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# Number of Livestock Breeds and Plant Varieties

**Genetic diversity is essential for conserving biodiversity. It does not take an entire species going extinct for diversity to be diminished: subspecies, breeds or varieties disappearing have the same effect. The risk for this to happen has increased in recent decades, as agriculture has been focusing on breeding and cultivating only a few breeds and varieties for the sake of maximum yield. Breeds and varieties that—measured by liters or kilograms produced per year—proved to be less profitable or more susceptible to diseases have been ousted from productive livestock keeping and commercial growing. For this reason, special efforts are being made to preserve heirloom breeds and varieties and their specific genetic properties.**

**The Z1 indicator provides a synopsis of both herdbook-registered livestock breeds bred in Switzerland and crop plant varieties of select species earmarked for preservation.**

**Status: August 2014**

**Contents**

Genetic diversity plays a pivotal role in biodiversity. However, since genetic information on plants and animals in the wild is still scarce, Z1 and Z2 indicators are limited to genetic diversity among plant varieties and livestock breeds used in agriculture. While Z1 merely lists the number of varieties and breeds found in Switzerland, it is closely linked to Z2, which assesses the importance of breeds kept and varieties grown in this country.

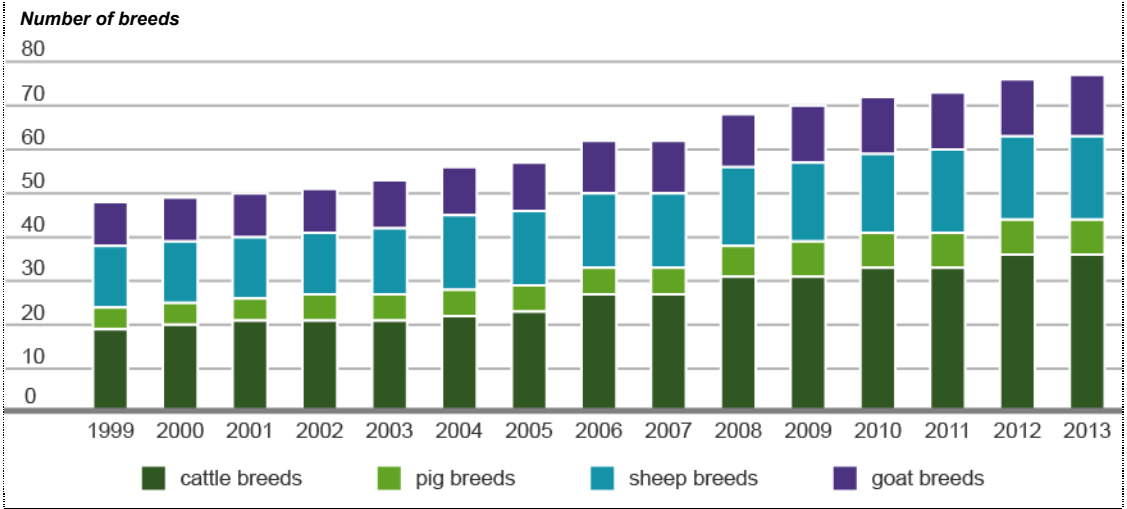
# Development in Switzerland

## Livestock breeds

Federally recognized breeders' organizations keep herdbooks for individual breeds. Such herdbooks record each breeding animal's bloodline, identification, performance and quality features, and physical appearance. Breeds are sometimes subdivided into so-called "sections". For example, Spotted Cattle is subdivided into the Simmental (the original form of all Spotted Cattle), Spotted Cattle, and Red-Holstein sections. Another example: Brown Swiss derive from Original Swiss Brown, and together these two sections now form the Brown Cattle breed. However, the transition from sections to new breeds is often fluid.

Figure 1 below illustrates the number of cattle, pig, sheep and goat breeds registered in Swiss herdbooks since 1999 (for data tables listing individual breeds please refer to the Appendix).

**Fig. 1: Number of cattle, pig, sheep and goat breeds registered in Swiss herdbooks**




© BDM (Z1 indicator). Data sources: Federal Office for Agriculture FOAG, Swiss Beef Cattle, Pro Specie Rara. Status: August 2014

### Comments

- While only a small proportion of the breeds kept in this country originate here, Switzerland bears particular responsibility for these few breeds. The federal government has set up dedicated conservation programs to promote livestock breeds that have been bred in Switzerland for at least 50 years and are considered to be endangered by international criteria. Likewise, the state has set up support programs for breeds that, even though not acutely endangered at this time, have steadily been dwindling in numbers for several years. In certain cases, Switzerland's particular responsibility is

restricted to just one section of a breed. True to its name, the Original Swiss Brown, for example, originates in Switzerland, but nowadays, it only accounts for a minor proportion of Brown Cattle. For this reason, only the Original Swiss Brown section is subsidized by federal funds.

