

# AgroSCOPE

Annual Report 2014



Schweizerische Eidgenossenschaft  
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Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,  
Education and Research EAER  
**Agroscope**

Additional information on the articles in the online report:  
[www.annual-report.agroscope.admin.ch](http://www.annual-report.agroscope.admin.ch)



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## Mission Statement

### **Swiss Research for Agriculture, Nutrition and the Environment**

Agroscope, the Swiss Federal Centre of Excellence for Agricultural Research, is affiliated with the Federal Office for Agriculture (FOAG). Since January 2014, Agroscope has been organised into four institutes: the Institute for Plant Production Sciences (IPS), the Institute for Livestock Sciences (ILS), the Institute for Food Sciences (IFS) and the Institute for Sustainability Sciences (ISS). Agroscope is strategically managed by the Agroscope Council, whilst the Agroscope Executive Board is responsible for its operative management.

### **Vision**

Agroscope makes an important contribution to a sustainable agriculture and food sector as well as to an intact environment, thereby contributing to an improved quality of life.

### **Aim and Purpose**

Agroscope researches along the entire value chain of the agriculture and food sector for a competitive and multifunctional agricultural sector, for high-quality food for a healthy diet, and for an intact environment. Our focus is on research and development for the benefit of the agriculture and food sector; the provision of decision-making bases for federal-authority legislation; enforcement tasks within the framework of the legal provisions in the service of agriculture and the general public; and knowledge exchange and technology transfer with practitioners, agricultural extension, industry, science, the teaching sector and the public.

## Learning from the Future

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In 2030 you will perhaps read the Agroscope Annual Report on your eyeglasses, on your watch, or in your coffee cup. Although we're nowhere near that reality yet, both research and communication must take the lead from visions that could become reality. Going straight to the heart of the matter, the American futurist Herman Kahn opined that "Anyone can learn from the past. These days it is more essential to learn from the future."

Although many nowadays regard print publications as outdated, they are hardly going to die out. Nevertheless, other publication channels have been gaining ground for several years now. In order to make the Annual Report as widely available as possible, Agroscope is also following this trend: At the beginning of the year, a print edition is also published which is simultane-

ously implemented as an online version. In addition, a purely online edition is always offered at the end of the year. In this way, we exploit the advantages of both publication channels: the handiness of print on the one hand, and the linking opportunities of the Internet, with specialist videos and additional links and information on the other.

What Charles Darwin said about animal species is also true for publication channels: "It is not the strongest species that survive, nor the most intelligent, but the ones most able to adapt to change." For research, this means working proactively on relevant future issues. You can read about what Agroscope is undertaking in this respect in the main article on soil ('Life in the Soil: The Basis for Agriculture and Nutrition'), and in the articles on pests ('Curbing the Cravings of a Fly'), horsekeeping ('Bridge-Builders between Town and Country') and nutrition ('From Fermented Foods to Human Health').

Agroscope is the right point of contact for addressing issues in the agriculture and food sector – because we are already dealing with tomorrow's topics today.



Bernard Lehmann  
President of Agroscope Council

Michael Gysi  
Head of Agroscope





## Life in the Soil: The Basis for Agriculture and Nutrition

**Tiny organisms in the soil perform important functions for society as a whole, especially for the agriculture and food sector. These organisms constitute a focal point of Agroscope's research.**

Incredible but true: There are more living organisms in a handful of soil than there are people on Earth! These organisms include bacteria, fungi and algae, but also larger soil dwellers such as worms, beetles and woodlice. One aim of Agroscope's research is to better understand the diversity of and services performed by soil organisms, and to create the scientific bases to safeguard the fertility of soils for future generations.

### Soil organisms as service providers

Intact soils are a prerequisite for producing high-quality food, simultaneously promoting groundwater filtering, flood protection, carbon storage, biological nitrogen fixation and the decomposition of organic matter. Such services performed by nature – so-called ecosystem services – are dependent upon the organisms that live in soils.

