



## Open-Source Seeds and the Tomato cultivar Sunviva

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*The ecological outdoor tomato project; Photo: B. Horneburg*

Open source was developed as an answer to the increasing privatisation of common goods (commons). On 26th April 2017, a new initiative was presented in Berlin to legally protect seed varieties as a common property. In cooperation with the NGO “Agrecol”, the Section of Genetic Resources and Organic Breeding of the University Göttingen and the seed producer “Culinaris – Quality Seeds for Wholesome Food, Germany” was introduced as new service provider for Open Source Seeds and the first Open Source Seed licensed cultivar, the cocktail tomato Sunviva was presented to the public.

Over several years a working group of Agrecol has searched for possibilities to develop and apply an open source principle for cultivars like it is

used already in information technology. Plant breeders, agronomists and lawyers together developed a license which offers an alternative to the common intellectual property rights in the seed selling sector and prevents privatization. This allows the unlimited use of seed varieties without any variety protection or patent (Kotschi and Rapf 2016).

### **From common goods to privileged few**

Agricultural seed varieties have been developed as a common good accessible for all over thousands of years. This led to a rich diversity of crops and their varieties. Only with the advent of scientific plant breeding at the end of the 19th century this practice changed. Since then, plant breeding

and agriculture have become increasingly separate.

From today's point of view, this development is ambivalent. The scientific plant breeding allowed enormous increases in yield and quality and with that the intensification of agriculture. At the same time, it led to a growing privatization of plant genetic resources. This alone might not be a problem, but privatization was accompanied by a market concentration that has now become monopolistic traits. This monopolization is so threatening because it leads to the reduction of genetic diversity and to one-sidedness in agricultural production. It also creates a growing dependency of seed users (and society as a whole) on a few companies. Thus, agriculture and food security are endangered in their sustainability.

### The Task: Diversity instead of standardization



*Tasting within the ecological outdoor project; Photo: B. Horneburg*

Standardization is the opposite of what we need to cope with the great challenges of the future. Instead of fewer crops and less varieties with a wide distribution, we need large diversity. First of all we need not only varieties for fertile regions, but also those that bring good yields on poorer soils and under difficult climatic conditions. Secondly we need a diversity of solutions to adapt agriculture to climate change and to achieve food security. Thirdly we need varieties which are less

dependent on chemical plant protection by optimally utilizing the respective site-specific ecological potentials. In this way, it is possible to produce high food quality, to reduce the environmental impact of agriculture and to obtain ecosystem services such as clean air, drinking water or recreational areas. We achieve all this through a great biological diversity, which the private seed sector increasingly cannot provide. Therefore, in addition to the private sector, a commons based seed sector is needed.

### Non-Profit Plant Breeding

While in Central Europe state-subsidized, public plant-breeding has been steadily declining over the last decades, numerous civil society breeding initiatives have emerged in Central Europe. They pursue the goal of breeding suitable varieties for organic farming and organic horticulture. This second group could be called "biodiversity conservationists", is devoted to the conservation of rare crops, the conservation and development of old varieties. These initiatives are organized as non-profit associations, cooperatives and foundations, but also as companies or informal networks that pursue non-for-profit goals. Many of them dispense with a plant variety varietal protection in breeding and seed production and with that they make their varieties available to all. This generosity however, also makes it possible to make it a private good. In this way, common goods are created, but not preserved as such.

### The License

This is where the Open Source Seed License starts. With the license Agrecol found a way to keep a seed as a common good. Open-source means that the seed is available unrestricted by various forms of intellectual property rights, such as patents or variety protection. At the same time, open-source is not identical to open access, the completely free and unregulated access. Rather, it is about preserving a good as a common property, that is, to protect it from privatization.

The seed license now allows the licensee to use the seed for its own purposes, to multiply it, to pass it on, to breed with it, and to spread the multiplied or developed material. At the same time, the licensee undertakes to grant future owners the same rights as he / she has enjoyed for the seeds and their further development. This obligation is viral and is also referred to as a copyleft clause, since not only the licensed seed itself, but all its further developments fall under this clause. Licensees become licensors and the license secures a common property that can no longer be transferred to a private property. The open-source seed license developed by Agrecol is a sui generis contract, which is based on the Civil Code. The contract also implicitly refers to the genetic information inherent in the material.