- Until 1999, Switzerland's federal government only supported the breeding of official Swiss breeds (4 cattle breeds, 2 pig breeds, 4 sheep breeds, 8 goat breeds). When the Swiss Ordinance on Livestock Breeding came into force on January 1, 1999, this limitation was abandoned, allowing the breeding of non-Swiss breeds to be subsidized as well. Replaced by an updated version on October 31, 2012, the new Ordinance also assigns responsibility for livestock breeding to federally recognized breeders' organizations, with the state setting the guide rails by reserving the right to recognize such organizations and by regulating artificial insemination. Due to the far-reaching effects of the new Ordinance on Livestock Breeding, the Z1 indicator only considers data collected as of 1999.
- As a result of the new Swiss Ordinance on Livestock Breeding coming into force in 1999 and import restrictions being lifted in 1995, the number of breeds registered in herdbooks has been increasing since 1999. Switzerland's federal government subsidizes breeders' services offered by recognized breeders' organizations regardless of breed. Contrarily to past practice, the state no longer stipulates breeding objectives, either. Nowadays, such objectives are determined by each individual breeders' organization. These activities are complemented by the efforts of the Swiss NPO *Pro Specie Rara* which focuses on the recognition and preservation of heirloom breeds.
- All sheep breeds are closely related by genotype, mainly differing by phenotype. Since the 1960s, many breeds have been merged into one due to their very high genetic similarity. The same can be said for goats, particularly the Chamois-Colored goat.
- The increase in the number of cattle breeds from 19 to 36 must mainly be attributed to beef breeds.

# Additional data

In 2002, Switzerland's federal government had a report on livestock breed diversity in Switzerland established for the Food and Agriculture Organization of the United Nations (FAO). Based on data collected in 1996, the report also covered poultry and rabbit breeds.

**Tab. 1: Number of poultry and rabbit breeds**

| Livestock species | Number of herdbook-registered breeds in 1996 | Herdbook-registered Swiss breeds in 1996 |
|---|---|---|
| Chicken | 87 | 57 |
| Pigeons | 90 | 25 |
| Rabbits | 36 | 33 |

© BDM (Z1 indicator). Data source: Federal Office for Agriculture FOAG. Data status: 1996

### Comments

- In order to qualify as a Swiss breed, a breed must have originated in Switzerland, be proven to have been bred in Switzerland for at least 50 years ("traditional breed") or 20 years ("new breed"), and its population needs to include enough animals fit for breeding.
- Most rabbit breeds have been bred in Switzerland for many years, so they are considered to be Swiss breeds. Out of all rabbit breeds that are kept in this country, only three do not qualify as Swiss breeds: Petit Argenté, Californian, and Petit Papillon tricolore. However, Switzerland bears particular responsibility for conserving the Perl Feh and Renard breeds, since they are traditional Swiss breeds.
- Likewise, most chicken breeds are considered to be Swiss breeds, even though only three have originated in Switzerland: the Appenzell Bearded Hen, the Appenzell Pointed Hood Hen, and the Swiss Hen.
- There are five bee breeds being bred in Switzerland: Carnica, Mellifera, Ligustica, Caucasica, and Buckfast. However, these mix by natural interbreeding. In 2004, a project was launched to conserve the Dark European Honeybee (*Apis mellifera mellifera*).

### Source

Federal Office for Agriculture FOAG, 1998: *Konzept zur Erhaltung der Rassenvielfalt bei den landwirtschaftlichen Nutztieren in der Schweiz* (not available in English), final report of the Livestock Genetic Resources team, FOAG, Bern. 31 pages.

### Status

1996. Poultry and rabbit breed data are not scheduled to be updated at this time.

# Crop plant varieties

Referring to the Swiss National Database (www.bdn.ch, data status May 2014), all information given here is based on positive lists posted on the Web, i.e. lists of all varieties meant to be preserved by the FOAG's National Action Plan for the Preservation and Sustainable Use of Plant Genetic Resources in Nutrition and Agriculture (NAP-PGRNA), provided their identity has been verified and at least one accession of each is available in a primary plant collection. In this case, accession means entry of one specimen in a primary plant collection.

The NAP-PGRNA program is restricted to:

- Swiss varieties. A Swiss variety is defined to be a variety that has originated or been cultivated in Switzerland, has a local name based in Switzerland, or can no longer be traced to an origin abroad.
- Endemic wild plants used for agricultural and nutritional purposes (collected or grazed, as a food resource for humans or animals).
- Endemic wild plants serving as predecessors of crop plants.
- Foreign varieties that play a cultural role in Switzerland, meaning crop plants that have been cultivated in Switzerland for generations, are connected to some traditional use, or have a certain importance for one particular region.