In a widely noted research project conducted in 2014, Agroscope demonstrated just how important soil organisms are for efficient plant production. In a model system, crops were grown on soils containing different populations and quantities of soil organisms. In the treatment with artificially limited biological soil activity, plant yield was markedly lower. At the same time, nitrogen loss through leaching increased. To better understand these mechanisms, Agroscope conducts field trials to investigate which agricul-

tural practices influence soil life during soil management, and develops recommendations for resource-efficient plant-production.

However, the natural resource 'soil' – the habitat of soil organisms – is threatened both in quantitative and qualitative terms. On the one hand, fertile soils that have formed over centuries in Switzerland are being lost every second owing to soil sealing; on the other hand, incorrect soil management techniques can lead to humus loss, erosion and compaction. The passage of heavy agricultural machinery over wet soils causes soil compaction, leading to waterlogging and oxygen deficiency. Using newly developed probes, Agroscope investigates when the state of the soil structure becomes critical for soil organisms and plant roots owing to insufficient oxygen availability. We also analyse how an unfavourable soil structure influences the availability and mobility of nutrients and pollutants. Such findings are applied in Terranimo – a decision-making tool for farmers developed by Agroscope, the School of Agricultural, Forest and Food Sciences (HAFL), and EU partners to avoid soil compaction.



◆ *Stephanie Pfister analyses the DNA of soil samples.*

### Focus on soil quality

In the context of the Swiss Soil Monitoring Network (NABO), Agroscope measures – in addition to other soil properties and on behalf



of the Federal Office for the Environment (FOEN) and the Federal Office for Agriculture (FOAG) – soil contamination by heavy metals and selected organic pollutants at regular intervals at about a hundred sites. In addition, soil microbiological parameters have been analysed at thirty of these sites since 2012 as part of the NABObio programme. For this purpose, mixed samples from hundred-square-metre observation plots are used to measure microbial biomass and soil respiration, and to analyse the genetic material of soil microorganisms. A finding of this research was, for example, that from 2012 to 2014

microbial biomass and activity in grassland soils were greater than in arable soils.

Moreover, soil organisms may serve as indicators, since they can point out harmful changes in their habitat at an early stage. The NABObio project makes use of the rapidly developing field of molecular genetics, which has recently enabled us to explore the diversity of microorganisms. Launched by Agroscope in 2014, the 'Microbial Biodiversity' research programme investigates the totality of microorganisms and the functions of their most important representatives in plants, fermented dairy products and the soil. In this context, microbial biodiversity is explored in various soils and systems that are representative for Switzerland and the agricultural sector, in order to better understand the interaction of soil type, soil management, and soil-dwelling microorganisms. This information will contribute to a more comprehensive assessment of soil quality.

