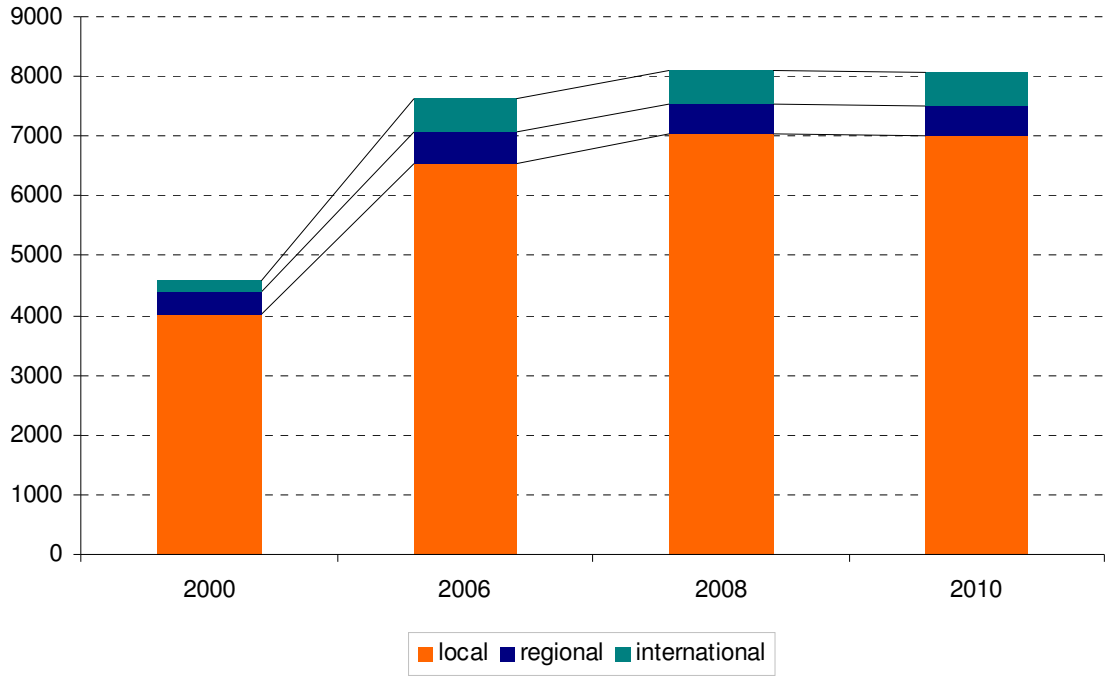
Year	Number of breeds	%
unspecified	460	73
before 1900	8	1
1900-1999	105	17
after 1999	58	9
Total	631	100

V. TRENDS IN BREED STATUS

17. Between December 2008 and October 2010, the shares of international transboundary, regional transboundary and local breeds in the total number of reported breeds remained steady at 7 percent, 6 percent and 87 percent respectively (Figure 9).

FIGURE 9

Local, regional and international breeds in 2000 and 2010



VI. TRENDS IN GENETIC EROSION

18. Between 2008 and 2010 the proportion of transboundary breeds classified as at risk and extinct remained steady at 16 percent and 1 percent respectively (Figure 10). The proportion of transboundary breeds classified as not at risk increased slightly from 67 percent to 69 percent, while the proportion classified as being of unknown risk status decreased from 16 percent to 15 percent.

19. Between 2008 and 2010, the number of local breeds categorized as at risk increased from 21 percent to 22 percent (Figure 11). This proportional increase is in part accounted for by a fall in the number of reported extinct breeds brought about by corrections made by national coordinators to their countries' breed inventories in DAD-IS. However, the absolute number of local breeds categorized as at risk also increased: from 1 477 to 1 543. This increase is largely caused by an increase in the number of at-risk breeds reported in the Europe and the Caucasus region (Figures 7 and 8). To a large extent, these additions are breeds that were previously unreported or classified as being of unknown risk status. The proportion of local breeds categorized as not at risk increased (from 29 percent to 31 percent). This change is also largely accounted for by slightly improved reporting (in several regions). The improvement is further reflected in the proportion classified as being of unknown risk status declined from 40 percent to 38 percent.

FIGURE 10

Changes in risk status of transboundary breeds from 2000 to 2010

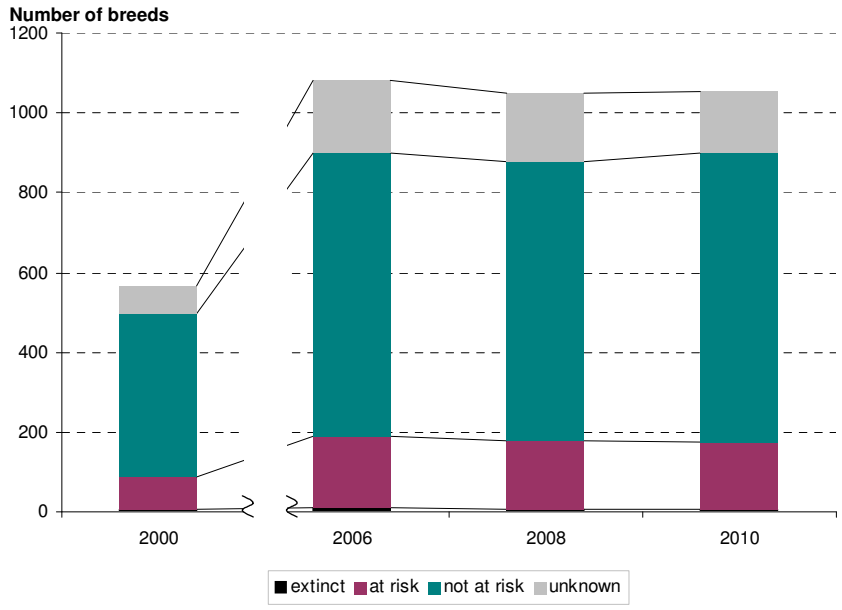
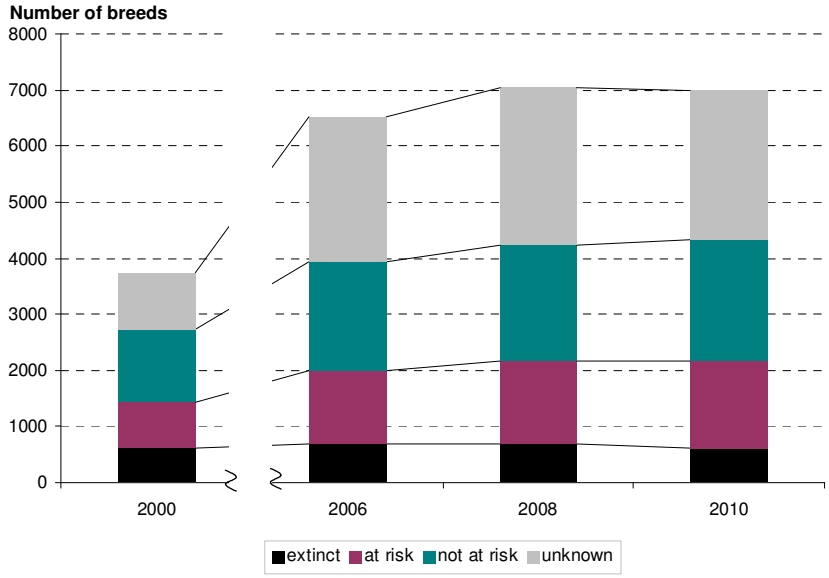


FIGURE 11

Changes in the risk status of local breeds from 2006 to 2010



VII. DEVELOPMENT OF INDICATORS FOR TRENDS IN THE GENETIC DIVERSITY OF DOMESTICATED ANIMALS

20. The template set out in the document *Format and content of future status and trends reports on animal genetic resources*[7] indicated that, in addition to the material presented above and in the annexes below, status and trends reports on animal genetic resources should include the Convention on Biological Diversity headline indicator for "trends in genetic diversity of domesticated animal species of major socioeconomic importance" once the indicator had been developed. To address this requirement, FAO convened an expert workshop on indicators, which was held in February 2010.[8]

21. The expert workshop proposed three indicators, to be calculated at national, regional and global levels for 17 different species, as follows:

- number of native breeds;
- proportion of the total population accounted for by native and non-native breeds;
- number of breeds classified as at risk, not at risk and unknown.

The proposed approach requires: the development of a new system for classifying breeds according to whether or not they are "native" or "non-native" to a given country; development of a means to record the new classification in DAD-IS; and the entry of the respective data for all breed records in DAD-IS. The feasibility of calculating the second element of the indicator also needs to be tested. The proposed indicator set is therefore not yet available. The third element of the proposed set of indicators (number of breeds by risk status category) is provided in Section IV and Annex 2 of the present report, but the figures are currently broken down according the distributional breed categories (local, regional transboundary and international transboundary) rather than on the proposed nativity classification, and are not broken down according to the list of species recommended by the expert workshop.