In addition, the NAP-PGRNA program includes:

- Rare foreign varieties, i.e. varieties that occur on less than five sites in Switzerland and are not being preserved by any official project in their country of origin.
- Accessions whose names are unknown, nameless varieties, or varieties known by a collective name.
- Special genetic material such as curios, mutants, etc. This category covers genetic material that cannot be attributed to any other program category, but does have original genetic properties.

As a rule, data are restricted to varieties of species also covered by the Z2 indicator. At this time, the Swiss National Database is still under construction, with both new species and varieties being added and established lists being verified and adjusted. For this reason, the Z1 indicator does not publish any change data yet, as this would primarily document progress made in completing the database.

**Tab. 2: Number of species with accessions included in positive lists in 2013**

| Plant species | Number of varieties |
|---|---|
| Potatoes | 38 |
| Apples | 819 |
| Pears | 848 |
| Vines | 134 |
| Barley | 733 |
| Rye | 18 |
| Spelt | 296 |
| Wheat | 426 |
| Corn | 303 |

**Comments**

- The significance of these figures must be assessed in relation to each variety's crop area (cf. Z2 indicator). Out of more than 800 listed apple varieties, only about five (including cider apples) are of any consequence in commercial fruit growing, with each variety having a share of at least 5%. Lowering that threshold would not bring about a fundamental change in the overall picture, either. While the diversity of crop plant varieties is immense, cultivation is confined to a select few.
- The situation is basically similar as regards pears (four major varieties) and vines (with four red vines and three white vines claiming a share of at least 5% each).
- The number of varieties of a species present in Switzerland (i.e. varieties that are being cultivated or have been included in a plant collection) is likely to be higher than the number indicated in Table 2. On the one hand, not all varieties of a species are entered in the corresponding positive list of the Swiss National Database, even if they are of great significance in cultivation. For example, the FOAG's report on wine production in 2013 *(«Weinjahr 2013»)* (Bundesamt für Landwirtschaft (BLW) / Office fédérale de l'agriculture (OFAG), 2014) lists 239 different vine varieties, while the vine positive list holds only 134. On the other hand, it cannot be excluded—as a matter of fact, it must be assumed—that positive lists comprise several genetically identical varieties under different names, which will eventually be eliminated after verification. The potato positive list, for one, included 97 varieties in 2009. After verification and adjustment, that number dropped to 38 in 2014. The apple positive list includes 819 varieties in 2014. However, another 843 varieties are in consideration for the positive list and need to be examined.

## Significance for biodiversity

Conserving livestock breeds and crop plant varieties saves the genetic diversity of the organisms we depend on for food production. Genetic diversity harbors an important response potential in case of parasite infestations, infectious diseases, or epidemics, since some breeds/varieties are better equipped to overcome certain diseases than others. The same goes for changes in climate: certain breeds/varieties are bound to display a better ability to adjust to shifted climatic factors than others.

Once a breed or variety goes extinct, it disappears forever, unless germinal cells, seeds, tissue, plants or plant parts have been preserved before. The extinction risk currently faced by a breed/variety and whether that risk has increased or diminished is reflected by a breed's/variety's population size (cf. Z2 indicator). Switzerland's farmers used to keep only 18 different hoofed livestock breeds (4 cattle breeds, 2 pig breeds, 4 sheep breeds, and 8 goat breeds), all of them official Swiss breeds subsidized by the federal government. When Switzerland ratified the Convention on Biological Diversity, putting it into force in 1995, the country committed itself to supporting the conservation of genetic resources. Since then, rare and endangered cultural breeds/varieties, either originally or traditionally bred in Switzerland, are being monitored and subsidized by specific programs. At the same time, the GATT treaty of 1995 made it easier to import new breeds/varieties, no longer requiring a special permit for each and every import. Moreover, the new Swiss Ordinance on Livestock Breeding, which took effect in 1999, brought about a crucial change in relaxing breeding regulations. Recognized breeders' organizations now receive subsidies for breeding any breed rather than a select few, increasing the incentive to introduce new breeds. In addition, breeders' organizations are now allowed to determine breeding objectives themselves, which makes for more diverse breeding. Finally, people have been beginning to realize that production performance should not be the only criterion emphasized in selecting animals for breeding, becoming conscious of the fact that they will benefit from genetic diversity within a breed as well. For all of these reasons, it is at present unlikely for any of the livestock breeds covered by the Z1 indicator to go extinct in Switzerland, unless the population size is very small (few individuals, no commercial—but of emotional value).

