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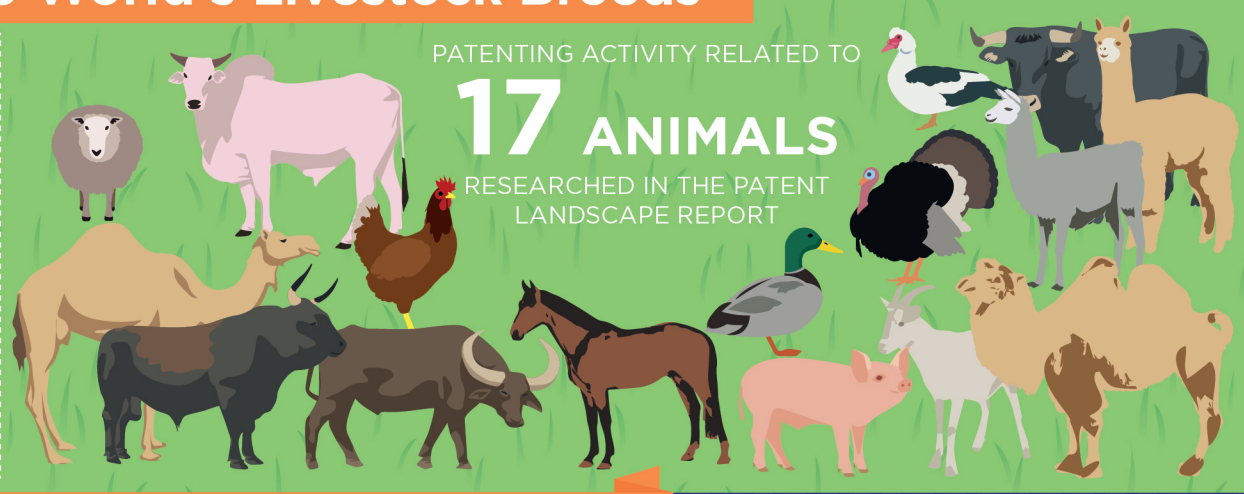
ANIMAL GENETIC RESOURCES PATENT LANDSCAPE REPORT

State of the World's Livestock Breeds

8,774
ANIMAL BREEDS GLOBALLY

17%
OF BREEDS AT RISK

PATENTING ACTIVITY RELATED TO
17 ANIMALS
RESEARCHED IN THE PATENT LANDSCAPE REPORT



Milestones in Animal Breeding

1890:
First experiments in embryo transfer using rabbits

1900

1920s:
Modern artificial insemination techniques developed

1975:
First report of successful superovulation in cattle and sheep using gonadotropins in advance of estrus

1978:
Fertilization of oocytes matured in vitro in cattle; superovulation advances reported using follicle-stimulating hormone

1980:
DNA microinjection used to create transgenic mouse

1997:
Dolly the Sheep becomes first animal clone using somatic cell nuclear transfer

2000

2004:
Chicken genome sequenced; creation of pigs for xenotransplantation of cells and organs into humans

2009 to present:
Cow, horse, domesticated turkey, pig, yak, zebu, mallard duck, domestic goat water buffalo, Muscovy duck and alpaca genomes sequenced

Tech Clusters Involving Animals and Animal Genetic Research

Biotechnology **41.5%**

Medicines, organic ingredients **20.9%**

Immunoassay/gene therapy **19.6%**

Fodder/foodstuffs **15.1%**

Stem cells **14.3%**

Animal husbandry **11.7%**

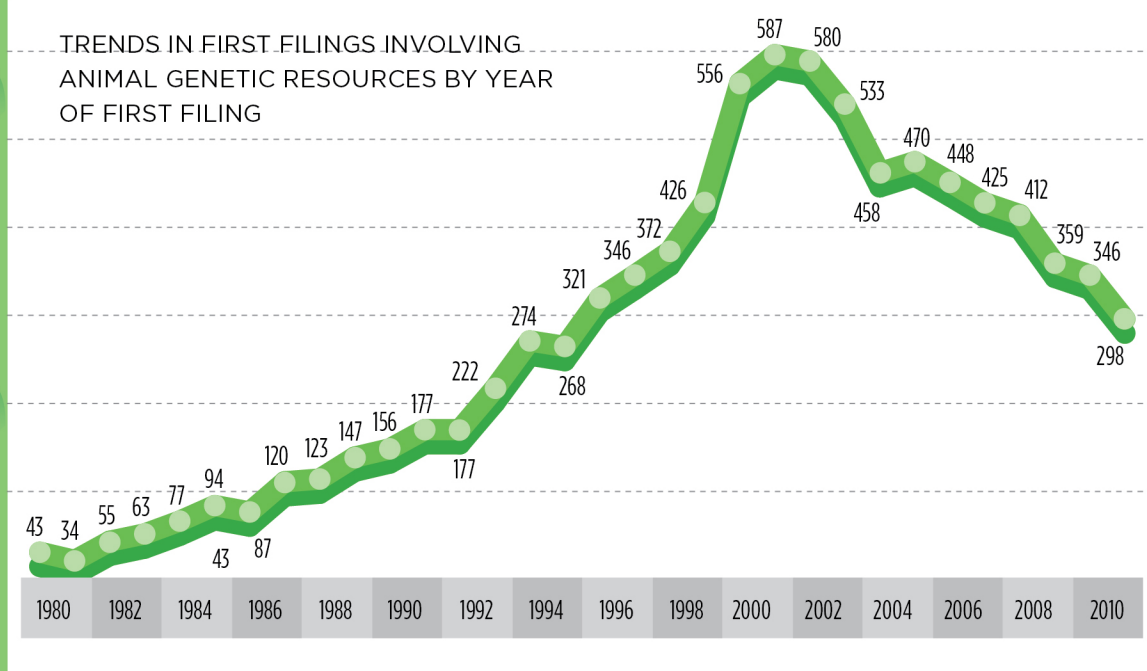
New breeds of animals **10.3%**

Investigating /analysing materials **7.8%**

Cooking equipment **0.6%**

Trends in Patent Filings

TRENDS IN FIRST FILINGS INVOLVING ANIMAL GENETIC RESOURCES BY YEAR OF FIRST FILING



Why the decline?

- Tightening of rules on DNA patents
- A lack of markets for GM farm products
- The dot.com "bubble" burst in 2001, negatively impacting investments in biotechnology.

Categories of Patent Activity related to food and agriculture

- Artificial insemination, sex selection and control of estrus
- Marker assisted breeding
- Transgenic animals
- Animal cloning
- Xenotransplantation
- Animal models

Report Conclusions

- Products from transgenic animals focus on medical proteins rather than food.
- Genomic selection and genomic indices are replacing phenotypic selection. Rise of synthethic biology and genome editing
- Patent activity concentrates on dominant breeds rather than genetic material from rarer breeds or traditional knowledge.
- The completion of genome sequencing projects for livestock animals may lead to integration with patent activity for software and business methods.

THE REPORT IS AVAILABLE AT http://www.wipo.int/patentscope/en/programs/patent_landscapes/reports/animal_gr.html