22. The expert workshop also recommended that indicators of trends in breed risk status, such as those presented in Section V above (and in future with respect to the third element of the proposed set of indicators), should be calculated based on the most up-to-date current and historical data available in DAD-IS at the time of calculation rather than by comparing current data to the data available in old reports. It was further proposed that for this purpose breeds should be allocated to their current distributional and/or nativity classification. The objective of this approach (in addition to taking advantage of the most up-to-date available data) would be to remove the confounding affects that occur when changes to breeds' risk statuses occur simultaneously with improvements in reporting and with changes in breeds' allocation to the various classification categories.

23. The expert workshop also noted the potentially misleading consequences of including breeds for which no updates of population data have occurred for many years in the calculation of indicators for trends over short periods such as the two-year reporting cycle upon which the current report is based. The expert workshop further noted that the problem could be reduced by introducing a cut-off point after which breeds revert to the "unknown" risk-status category if population figures are not updated; it proposed introducing a ten-year cut-off point for this purpose.

[7] CGRFA/WG-AnGR-5/09/3.2. (http://www.fao.org/ag/againfo/programmes/en/genetics/documents/ITWG_AnGR_5_09_3_2.pdf).
[8] Report: Workshop on Indicators to Measure Trends in Genetic Diversity of Domesticated Animals.

VIII. CONCLUSIONS

24. During the period between December 2008 and October 2010 the coverage of breed diversity in the Global Databank for Animal Genetic Resources was improved. However, breed-related information remains far from complete. For more than one-third of all reported breeds, risk status is not known because of missing population data. The completeness of data by country is shown in Annexes 1 and 2.

25. Global summaries of breed risk status have been affected by corrections to breed inventories and by some improvements in the reporting of data on breed population sizes. The current state of data availability and updating means that it is not possible to draw reliable conclusions regarding global trends in breed risk status.

26. If future status and trends reports in this series are to provide meaningful inputs to decision-making in animal genetic resources management, there is an urgent need for National Coordinators for the Management of Animal Genetic Resources to improve the completeness and frequency of reporting on the sizes of their national breed populations. Historical data should also be entered, as this will provide a more complete set of data with which to calculate trends in breed population size and structure. Reviewing the linkages of national breed populations to transboundary breeds is also very important, as this affects the analysis of risk status at national, regional and global levels.

27. Progress has been made in developing the headline indicator for “trends in genetic diversity of domesticated animal species of major socioeconomic importance”, but further development, testing and reporting are required before the indicator can be presented.

Annex 1: Status of population data reported by each country and region

1.1. Africa

1.2. Asia

1.3. Europe and the Caucasus

1.4. Latin America and the Caribbean

1.5. Near and Middle East

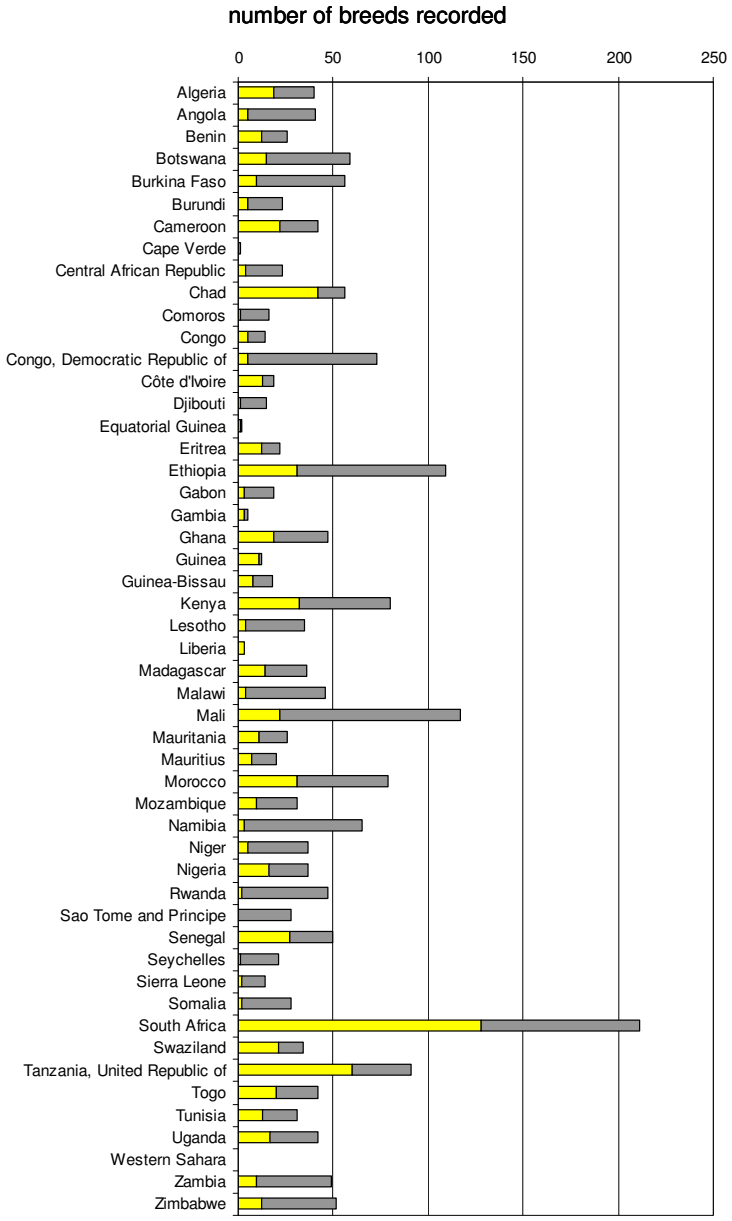
1.6. North America

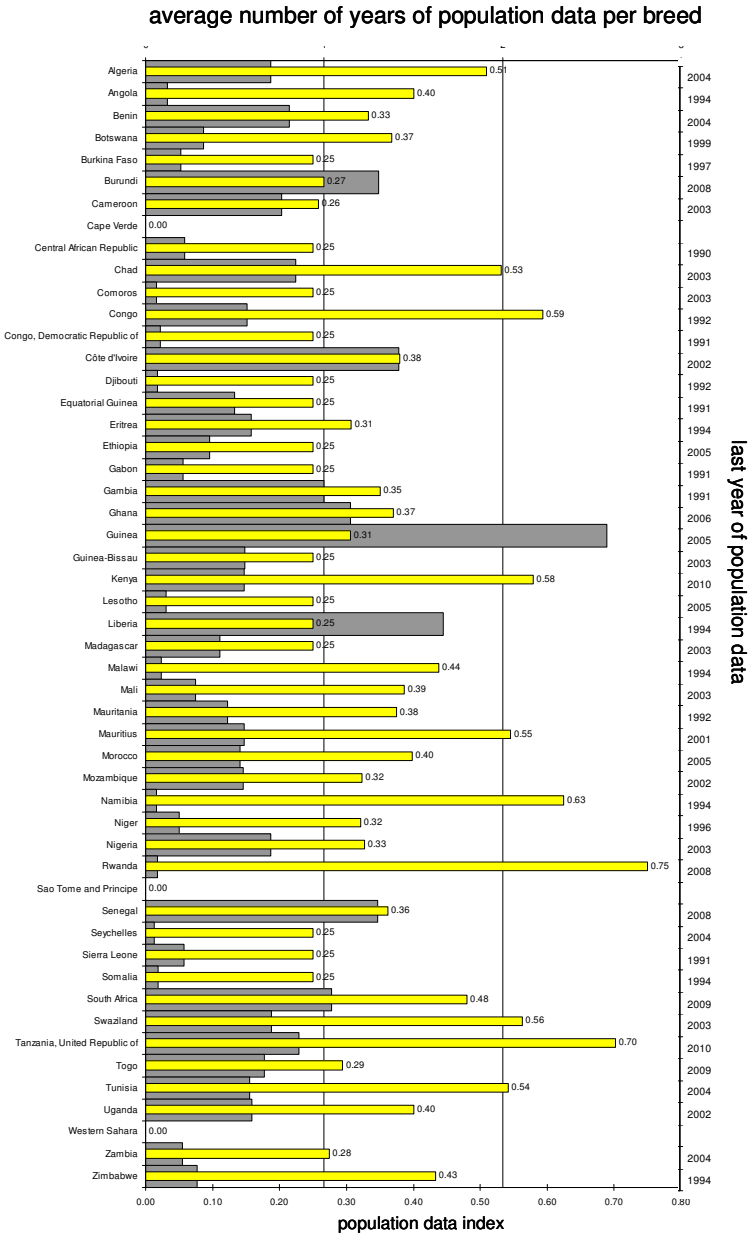
1.7. Southwest Pacific

This annex allows countries to view the state of completeness of their breed population data in DAD-IS. They can also see how their progress in entering population data compares to that of other countries in their respective regions.

Two graphics are presented for each region. The first shows the number of breeds for which population data have been recorded and the number of breeds that have been entered into the system but for which no population data have yet been recorded. The second graphic presents two further measures of data completeness: the average number of years for which population has been reported per breed and the "population data index". The latter relates only to breeds for which some population data have been entered – it represents the fraction of selected population data fields (population, size, number of breeding females, number of breeding males, and the percentage of females bred to males of the same breed) that contain data, averaged across breeds and years. The figures also show the most recent year for which population data are available from a given country. Dependent territories are listed under the respective country.

