

Rationalization and further development of European livestock genebank collections

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Many local breeds in Europe are at risk of extinction (FAO, 2019). Hence a genetic reserve in the form of gene bank collections is crucial to be able to adapt to future changes in markets, climate or production systems. European countries have developed animal germplasm collections as a security back up and genetic reserve for breeding and research. The challenge ahead for such an ex situ in vitro conservation strategy is demonstrated by SDG indicator 2.5.1 'the proportion of local breeds for which sufficient genetic material is stored in gene bank collections for long term conservation'. IMAGE survey data shows that for many local breeds the amount of genetic material stored is still limited. The IMAGE project has undertaken rationalization case studies, in order to evaluate national gene bank strategies and objectives, to assess the genetic diversity captured in gene bank collections compared to diversity in live breeding populations, and to monitor changes in genetic diversity over time. In addition to national gene banks, universities and research institutes harbour a large variety of DNA and tissue collections. Future research and breeding would benefit from better integration and access to data of both germplasm and DNA/tissue collections. From an economic point of view, Europe should aim for an optimized European genetic reserve, minimizing costs, maximizing genetic diversity stored, and maximizing the options for future benefits. Within IMAGE, we developed a mathematical model to illustrate alternative scenarios. IMAGE also demonstrates differences between gene banks regarding their state of development. Quality management principles should be implemented by all gene banks, considering sampling strategies, conservation methods, legal aspects, data management and use policies. IMAGE results will be integrated in future work of the European Gene Bank Network for Animal Genetic Resources (EUGENA). The IMAGE project received funding from the EU H2020 Research and Innovation Programme under the grant agreement n° 677353.