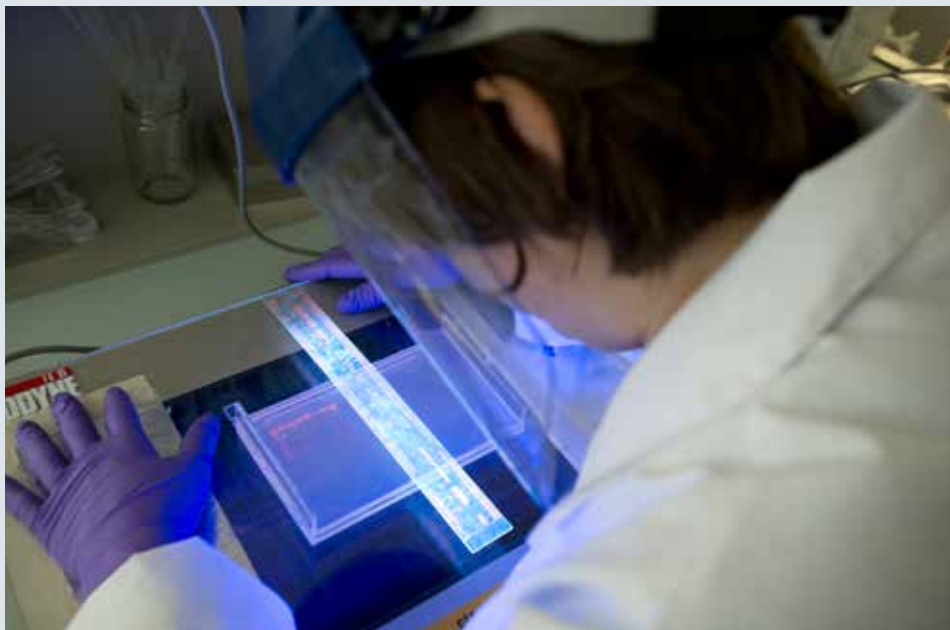
### **Sustainable management**

Agroscope develops measures for regenerating damaged soils. For this, the natural swelling and shrinkage behaviour of soils is studied in compacted soils, together with the formation of soil pores through the activity of roots and earthworms. In addition to an intact soil structure, humus content is important for the quality of an agricultural soil. In 2014, Agroscope used a new method to calculate the humus balance of various farm types throughout Switzerland, thereby providing indications regarding the sustainability of soil use. Leaving root and crop residues in the field and applying organic and recycled fertilisers such as farmyard manure and compost provides soil organisms with nutrients and improves soil structure. This is confirmed by analyses of the measurements in the DOK long-term trial, in which integrated and organic cultivation systems have undergone



comparison for over thirty years. Similar advantages for soils are provided by green-manure crops in combination with no-till cultivation systems, which are developed and tested by Agroscope for resource-efficient arable agriculture.

Agroscope not only generates new knowledge, however – it is also concerned with the transfer of this knowledge to practice. In 2014, Agroscope employees delivered numerous technical papers at field and advisory meetings of cantonal institutions, and made important contributions in both the education



and policy advisory sectors. Here, principles were provided for the understanding of life processes in soils, and how these processes can be used for sustainable agricultural production ■



### **Swiss Cheese and Potatoes with Lower Environmental Impacts than Imported Goods**

From an environmental point of view, Swiss milk production has a site advantage over foreign countries. With Swiss potatoes, the short transport distances have a positive impact, whilst for wheat

bread, beef and feed barley the results are not clear-cut. The findings are from the study 'Life-Cycle Assessment of Selected Swiss Agricultural Products Compared to Imports'.



### **Limiting the Increase in Water Demand**

For many Swiss farmers, an increasingly warm climate means that crops will need to be irrigated more in future, although many rivers will be carrying less water. "The aim is to maintain productivity whilst minimising water demand and environmental impacts" explains Jürg Fuhrer,

who led the recently completed Swiss National Science Foundation project 'Water Demand in Swiss Agriculture and Sustainable Adaptive Options for Land and Water Management' (AGWAM) at Agroscope.



### **A New App for Agroscope Publications**

Agroscope publications and journals will henceforth be accessible via tablet and smartphone, thanks to the new 'Agroscope Publications' app. Agroscope Transfer, Agroscope Science and Agroscope factsheets can be downloaded free of charge under the headings 'Plants', 'Animals', 'Foodstuffs', 'Environment',

'Economy', 'Social Aspects' and 'Technology'. Agrarforschung Schweiz / Recherche Agronomique Suisse and the Revue suisse de Viticulture, Arboriculture, Horticulture are accessible via subscription (see respective Websites of journals).



### **Wood Ash: An Attractive Nutrient Source for Agriculture**

Ashes from the burning of wood are currently disposed of in landfills, since their metallic trace-element content exceeds authorised Swiss thresholds for application on agricultural land as recycled fertiliser. The use of wood ash as a calcium amendment and potassium fertiliser was tested on different soils and agricultural

crops by the Plant Nutrition team. By improving the chemical and biological properties of the soils, the wood ash stimulated the production of dry matter and improved the quality of the crop, thereby demonstrating its potential as a potassium fertiliser and liming agent.

### **Tracing Impurities in Feed**

The coupling of liquid chromatography with tandem mass spectrometry (LC-MS/MS) is an analytical technique enabling the separation and determination of molecules. Since the beginning of 2014, Agroscope Posieux's Feed Analytics Group has been working with a new triple

quadrupole LC-MS/MS device. The aim is to simultaneously identify several unauthorised substances in feed, quickly and precisely. Specifically, for e.g. antibiotics, the device can detect traces from 0.000003 grams per kilogram upwards.