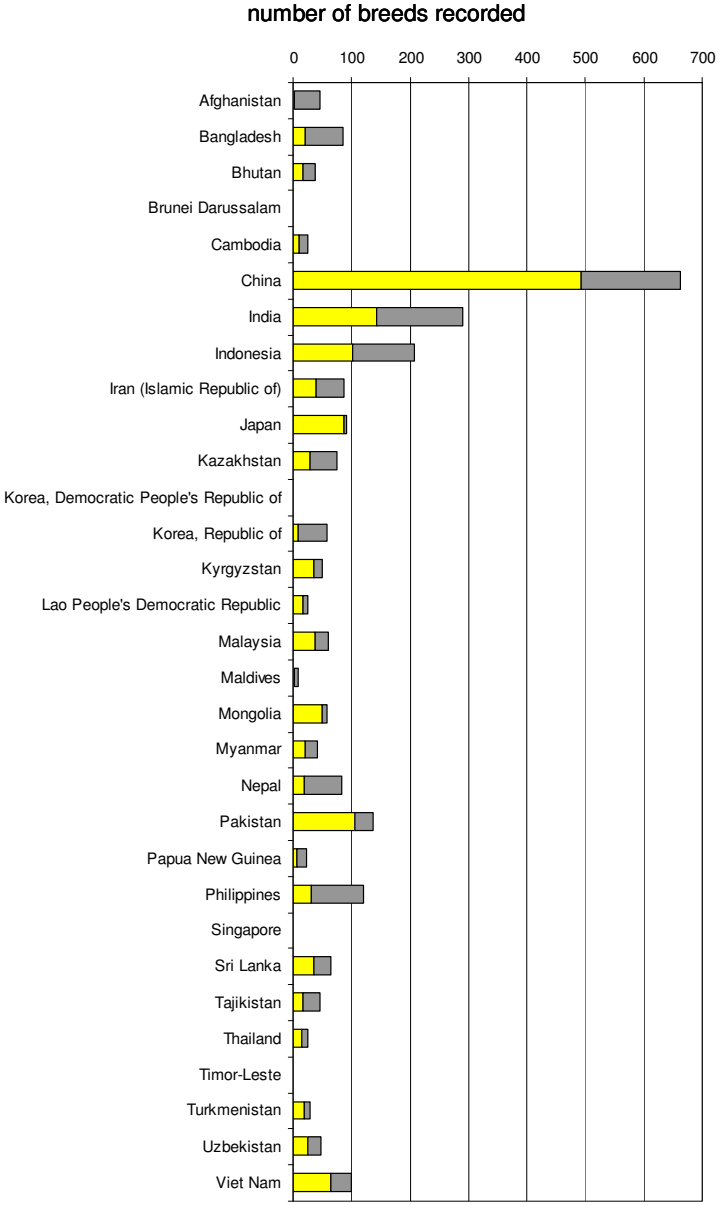
1.1. Africa

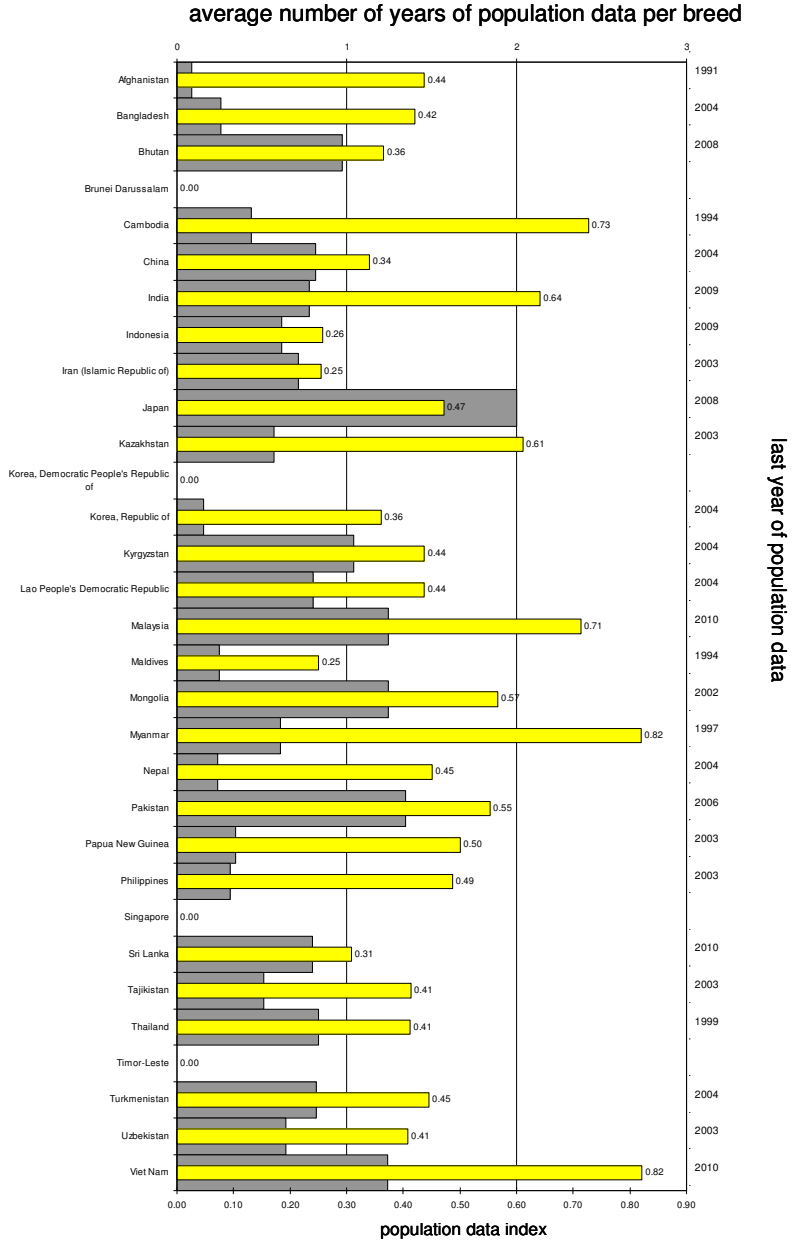




Population Data Index (PDI) – For each country the PDI was calculated only for those breeds recorded as having population data. The PDI is the fraction of selected population data fields (population size, number of breeding females, number of breeding males and the percentage of females bred to males of the same breed) that contain information, averaged across breeds.