## How to finance Open Source Seeds?

It is frequently argued that it is not possible to finance the breeding of open seeds licensed varieties, since plant breeding is only possible through income from variety- or patent rights. However, if breeding is required, which is based on agro-ecological diversity and not on large-scale, uniform distribution, the income from varietal and patent protection is low in any case. For example, a study on the financing of organic cereal crops showed that income from cultivating varieties in the best case covered 12% of the cost of breeding (Kotschi and Wirz 2015). From this point of view, ecological plant breeding is not an economic, but rather a whole-society task, whereas the production of seed as a service is clearly economic - also from open-source seed.

Therefore, new financing concepts are required. This includes making the state more involved, and also involving society along the value chain. "Crop development contributions", which are negotiated with seed producers and farmers, a breeding cent that is traded in trade and processing, as well as state breeding funds and funds of foundations point towards an alternative. The funds generated so far for commons based plant breeding are still too small, but they are increasing year after year. The majority of organic producers of cereals and vegetables in Europe are acting in this way.

## The Tomato Sunviva



Seed ling of Sunviva; Photo B. Horneburg

The cocktail tomato Sunviva was the first - but not the only - cultivar to be endowed with the open source seed license. Sunviva was jointly bred in the network of the organic outdoor tomato project, which was launched in

2003 at the University of

Göttingen as a participatory organic breeding program and covers the entire value chain. It is based on the free exchange of knowledge and tomato genotypes and serves the methodological improvement of organic plant breeding (Horneburg 2010). Breeding lines are tested and selected in many gardens, marked gardens and research- and consultancy facilities. The tomatoes

developed here are adapted to hard outdoor conditions and have improved field resistance to the late blight (*Phytophthora infestans*).



Seed bag Tomato Sunviva; Photo B. Horneburg

## OpenSourceSeeds

OpenSourceSeeds, a new service provider, supports plant breeding, seed propagation and agriculture to protect newly developed cultivars from patenting, to use as a common property and to keep it as such. We hope that many not-for-profit plant breeders will make use of this opportunity so that in addition to powerful private seed farming, a seed-based seed sector can be established which provides the necessary diversity of efficient crops and cultivars to their right.

## More Information:

OpenSourceSeeds

[www.opensourceseeds.org](http://www.opensourceseeds.org)  
[info@opensourceseeds.org](mailto:info@opensourceseeds.org)

## Literature

Horneburg, B., 2010: Participation, utilization and development of genetic resources in the Organic Outdoor Tomato Project.  
[http://orgprints.org/18171/1/Breeding\\_for\\_resilience%2DBook\\_of\\_abstracts.pdf](http://orgprints.org/18171/1/Breeding_for_resilience%2DBook_of_abstracts.pdf)

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Kotschi, J. und K. Rapf (2016): Liberating seeds with an open source seed license. Working paper. Agrecol.  
[http://www.opensourceseeds.org/sites/default/files/downloads/Liberating\\_seeds\\_with\\_an\\_Open\\_Source\\_Seed\\_license.pdf](http://www.opensourceseeds.org/sites/default/files/downloads/Liberating_seeds_with_an_Open_Source_Seed_license.pdf)

## Dutch Rare Cattle Breeds Threatened by Phosphate Laws

Source: <https://www.slowfood.com/dutch-rare-cattle-breeds-threatened-phosphate-laws/> und SZH



*The Groninger Blaarkop are nicknamed 'Polderpanda' due to their striking similarity to the Giant Panda „Polderpanda“ genannt.  
Foto: Slow Food image library*

Phosphate pollution is an issue that the European Union takes very seriously. National quotas are imposed on Member States which are met with penalties should they exceed them. However, as part of the EU's Emission Trading Scheme, countries with lower phosphate production are able to sell some of their quota to more productive countries which would otherwise exceed them. This is important for the dairy sector in the Netherlands (which creates millions of tons of phosphate annually). The Dutch parliament debates the matter of national phosphate restrictions, which could result in farmers being restricted to a fixed number of animals.