However, genetic diversity not only depends on the number of breeds, but also on the number of sires involved in the reproduction of a breed. In the old days, for example, every village used to have its own bull, which literally shaped the local herd. Today, anybody can order the semen of any bull, as artificial insemination has become the rule since the 1980s. But as farmers all over Switzerland tend to prefer the same bulls, i.e. those labeled "best of breed", the number of sires decreases, and along with it genetic diversity.

Other than having specific genetic properties, breeds or varieties may also be of particular ecologic, economic, or cultural/historical significance. Eringer cow fighting, to name but one prime example, is a sociocultural event in the canton of Wallis each spring.

Looking at crop plants, the situation is completely different, as the number of varieties surpasses the number of breeds by far, making it all the more challenging to identify, describe, and conserve them. Yet by ratifying the "International Treaty on Plant Genetic Resources for Food and Agriculture", which took effect in this country in 2005, Switzerland has incurred an obligation in this area as well. Among other things, it will take part in developing and constructing a global information system on plant genetic resources used in nutrition and agriculture.

# Definition

Changes in the numbers of all livestock breeds and crop plant varieties recognized in Switzerland. For reasons of practicability regarding livestock breeds (available data), the indicator is restricted to cattle, pigs, sheep and goats for the time being.

The indicator is calculated to represent both the total number of all livestock breeds and individual livestock species.

A livestock breed is considered to be any homogeneous group of farm animals differentiated from other groups within the same species by predefined visible features.

For the purposes of the Z1 and Z2 indicators, farm animals are considered to belong to a certain livestock breed or species if they are registered in a herdbook kept by a federally recognized breeders' organization.

As regards crop plants, the indicator is calculated to represent the total number of varieties of select species deemed to be worthy of preservation by the National Action Plan for the Preservation and Sustainable Use of Plant Genetic Resources in Nutrition and Agriculture (NAP-PGRNA) and covered by preservation measures.

# Surveying methods

Breeders' organizations keeping records of the population size of a breed must be recognized by the federal government. Such herdbooks need to contain statistical and historical information on bloodlines, identification, performance and quality features as well as the physical appearance of a breed's or breeding population's breeding animals. The Federal Office for Agriculture FOAG collects and compiles this data on an annual basis. Additional data is supplied by Swiss Beef Cattle, Pro Specie Rara, and Swissherdbook.

Crop plant data is based on the Swiss National Database (www.bdn.ch) of the FOAG's National Action Plan for the Preservation and Sustainable Use of Plant Genetic Resources in Nutrition and Agriculture (NAP-PGRNA) as managed by the Swiss Commission for the Conservation of Cultivated Plants CPC. Evaluations are made using positive lists posted on the Web, which include all varieties meant to be preserved by the NAP-PGRNA program (VARCONSERSTAT descriptor must read "yes"), provided their identity has been verified (VARVALIDITY descriptor must read "yes"), and accessions are available in primary plant collections (descriptor GLOBACCVAR >0).

# Further information

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**Related indicators**

> Z2 “Proportion of Livestock Breeds and Plant Varieties”

**Additional sources of information**

> www.blw.admin.ch/index.html?lang=en website of the Federal Office for Agriculture FOAG

> www.cpc-skek.ch website of the Swiss Commission for the Conservation of Cultivated Plants CPC

> www.bdn.ch/?set_language=en&cl=en database of the National Action Plan for the Preservation and Sustainable Use of Plant Genetic Resources in Nutrition and Agriculture (NAP-PGRNA)

> www.prospecierara.ch *Pro Specie Rara*, the Swiss Foundation for the Cultural and Genetic Diversity of Plants and Animals (no information in English)

> www.mutterkuh.ch/en/ Swiss Beef Cattle, the Swiss Association of suckler cow husbandry

> www.admin.ch/ch/d/sr/916_310/index.html Swiss Ordinance on Livestock Breeding (not available in English)

> www.blw.admin.ch/themen/00013/00082/00087/index.html?lang=de list of recognized breeders’ organizations in Switzerland (pdf not available in English)

> www.admin.ch/ch/d/sr/i9/0.910.6.de.pdf International Treaty on Plant Genetic Resources for Food and Agriculture (not available in English)

**Bibliography**

> Federal Office for Agriculture FOAG, 1998: *Konzept zur Erhaltung der Rassenvielfalt bei den landwirtschaftlichen Nutztieren in der Schweiz*, final report of the working team for genetic resources of livestock. FOAG, Bern. 31 S. (not available in English).

> Bundesamt für Landwirtschaft (BLW) / Office fédérale de l’agriculture (OFAG), 2014: Das Weinjahr - L’année viticole 2013. Bern, 46 S. (not available in English).

**Additional non-illustrated appendices**

> Breeds registered in herdbooks kept by breeders’ organizations recognized by the FOAG

*This information is based on the German language document 1260_Z1_Basisdaten_2013_v1.docx dated April 22, 2015.*