1.2. Asia





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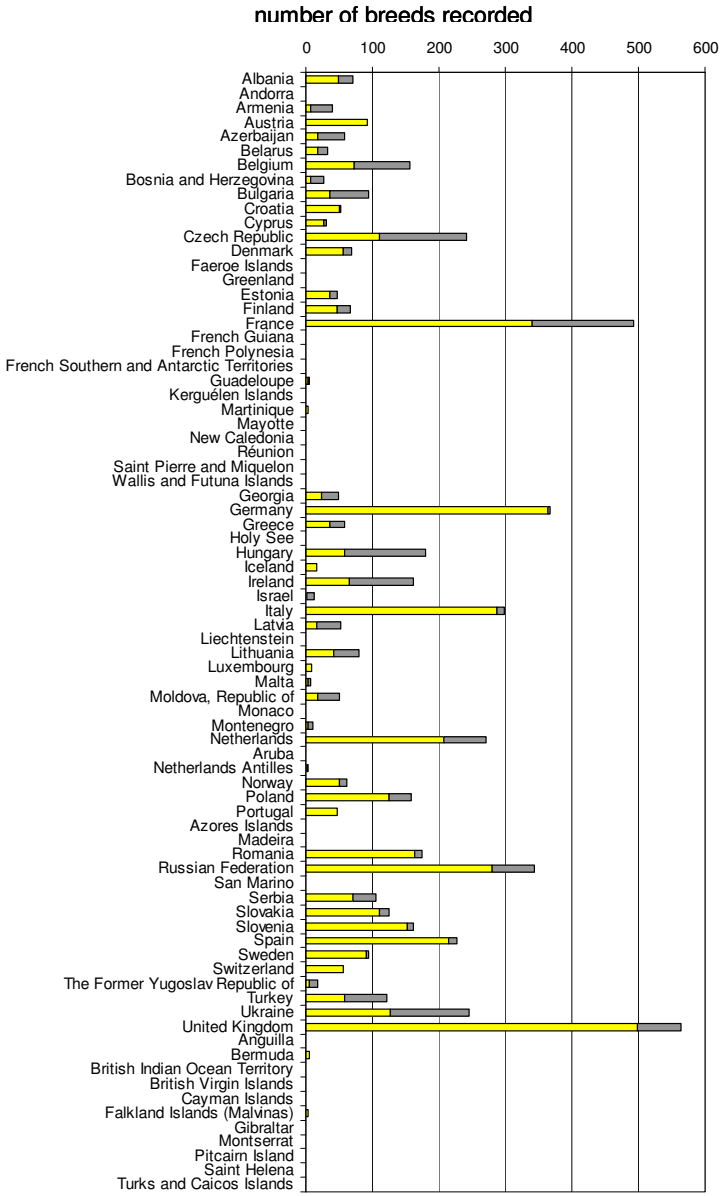
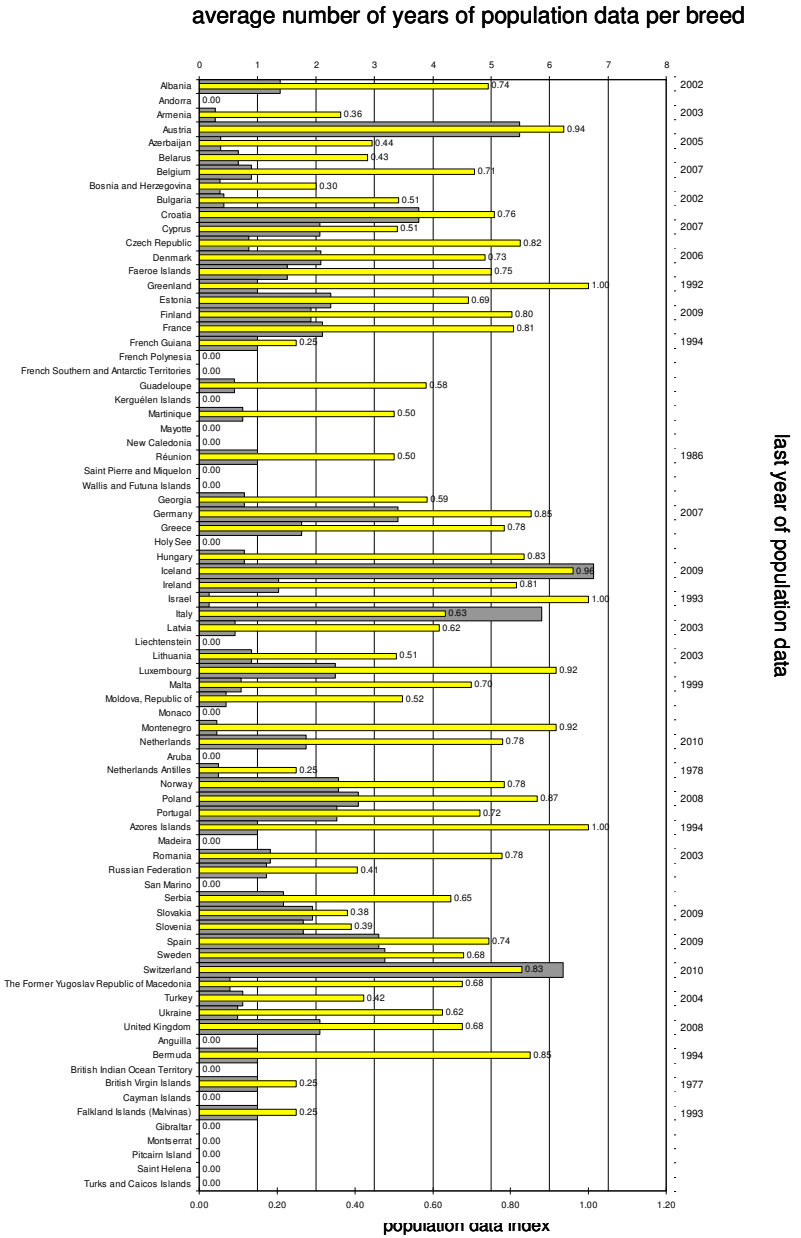
1.3. Europe and the Caucasus





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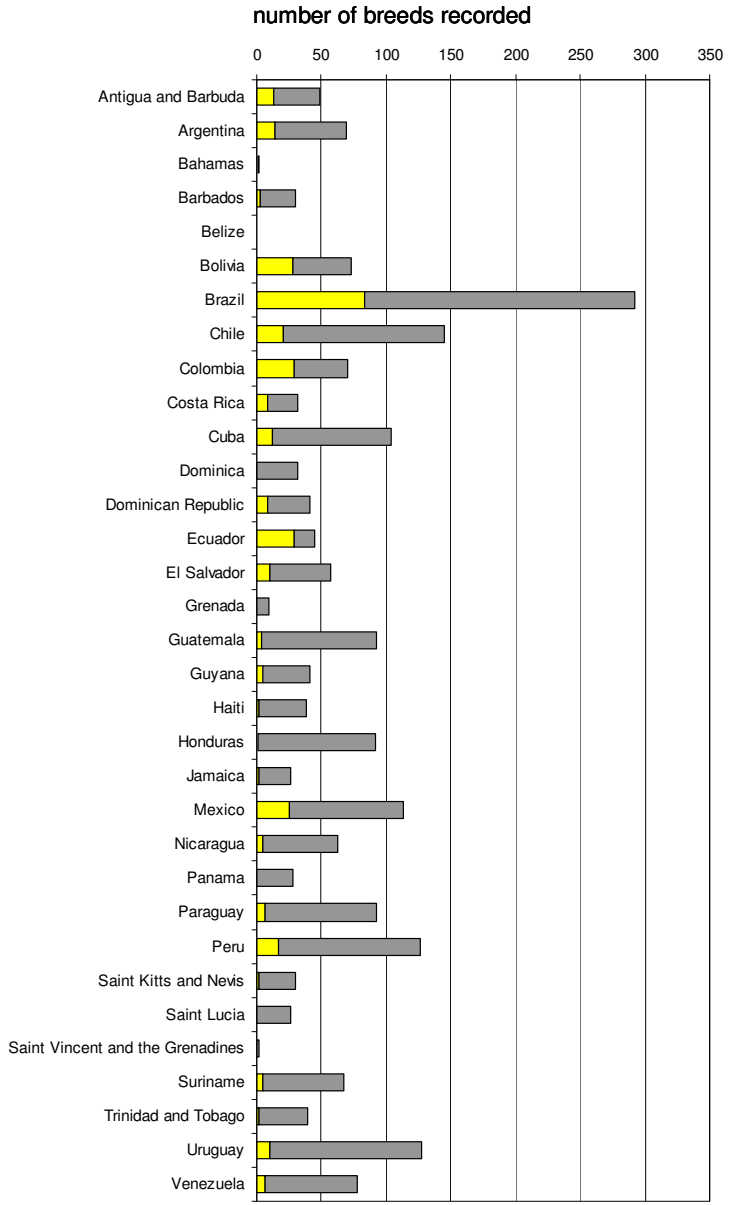
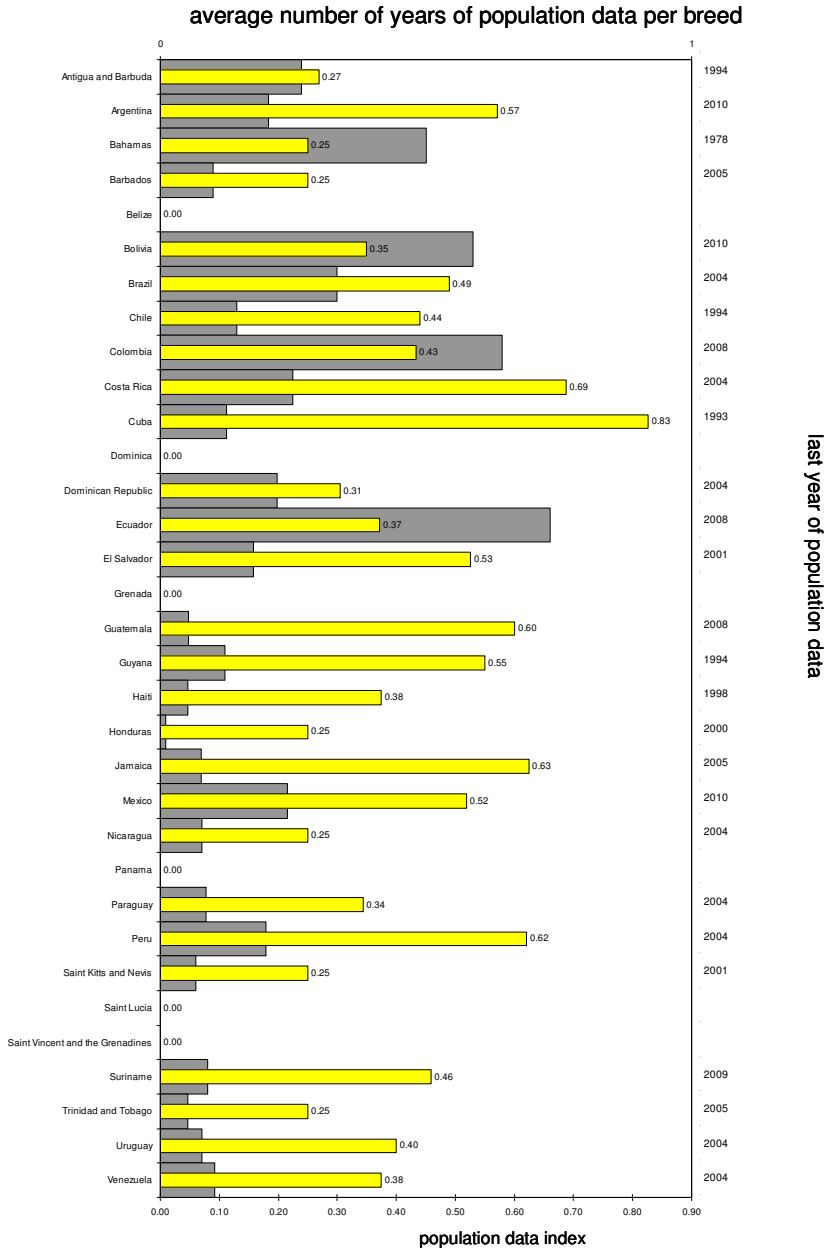
1.4. Latin America and the Caribbean