Up to the 31<sup>st</sup> March 2015, a milk quota in place in the European Union was in place, which restricted milk production. But since it was lifted, industrial dairy producers in the Netherlands expanded their operations, leading to an excess in phosphate pollution, because cows raised in the intensive, industrial

dairy system eat feed which contains very high levels of phosphorous and nitrogen, more than their digestive system can handle, and thus, they are expelled in manure. Intensive farms are thus major sources of phosphate and nitrate pollution, which seeps into the groundwater. Now, the Dutch government is planning to reduce the number of dairy cows in the country by as much as 8% – yet this strategy is riddled with holes that will render damaging to the country's agricultural biodiversity. The rare cattle breeds, which account for only 0.25% of the total population, as they produce less milk (and less phosphate), will be under the most pressure if total numbers are to be reduced.

The dairy industry can buy phosphate quotas from smaller producers. This inevitably leads to an increase in the industrial mainstream cattle like the Dutch-American "Holstein Friesian" (which are kept indoors, milked by robots and constantly fed). The less productive traditional breeds such as "Gron-



inger Blaarkop" and "Lakenvelder" are once again under economic pressure.

The Stichting Zeldzame Huisdierrassen (SZH – Foundation for Rare Breeds) launched a crowdfunding campaign, and with the support of 590 donors, raised €16,000 in four days and saving hundreds of Dutch rare breed cattle from the slaughterhouse. The SZH will continue to make objections against the proposed new laws because they are implicitly unjust. The SZH states that rare breeds should not be compared with high-yield cows but appreciated for their own qualities, and should enjoy exemption status from the restriction given their value to biodiversity.



Dutch-American "Holstein Friesian"; Photo: <http://cattleinternationalseries>

There are other curious aspects of the Dutch government's strategy: calves imported for veal are not subjected to the phosphate quota, while calves bred extensively, suckled by their own mothers, are subject to the quota. Those farmers who have maintained their traditions for centuries are being punished for not adopting industrial production methods. The very idea of any new small-scale farmers entering the sector to support rare breeds is now unthinkable, so any such farmers who do abandon these breeds out of economic necessity will not be replaced.

Reurt Boelema, coordinator of the Slow Food Presidium for Lakenvelder cattle, explains "people know that farming is not simply a mechanical operation, where you put Unit X (feed) into Unit Y (animal) and take out Unit Z (beef, milk) and dispose of the unwanted by-products like Unit M (manure). Agriculture is landscape, animal welfare, the environment, food safety, bio security. And manure is just something that is needed in between the animal and the crop or grass. If you have land, manure is needed, not waste. Agriculture should be focused on that circle."

"The small-scale extensive sucker cattle farmers have to compete for their phosphate rights with intensive large-scale dairy farmers. While the latter group has grown over 10% in terms of production in the last five years, the former group has decreased by 40%."

It is ironic, of course, that at the same time as pursuing their phosphate reduction plan and the new phosphate rights, the Dutch government elsewhere promotes more sustainable, organic agriculture, and local food systems, as the current approach to phosphate reduction will damage traditional agriculture. Even if the correct level of phosphate emissions is reached, simply achieving one numerical target does not solve the problem as a whole. There are many other pollutants related to agricultural production: nitrates, ammonia, methane.

Slow Food urges the Dutch government to reconsider the nature of phosphate quotas in the country. The work small-scale farmers raising rare breeds are doing to protect biodiversity, cultural heritage and long-standing agricultural traditions must be taken into before imposing strict quotas that will threaten their livelihoods. Meanwhile the factory-scale dairy industry is free to continue unabated, as they can afford to buy the right to produce more phosphate in emissions trading schemes.

On the 6th of June the SZH gave a 'letter of emergency' to the Dutch government where they asked the Government to take more responsibility and for more financial support for the SZH.