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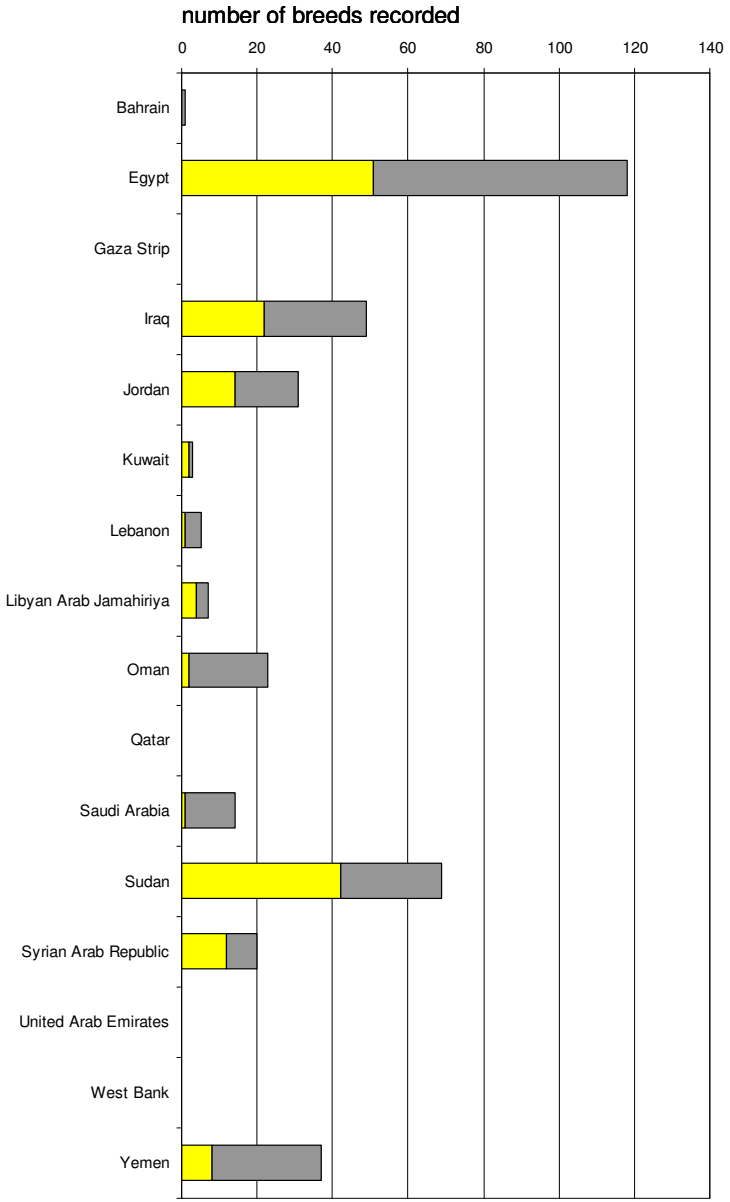
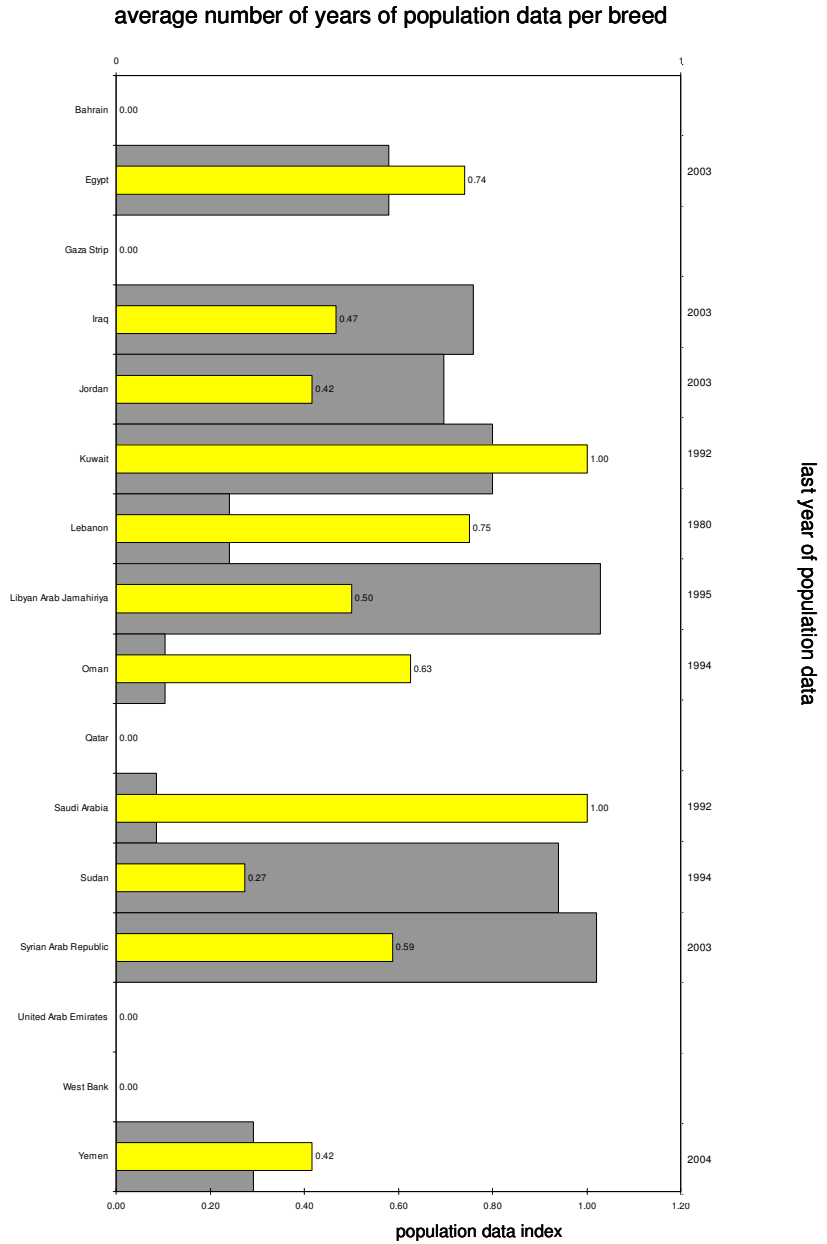
1.5. Near and Middle East





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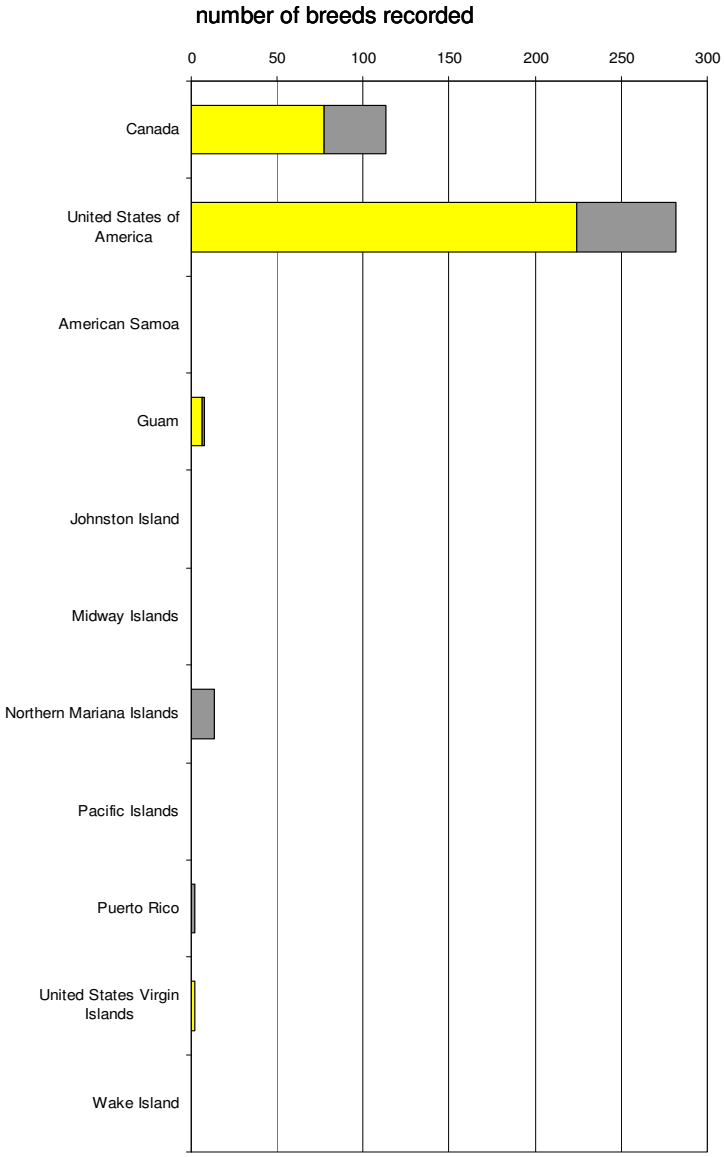
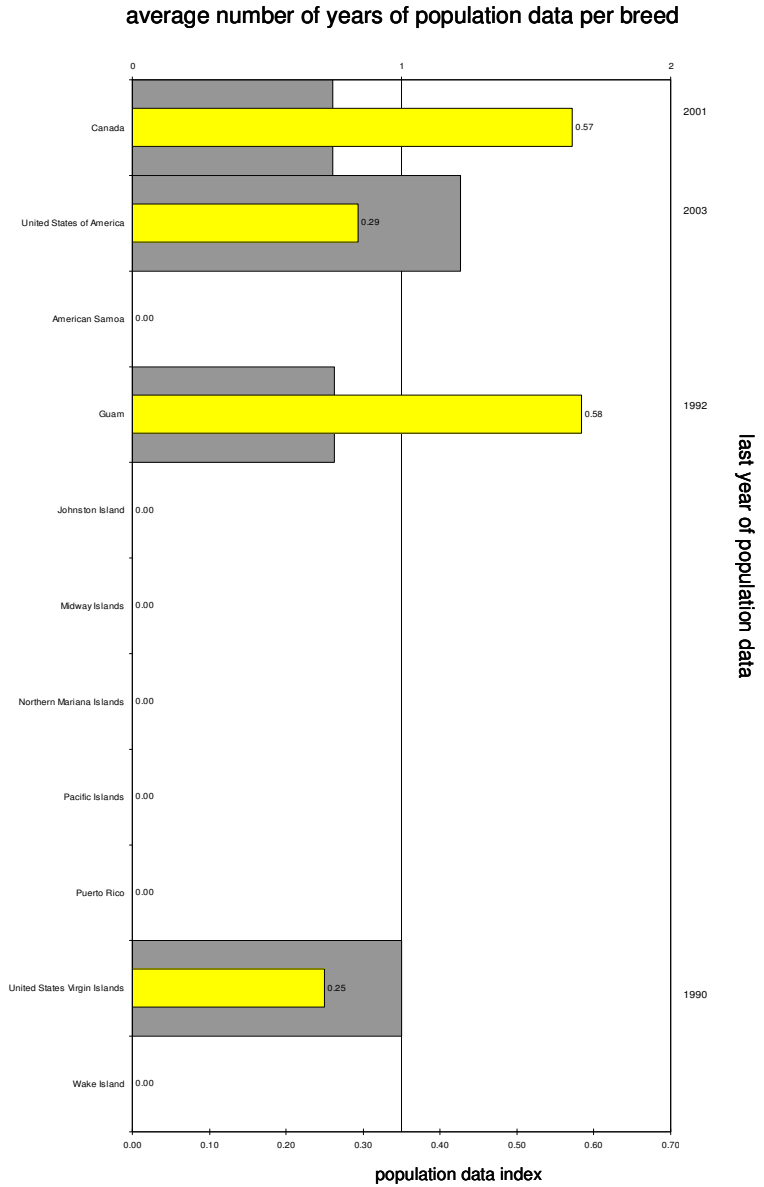
1.6. North America





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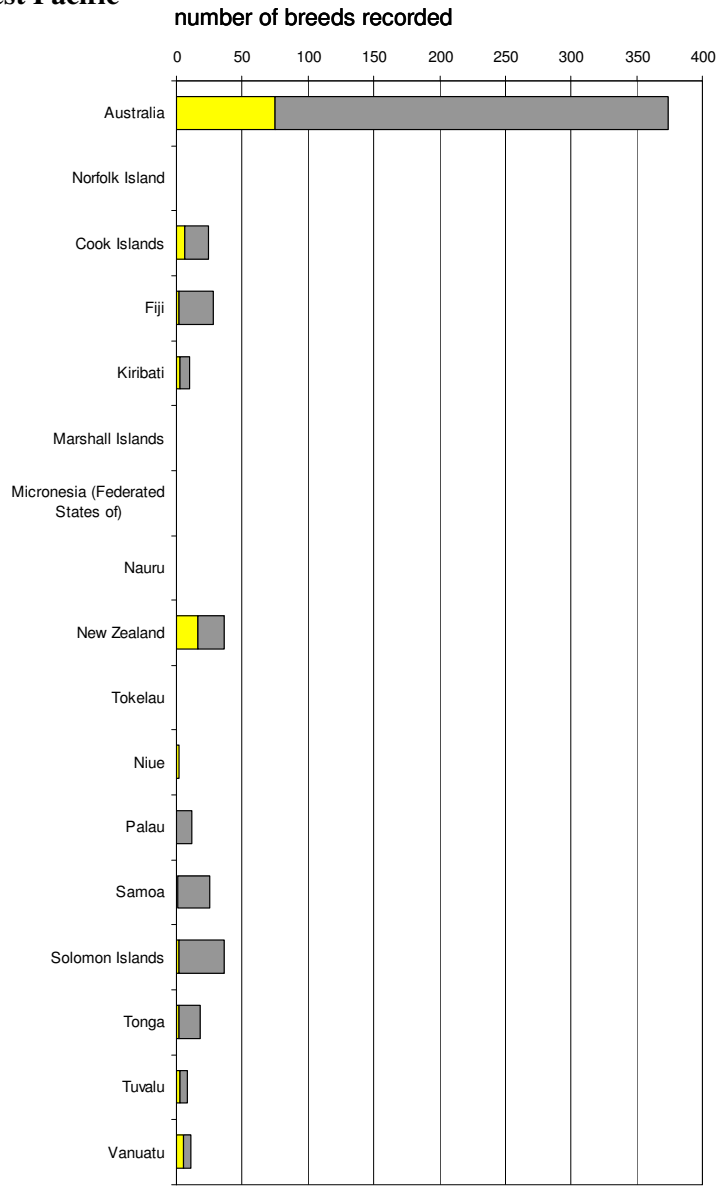
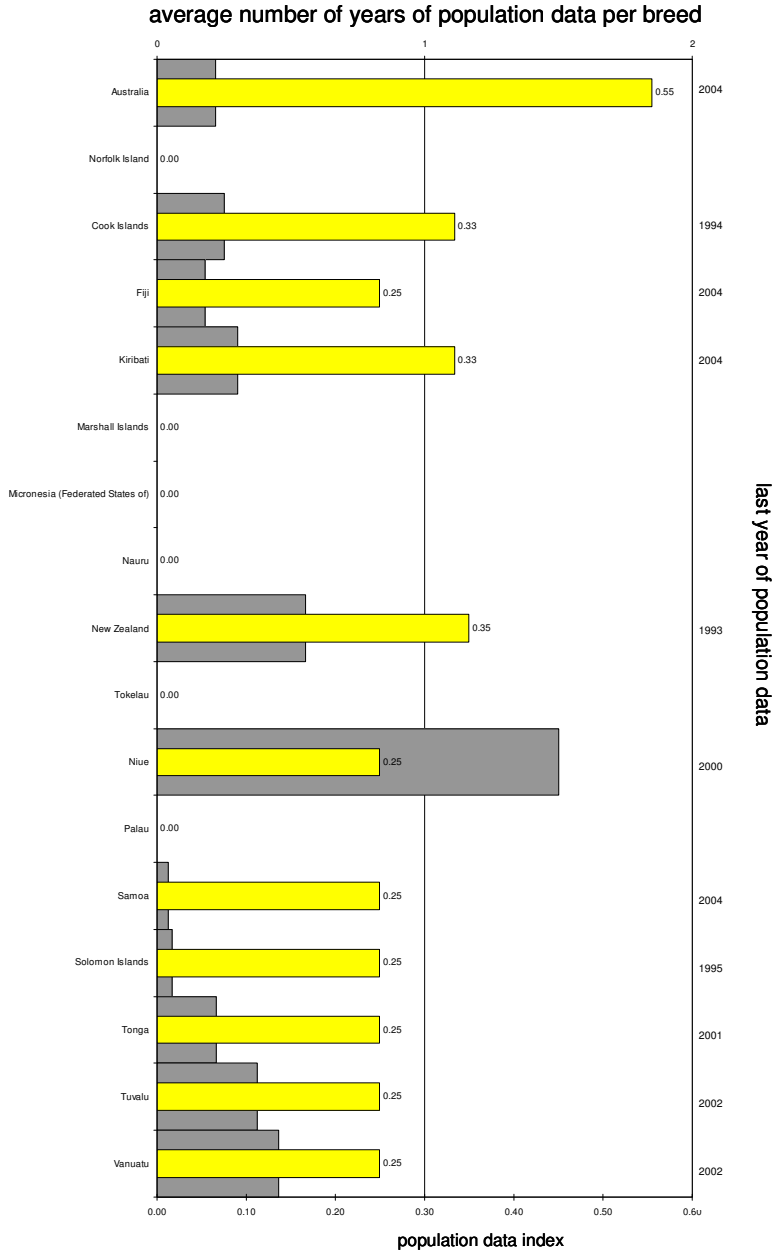
1.7. Southwest Pacific