**Remark:** In the final report of the „Preparatory action on EU plant and animal genetic resources" is concluded at page 79 'The legal basis for payments for agri-environmental measures (including payments for grassland and rare breeds or traditional/conservation varieties), organic farming (closely related to agrobiodiversity) and Natura 2000 (established to protect biodiversity) are in place. However, in some countries, e.g. the Netherlands, rural development measures hardly address genetic diversity objectives.'

[https://ec.europa.eu/agriculture/sites/agriculture/files/external-studies/2016-preparatory-action-eu-plant-and-animal-genetic-resources/final-report\\_en.pdf](https://ec.europa.eu/agriculture/sites/agriculture/files/external-studies/2016-preparatory-action-eu-plant-and-animal-genetic-resources/final-report_en.pdf)

## Ethics and Biodiversity



*Leinesheep, Germany; Photo: SAVE Foundation*

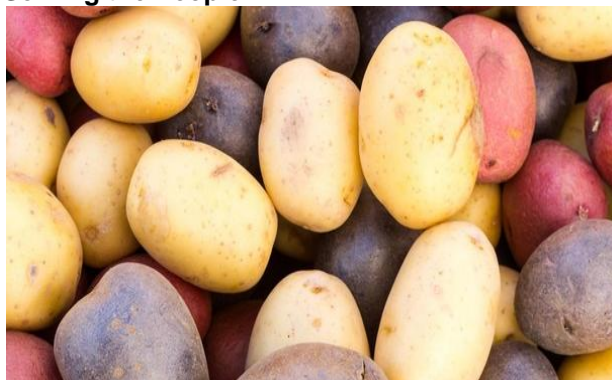
Modern Agriculture has an impact on Biodiversity. This raises ethical questions. Researchers at the INRA (Institut national de la recherche agronomique) in France got to the bottom of this matter. They published their findings in the book series "Natures Sciences Sociétés" under the title "Éthique et biodiversité: questions posées à et par la recherche agronomique". The central question behind the research is: Are we allowed to change or eradicate species just for human requirements?

The aim of every agricultural activity is the adequate production of food – but at what price? The technical advances are enormous, and fascinating for scientists. However, the use of genetic engineering leads to far-reaching consequences. This raises fundamental questions, such as: Why should we accept the growing biodiversity impoverishment?

The term "biodiversity" means genetic diversity, diversity of species and ecosystems typical for a region. A regional agricultural system is not an isolated system in space. It has an influence on the surrounding economy. In almost all industrialized countries, biodiversity has declined in the last decades as much as the industrialization of agriculture was growing. The choice of the agricultural system and its integration into the local biodiversity reflects social values. A purely industrial, engineered agriculture is not without any alternative. Agricultural ecology reconciles biodiversity and agriculture. Any further technical progress needs to be reflected against the background of ethical values. One of the solutions proposed by the authors is the consistent use of synergies between agriculture and biodiversity, such as pollination or biological pest control.

According to the study, agricultural research has hitherto been too much directed at human food production and far too little to the needs of the animals and plants concerned. Food production is subject to industrial processes, markets and marketing strategies, although the production of plants and breeding of animals is much more complex. One-dimensional production presupposes the control of processes which is not actually possible with living organisms. According to the authors, the integration of biodiversity is therefore more important than many technical achievements of the last decades, which led to a dead end, as, for example, the never-ending use of pesticides in industrial agriculture. Some pesticides are, for example, suspected of being complicit in the massive bee mortality. But the bees are of great importance for the pollination in agriculture – have we shot ourselves in our own foot? The scientists at INRA are vehemently calling to bring biodiversity back on board as a co-pilot, to stop the wandering in the dark. Nature controls itself.

### Serving the People



*Potato diversity; Photo: [www.transgen.de](http://www.transgen.de)*

Traditional agricultural research is aimed at providing enough food for a growing world population. This is legitimate, because famines were and are a terrible threat. Agricultural research has reduced crop losses and increased production. But humans defined which species and varieties are useful. And vice versa, man also decided which plants or animals are superfluous and which are even harmful. put biodiversity through an economic cost-benefit analysis. However, the fact that destroyed and exterminated pests have a role in the ecosystem has only slowly penetrated human consciousness. For the eradication of a whole species influences the population dynamics and the evolution of other species. It is only in recent years that agricultural research recognizes that every action has an influence on the ecosystem. But these findings also do not lead to reversal.