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Annex 2: Number of local and transboundary breeds by risk status category reported by each country and region

2.0. Regional overview

2.1. Africa

2.2. Asia

2.3. Europe and the Caucasus

2.4. Latin America and the Caribbean

2.5. Near and Middle East

2.6. North America

2.7. Southwest Pacific

The tables in this annex show the number of local, regional transboundary and international transboundary breeds and their respective risk status by region and by country. Dependent territories are listed under the respective country. The tables will help countries to identify need for action in surveying and conservation.

2.0. Regional overview	local			regional			international			
Region	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	Total
Africa	60	221	494	4	65	25	8	262	43	1182
Asia	110	922	637	5	54	17	15	318	42	2120
Europe & the Caucasus	1229	800	734	92	153	24	44	341	38	3455
Latin America & the Caribbean	50	88	456	1	17	11	16	263	35	937
Near & Middle East	11	98	141	0	3	2	0	69	10	334
North America	59	11	52	12	4	3	20	165	5	331
Southwest Pacific	24	22	158	3	2	1	22	265	21	518
World	1543	2162	2672	117	298	83	50	428	70	7423

2.1. Africa	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Algeria	0	4	12	0	7	1	1	8	0	33
Angola	0	4	14	1	2	0	0	19	0	40
Benin	0	3	7	0	6	1	0	7	1	25
Botswana	1	3	5	1	4	1	0	41	2	58
Burkina Faso	1	4	17	0	8	2	0	20	3	55
Burundi	0	3	4	0	0	0	0	14	2	23
Cameroon	0	11	10	0	8	1	0	8	0	38
Cape Verde	0	0	0	0	0	0	0	1	0	1
Central African Republic	0	0	9	0	4	2	0	7	1	23
Chad	13	18	4	0	7	4	0	8	1	55
Comoros	0	1	6	0	1	0	0	8	0	16
Congo	0	0	3	0	2	1	1	7	0	14
Congo, Democratic Republic of	0	2	22	0	4	1	0	42	2	73
Côte d'Ivoire	0	4	6	0	6	0	0	3	0	19
Djibouti	0	0	9	0	3	0	0	1	1	14
Equatorial Guinea	0	0	0	0	1	0	0	1	0	2
Eritrea	0	2	4	1	9	2	0	3	1	22
Ethiopia	0	17	50	1	13	3	0	20	3	107
Gabon	0	0	4	0	3	1	1	10	0	19
Gambia	0	0	0	0	1	0	0	3	0	4
Ghana	2	8	10	0	7	0	0	16	3	46
Guinea	0	5	1	0	2	0	0	3	0	11
Guinea-Bissau	0	3	1	0	2	0	0	12	0	18
Kenya	0	14	12	0	7	3	1	41	2	80
Lesotho	0	2	7	0	1	0	0	23	1	34
Liberia	0	0	0	0	2	0	0	1	0	3
Madagascar	4	8	5	0	0	0	0	14	3	34
Malawi	0	2	11	0	2	0	0	25	3	43
Mali	0	7	50	0	14	5	0	32	4	112
Mauritania	0	3	3	0	7	4	0	9	0	26
Mauritius	0	1	4	0	0	1	0	14	0	20
Morocco	0	14	27	0	3	1	0	30	3	78
Mozambique	1	5	6	0	4	0	0	14	0	30
Namibia	1	0	17	1	4	0	0	41	1	65
Niger	0	1	22	0	7	2	0	5	0	37
Nigeria	0	1	13	0	14	3	0	4	0	35
Rwanda	1	0	11	0	0	1	0	32	0	45
Sao Tome and Principe	0	0	6	0	0	0	0	22	0	28
Senegal	0	8	5	0	7	1	0	23	5	49
Seychelles	0	0	1	0	0	2	0	16	1	20
Sierra Leone	0	0	0	0	1	0	0	13	0	14
Somalia	1	0	17	1	3	1	0	4	1	28

2.1. Africa	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
South Africa	25	5	36	2	6	1	2	103	9	189
Swaziland	1	11	3	0	4	0	0	14	1	34
Tanzania, United Republic of	6	24	16	0	5	4	0	28	1	84
Togo	0	6	1	0	8	3	0	17	6	41
Tunisia	0	3	5	0	1	0	0	16	3	28
Uganda	2	5	6	0	6	4	1	18	0	42
Western Sahara	0	0	0	0	0	0	0	0	0	0
Zambia	0	6	9	0	2	0	1	28	2	48
Zimbabwe	1	3	3	1	4	1	0	34	2	49

2.2. Asia	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Afghanistan	0	0	37	1	3	3	0	2	0	46
Bangladesh	3	7	38	0	6	0	0	22	5	81
Bhutan	1	11	12	0	1	0	0	11	2	38
Brunei Darussalam	0	0	0	0	0	0	0	0	0	0
Cambodia	2	7	7	1	2	2	0	4	0	25
China	28	421	111	0	10	1	4	56	6	637
India	8	100	107	0	27	6	1	41	0	290
Indonesia	4	51	73	1	4	1	2	48	13	197
Iran (Islamic Republic of)	5	23	31	0	3	1	1	17	4	85
Japan	18	22	8	1	0	0	3	36	1	89
Kazakhstan	3	12	30	0	10	0	0	19	0	74
Korea, Democratic People's Republic of	0	0	1	0	0	0	0	0	0	1
Korea, Republic of	1	6	9	1	0	0	2	33	5	57
Kyrgyzstan	1	15	10	1	7	1	1	13	0	49
Lao People's Democratic Republic	2	13	1	1	1	1	0	6	0	25
Malaysia	4	13	6	2	3	1	1	26	4	60
Maldives	0	1	3	0	0	0	0	3	1	8
Mongolia	0	36	4	0	6	0	1	10	0	57
Myanmar	2	16	1	0	1	0	0	21	0	41
Nepal	0	11	22	0	11	3	0	31	3	81
Pakistan	13	71	20	1	11	1	0	18	0	135
Papua New Guinea	1	4	4	0	1	0	0	13	0	23
Philippines	2	13	29	0	2	1	0	65	6	118
Singapore	0	0	0	0	0	0	0	0	0	0
Sri Lanka	1	10	10	0	7	1	0	34	1	64
Tajikistan	0	6	15	1	9	2	0	10	0	43
Thailand	4	6	8	2	2	1	0	1	0	24
Timor-Leste	0	0	0	0	0	0	0	0	0	0
Turkmenistan	0	3	7	0	5	3	0	6	0	24
Uzbekistan	0	6	15	0	9	3	0	11	1	45
Viet Nam	7	38	18	1	1	3	0	28	1	97

2.3. Europe & the Caucasus	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Albania	7	29	6	0	2	1	0	23	1	69
Andorra	0	0	0	0	0	0	0	0	0	0
Armenia	1	2	10	3	2	3	0	16	1	38
Austria[9]	16	13	0	3	12	0	0	28	0	72
Azerbaijan	3	1	27	4	5	3	1	8	0	52

[9] The country has established a national information system within the FABISnet network