People have massively increased the number of varieties by breeding. There are thousands of types of corn, wheat, rice, and potato varieties. But modern plant and animal breeding is increasingly market driven. The focus is on the most productive varieties and less on other quality criteria. Therefore, despite of this large selection, the diversity in the field decreases. Conventional research comes up against its limits. The yields can no longer be increased arbitrarily by breeding. Extreme breeding of livestock animals like chickens or turkeys lead to such heavy animals that they can no longer reproduce themselves without human intervention. The much too muscular calves of the



Belgian Blue Bull; Photo: <http://masterrind.com/bull/faucon>

Belgian Blue cattle, which can be delivered only with a C-section, raise ethical questions. Intensive animal husbandry leads to mass slaughter, and traumatising of farmers in cases of outbreaks of infectious diseases. The increase in milk yield, the weight increase in livestock, vegetables, fruits or grain, the increased size of eggs - all this serves purely economic purposes. In addition, there are breeds for aesthetic reasons which often seem to mock animal protection. Are people aware of their power to create, change or multiply new varieties? Are they taking the responsibility arising from the new technical possibilities in the field of genetic modification?

### Respect for the living creature

Mutations are a natural phenomenon that has always been used by agriculture. Where is the difference to the targeted selection of new properties by gene-changing technologies, of which there are a whole series? While the one is a selection process of naturally-controlled change processes, the use of other technologies can bring together different genetic information that would not have occurred in nature. The boom of transgenic

plants (contain foreign genes) raises important questions, like the need for a separation of genetically modified and conventional varieties. The use of gene technology is capital intensive. New breeds and varieties are patented and farmers must pay for a license. Thus, they lose part of their autonomy. Synthetic biology, which moves in the boundary between organic and artificial life, increases the discomfort over the disturbed natural evolution. Farmers and consumers are unsettled. In 2050, the planet may have to feed 10 billion people. However, it is still open whether they can be fed only with high-tech agriculture. Progress in agricultural research must always be questioned ethically and philosophically.

The authors of the INRA article advocate a new and qualitatively better relationship between agriculture and biodiversity. Can we respect the world around us if we do not respect ourselves? According to INRA authors, agricultural research should not only focus on future agricultural issues, but also on the present, with respect for cultural traditions, the environment and the needs of all plant and animal species.



Foto: LepoRello - Eigenes Werk, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=25850558>

### Source

Éthique et biodiversité : questions posées à et par la recherche agronomique Pierre Barret, Denis Bourguet, Pierre-Henri Duée, Sophie Gerber, Xavier Le Roux, Michèle Tixier-Boichard in: Natures Sciences Sociétés, 24, 270-276 (2016) © NSS-Dialogues, EDP Sciences 2016, DOI: 10.1051/nss/2016029

## Carthian Buffalo Nucleus herd in the Danube Delta, Ukraine



Michel Jacobi zeigt den Umgang mit den Büffeln; Foto: UNIAN: <https://www.unian.info/>

A basic concept of the conservation of rare traditional breeds aims to keep the animals as decentralized as possible to prevent the loss of the breed in the case of a disaster such as the outbreak of a disease, environmental incidents or the withdrawal of the holder. The Carpathian buffaloes have so far only been conserved and bred in the Oblast, Transcarpathia, within the framework of a project supported by SAVE Foundation. In autumn 2016 some carefully selected animals were moved to the Odessa region. The action in the village of Orlovka (Reni district, Odessa region, Ukraine) attracted much attention.

The idea to rescue buffaloes in the Danube delta was developed together with the True Nature Foundation, the National Ecological Center of Ukraine and the WWF as part of the "Odessa Center for Regional Studies" project CFE II. 14 Carpathian buffaloes got a new home near Orlovka. The former breeder of the buffaloes – Michel Jacobi – originally from Germany, has rebuilt the Carpathian buffalo population in the Ukraine. He teaches the locals of Orlovka how to take care of the buffaloes and make cheese from their milk. The creation of a nucleus herd of carpathian buffaloes in the Danube Delta is a pilot project to show how the unproductive territories can be used in the region and the people will have an additional income. From beginning on a shepherd was employed to look after the herd and workers for

cheese production have already been hired. In the new Eco Park, tourist guides were newly recruited..

Buffaloes are excellent "workers" for maintaining the ecosystem in the Danube delta. They act as soil improvers because they keep the terrain open both in the wetlands as well as on dry sandy or stony surfaces. They also dig troughs in the sand and "build" ponds that serve birds and reptiles as habitats. The robust Carpathian buffaloes are adapted to changing climatic conditions and less susceptible to diseases.

Last but not least, the rustic animals are also a tourist attraction in the eco-park near the village of Orlovka on the Kartal Lake. For the continuation of the conservation of the Carpathian buffaloes, an agreement has been reached between the True Nature Foundation and SAVE to provide herd book data on a regular basis and continuing breeding in the Odessa region.



Foto: UNIAN: <https://www.unian.info/>

Read more on UNIAN:

[www.unian.info/society/1584247-operation-buffalo-deemed-successful-buffalo-start-feeling-comfortable-in-odesa-region-photos.html](https://www.unian.info/society/1584247-operation-buffalo-deemed-successful-buffalo-start-feeling-comfortable-in-odesa-region-photos.html)



## Newsflash

### Ancient Spelt & Baking Quality



Ancient Spelt; Photo: University of Hohenheim Dorothee Barsch

The so far largest quality test on ancient spelt reveals big quality differences especially in view of the baking quality.

High yield, stability and resistance to diseases — These criteria have so far given priority in the cultivation and breeding of spelt. However, this priority fails to meet the needs of the bakers, according to the results of the largest spelt test ever with 160 spelt varieties of the University of Hohenheim, Germany. This is the reason why varieties with poor baking quality are still on the market. However, the results also show that new breedings are possible, combining prime quality cultivation and baking characteristics. In the context of the spelt experiment, the researchers also developed several rapid tests, with which millers, bakers and noodle producers can already assess the baking quality at the purchase. More information:

<https://biooekonomie.uni-hohenheim.de/>

### When the slaughterhouse comes to the farm



Mobile Butcher Foto: <https://abattagealternatives>

Slaughtering of livestock animals is a focal point in the discussion on farm animal welfare. In the media, conventional slaughterhouses are criticized again and again. Less well-known is the fact that farmers themselves also criticize the common practices. Particularly for farmers who use short supply chains and direct marketing, slaughterhouses are not in line with their animal husbandry philosophy, because they often cannot take over full responsibility for the animal welfare. These producers would rather prefer to have the full control over the whole life span of the animal.

The aim of the "collectif Quand l'abattoir vient à la ferme" in France is to create alternative solutions for the slaughterhouse like the development of slaughter possibilities directly on the farm. This is already possible in other European countries (Sweden, Germany) where mobile slaughterhouses or "pit boxes" are used. Butcheries and suitable slaughterhouses could use these alternatives, which would enable them to make better contact with the breeder and serve the animal welfare.

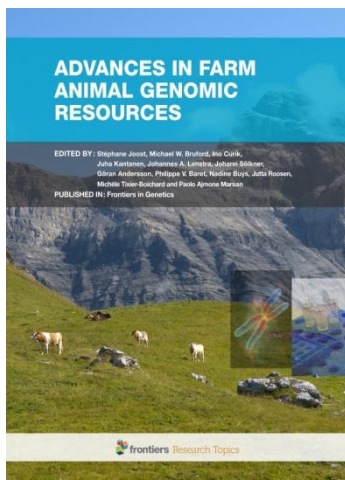
Today, animal husbandry is at a crossroads: either developing new methods and relationships with animals that correspond to the spirit of the time, or remaining involved in the production ideologies of the 19th century, with the risk to disappear because of an increasing use of biotechnologies 2.0 in the food sector (substitutes, In-Vitro-Meat, etc.). Alternatives to the traditional slaughterhouse are a first step to an improving animal husbandry.