2.3. Europe & the Caucasus	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Belarus	3	7	5	0	4	0	0	10	0	29
Belgium	27	10	28	6	14	2	2	50	2	141
Bosnia and Herzegovina	1	3	15	0	2	0	0	3	0	24
Bulgaria	9	5	25	0	5	2	1	30	0	77
Croatia	8	17	2	2	3	0	0	14	0	46
Cyprus[9]	3	10	4	0	1	0	0	11	0	29
Czech Republic	25	13	53	18	31	1	2	82	3	228
Denmark	16	4	1	0	5	0	0	40	0	66
Faeroe Islands	0	1	0	0	0	0	0	1	0	2
Greenland	0	1	0	0	0	0	0	0	0	1
Estonia[9]	4	6	1	1	4	0	0	29	1	46
Finland[9]	18	7	3	1	4	1	0	34	0	68
France	91	55	132	10	24	0	5	76	2	395
French Guiana	1	0	0	0	0	0	0	0	0	1
French Polynesia	0	0	0	0	0	0	0	0	0	0
French Southern and Antarctic Territories	0	0	0	0	0	0	0	0	0	0
Guadeloupe	0	0	0	0	0	0	0	4	1	5
Kerguélen Islands	0	0	0	0	0	0	0	0	0	0
Martinique	0	0	0	0	0	0	0	3	1	4
Mayotte	0	0	0	0	0	0	0	0	0	0
New Caledonia	0	0	0	0	0	0	0	0	0	0
Réunion	0	0	0	0	0	0	0	1	0	1
Saint Pierre and Miquelon	0	0	0	0	0	0	0	0	0	0
Wallis and Futuna Islands	0	0	0	0	0	0	0	0	0	0
Georgia[9]	2	8	14	6	7	7	0	2	0	46
Germany	128	55	2	18	53	0	6	102	0	364
Greece[9]	12	17	5	0	1	0	0	19	0	54
Holy See	0	0	0	0	0	0	0	0	0	0
Hungary[9]	9	7	64	5	13	2	1	60	5	166
Iceland[9]	2	2	0	0	3	0	0	8	0	15
Ireland[9]	11	7	14	11	10	3	10	89	4	159
Israel	0	0	3	0	0	0	1	6	2	12

2.4. Europe & the Caucasus	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Italy[9]	113	75	10	0	6	0	1	27	0	232
Latvia	1	2	7	1	8	2	0	28	1	50
Liechtenstein	0	0	0	0	0	0	0	0	0	0
Lithuania	5	8	7	0	14	1	0	34	3	72
Luxembourg	0	0	0	0	1	0	0	8	0	9
Malta	1	1	0	0	1	0	0	4	0	7
Moldova, Republic of	3	7	7	0	3	1	0	19	5	45
Monaco	0	0	0	0	0	0	0	0	0	0
Montenegro	1	1	4	1	0	0	0	3	0	10
Netherlands[9]	90	29	30	12	28	0	2	72	2	265
Aruba	0	0	0	0	0	0	0	0	0	0
Netherlands Antilles	0	0	0	0	0	0	0	2	1	3
Norway	33	8	10	0	4	0	0	6	0	61
Poland[9]	55	38	12	1	8	3	0	30	0	147
Portugal	4	28	0	1	3	0	0	9	0	45
Azores Islands	0	0	0	1	0	0	0	0	0	1
Madeira	0	0	0	0	0	0	0	0	0	0
Romania	83	7	4	6	13	0	4	36	1	154
Russian Federation	21	103	54	6	18	7	2	60	2	273
San Marino	0	0	0	0	0	0	0	0	0	0
Serbia	23	4	13	3	9	1	1	40	1	95
Slovakia[9]	27	7	1	9	19	0	1	55	0	119
Slovenia[9]	45	10	4	11	18	0	9	57	2	156
Spain	88	80	17	0	3	0	1	20	0	209
Sweden	32	13	0	3	4	0	1	35	1	89
Switzerland[9]	6	17	1	3	5	0	0	11	0	43
The Former Yugoslav Republic of Macedonia	1	4	2	0	2	0	0	10	0	19
Turkey	11	15	45	1	1	2	0	22	3	100
Ukraine	55	28	67	1	17	3	1	45	6	223
United Kingdom[9]	130	34	25	38	37	2	24	180	9	479
Anguilla	0	0	0	0	0	0	0	1	1	2
Bermuda	2	0	0	0	1	0	0	2	0	5
British Indian Ocean Territory	0	0	0	0	0	0	0	0	0	0
British Virgin Islands	0	0	0	0	0	0	0	1	0	1
Cayman Islands	0	0	0	0	0	0	0	0	0	0
Falkland Islands (Malvinas)	2	1	0	0	0	0	0	1	0	4
Gibraltar	0	0	0	0	0	0	0	0	0	0
Montserrat	0	0	0	0	0	0	0	1	1	2
Pitcairn Island	0	0	0	0	0	0	0	0	0	0
Saint Helena	0	0	0	0	0	0	0	0	0	0
Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0

2.5. Latin America & Caribean	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Antigua and Barbuda	2	2	3	0	0	1	3	36	1	48
Argentina	0	7	14	0	2	0	1	42	2	68
Bahamas	0	0	1	0	0	0	0	1	0	2
Barbados	0	0	6	0	0	0	0	20	3	29
Belize	0	0	1	0	0	0	0	0	0	1
Bolivia	2	7	8	0	8	0	0	46	1	72
Brazil	23	19	76	0	1	2	5	134	14	274
Chile	1	3	43	0	7	0	3	77	6	140
Colombia	2	14	4	1	2	0	0	44	2	69
Costa Rica	0	0	4	0	3	0	0	21	2	30
Cuba	3	5	36	1	1	0	0	48	7	101
Dominica	0	0	3	0	0	0	0	27	1	31
Dominican Republic	3	0	3	0	3	1	0	28	2	40
Ecuador	1	9	9	0	2	0	0	21	0	42
El Salvador	0	2	6	0	2	2	0	41	4	57
Grenada	0	0	0	0	0	0	0	8	1	9
Guatemala	2	1	16	0	4	1	1	62	4	91
Guyana	0	0	10	0	1	1	0	28	0	40
Haiti	0	0	9	0	2	1	0	23	2	37
Honduras	0	1	21	0	2	4	0	60	3	91
Jamaica	1	0	7	0	0	0	0	17	1	26
Mexico	5	5	25	0	4	2	0	69	2	112
Nicaragua	0	1	8	0	3	0	0	46	4	62
Panama	0	0	3	0	2	1	0	21	1	28
Paraguay	1	2	15	0	3	0	0	68	3	92
Peru	0	6	26	0	9	2	0	76	6	125
Saint Kitts and Nevis	2	0	16	0	0	0	0	11	1	30
Saint Lucia	0	0	6	0	0	0	0	18	2	26
Saint Vincent and the Grenadines	0	0	0	0	0	0	0	1	1	2
Suriname	0	0	13	0	1	1	1	47	3	66
Trinidad and Tobago	0	0	4	0	1	0	0	31	3	39
Uruguay	2	2	35	0	1	1	4	73	2	120
Venezuela	0	2	25	0	4	1	0	43	1	76

2.6. Near & Middle East	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Bahrain	0	0	1	0	0	0	0	0	0	1
Egypt	3	33	40	0	1	0	0	31	3	111
Gaza Strip	0	0	0	0	0	0	0	0	0	0
Iraq	7	8	9	0	2	0	0	19	2	47
Jordan	0	5	16	0	1	0	0	9	0	31
Kuwait	0	0	0	0	2	0	0	1	0	3
Lebanon	0	1	0	0	0	1	0	3	0	5
Libyan Arab Jamahiriya	0	1	2	0	1	0	0	2	0	6
Oman	0	2	16	0	0	0	0	5	0	23
Qatar	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	0	0	9	0	1	1	0	3	0	14
Sudan	0	36	20	0	0	0	0	11	2	69
Syrian Arab Republic	1	4	3	0	0	1	0	7	3	19
United Arab Emirates	0	0	0	0	0	0	0	0	0	0
West Bank	0	0	0	0	0	0	0	0	0	0
Yemen	0	8	25	0	0	1	0	2	1	37

2.7. North America	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Canada	26	0	15	11	3	3	3	45	0	106
United States of America	33	8	35	11	4	3	18	153	4	269
American Samoa	0	0	0	0	0	0	0	0	0	0
Guam	0	3	2	0	0	0	0	3	0	8
Johnston Island	0	0	0	0	0	0	0	0	0	0
Midway Islands	0	0	0	0	0	0	0	0	0	0
Northern Mariana Islands	0	0	1	0	0	0	0	12	0	13
Pacific Islands	0	0	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	1	1	2
United States Virgin Islands	0	0	0	0	0	0	0	2	0	2
Wake Island	0	0	0	0	0	0	0	0	0	0

2.8. Southwest Pacific	local			regional			international			Total
country	at risk	not at risk	unknown	at risk	not at risk	unknown	at risk	not at risk	unknown	
Australia	9	10	122	2	1	1	22	183	14	364
Norfolk Island	0	0	0	0	0	0	0	0	0	0
Cook Islands	2	2	2	0	1	0	0	15	2	24
Fiji	0	1	11	0	1	0	0	13	2	28
Kiribati	0	0	2	0	0	0	0	7	1	10
Marshall Islands	0	0	0	0	0	0	0	0	0	0
Micronesia (Federated States of)	0	0	0	0	0	0	0	0	0	0
Nauru	0	0	0	0	0	0	0	0	0	0
New Zealand	9	0	8	3	0	1	1	10	2	34
Tokelau	0	0	0	0	0	0	0	0	0	0
Niue	2	0	0	0	0	0	0	0	0	2
Palau	0	0	0	0	0	0	0	11	1	12
Samoa	0	0	3	0	0	0	0	21	1	25
Solomon Islands	0	1	7	0	0	0	0	27	1	36
Tonga	1	1	1	0	0	0	0	15	0	18
Tuvalu	0	3	0	0	0	0	0	5	0	8
Vanuatu	1	4	1	0	0	0	0	5	0	11