#### More information:

<https://abattagealternatives.wordpress.com/>

Contact: Porcher J., (INRA), Brousseau C. (Afaad), Dumas C. (Biowhere), [jocelyne.porcher@inra.fr](mailto:jocelyne.porcher@inra.fr)

## Advances in Farm Animal Resources

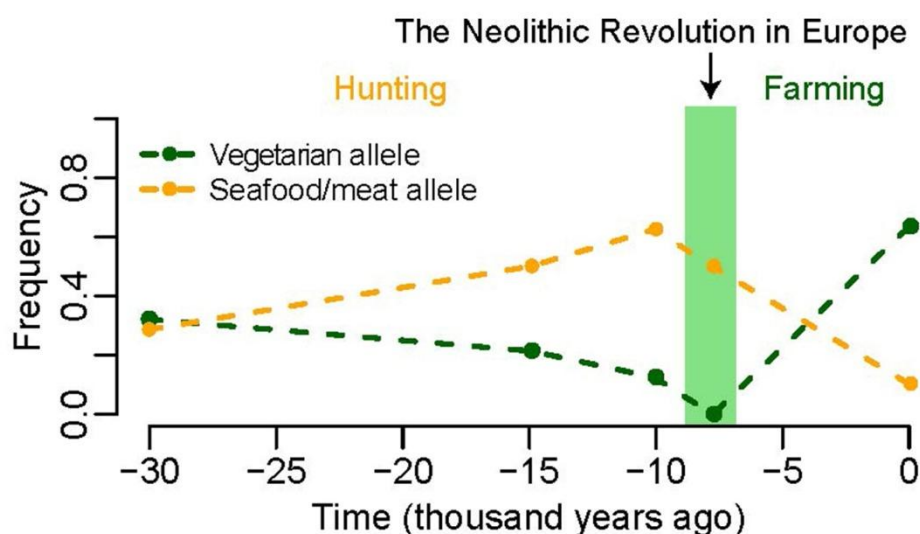


Frontiers, the community-rooted, open-access academic publisher, released an eBook titled „Advances in Farm Animal Resources“. The goal of this Research Topic was to collect contributions of high scientific quality relevant to biodiversity management, and

applying new methods to either new genomic and bioinformatics approaches for characterization of Farm Animal Genetic Resources (FAnGR), to the development of FAnGR conservation methods applied ex-situ and in-situ, to socio-economic aspects of FAnGR conservation, to transfer of lessons between wildlife and livestock biodiversity conservation and to the contribution of FAnGR to a transition in agriculture (FAnGR and agro-ecology).

An article about the FAO funded BushaLive project, implemented by SAVE Foundation 2013-2015, is published on page 190/191. Download: <http://frontiersin.org/books/b/788>

## Remarkable Fact: Modern European Genes may favor Vegetarianism



practices are reflected in the genes of Europeans. Researchers collected data from more than 25 other studies that examined ancient DNA from fossils and archaeological remains (dating back to 30,000 years ago until about 2,000 years ago), and DNA from contemporary populations.

The study found that adaptations occurred in an important genomic region that includes three fatty acid

A Cornell study (USA) describes how shifts in diets in Europeans after the introduction of farming 10,000 years ago led to genetic adaptations that favored the dietary trends of the time.

Before the Neolithic revolution that began around 10,000 years ago, European populations were hunter-gatherers who ate animal-based diets and some seafood. But after the advent of farming in southern Europe around 8,000 years ago, which spread northward thereafter, European farmers switched to primarily plant-heavy diets.

The study – the first to separate and compare adaptations that occurred before and after the Neolithic revolution – reveals that these dietary

desaturase (FADS) genes. Different versions of the same FADS1 gene, called alleles, corresponded to the types of diets that were adopted.

“The study shows what a striking role diet has played in the evolution of human populations,” said Alon Keinan, associate professor of computational and population genomics and the paper’s senior author. Kaixiong Ye, a postdoctoral researcher in Keinan’s lab, is the paper’s lead author.

Source: Cornell University (USA):

<https://cals.cornell.edu/news/modern-european-genes-may-favor-vegetarianism>