### **Swiss Federal Councillor Schneider-Ammann visits Agroscope**

Federal Councillor Johann N. Schneider-Ammann visited the Wädenswil and Avenches sites in 2014. In Wädenswil he toured the biosafety greenhouse and was given an introduction to antibiotics-resistance research, as well as being made

aware of links with the economy. In Avenches he was treated to a look behind the scenes at the Swiss National Stud, and learned a wealth of interesting facts about equine and bee research.



### **Fewer Mycotoxins in Wheat thanks to Alder Buckthorn Bark and Tannic Acid**

Fusarium fungi attack cereals and maize and infect crops with toxins (so-called mycotoxins). Over the past fifteen years, a twentyfold increase in the infestation of wheat with *Fusarium graminearum* has been observed in Switzerland. Experi-

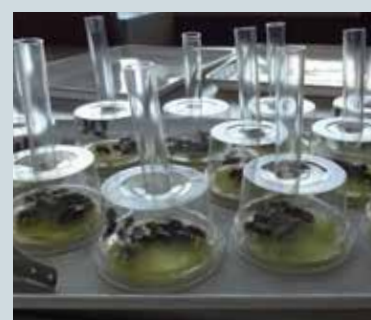
ments with alder buckthorn bark, Chinese galls, tannic acid and rhubarb have demonstrated that suspensions of medicinal-plant meals can be as effective as synthetic fungicides against this *Fusarium* fungus.



### **Risk Assessment of Pesticides for Bees**

In spring 2014, the Swiss Federal Council adopted a national action plan for bee health, introducing measures for improving the availability of nectar and pollen plants and for the risk assessment of plant-protection products (PPP). As part of the PPP authorisation process, the

Bee Research Centre assesses the compatibility of these products with honey bees. Further tasks are the performance of international interlaboratory trials and cooperation in solving cases of bee poisoning.







## Curbing the Cravings of a Fly

**Just three millimetres long, but scarcely a fruit is safe from it: the maggots of the spotted-wing drosophila *Drosophila suzukii* have an appetite for berries, stone fruit and even grapes. In 2014, this tiny fly caused major economic losses in Switzerland in some instances, attacking cherries, apricots, plums, damsons and grapes for the first time, in addition to various berry crops.**

Favourable weather conditions were the reason for the mass propagation of the spotted-wing drosophila (*Drosophila suzukii*) in 2014. Months of warm, damp weather on the heels of a mild winter made this pest introduced from Asia feel right at home here in Switzerland – the reason why Agroscope experts captured around ten times more flies in the monitoring traps than they had in previous years.

### **Stone fruit: more damage than ever before**

The early onset of spring in 2014 provided the flies with ideal breeding conditions, allowing them to propagate at breakneck speed in early cherry varieties. A growing population needed even more fruit in which to lay eggs, so infestation pressure rose steadily over the course of the season. Consequently, late-ripening cherry varieties and damsons failed completely in individual instances. Peaches, apricots and numerous wild fruit species were infested in addition to cherries and damsons. High-stem orchards, meadow orchards and direct-marketing farms were the hardest hit.

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◀ *Insect experts Stefan Kuske and Laura Kaiser examine their *Drosophila suzukii* trap.*

### **Berries: Agroscope strategy makes an impact**

Berries are the crop most at risk. Because of the previous year's losses, most berry producers had been forewarned, and had implemented the Agroscope plant-protection strategy, so damage to berries in 2014 was kept within limits. Substantial crop losses only occurred when the recommended measures were not implemented, or were implemented too late.

### **Grapes: sour rot or flies?**

The wet summer not only encouraged the spotted-wing drosophila, but also fungal diseases and the bursting of individual grapes. Such circumstances promoted sour rot such as had not been seen in years. All in all, this disease destroyed up to 10 % of the Swiss vintage in 2014. With hindsight, the fly was wrongly suspected of part of the damage.

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**Agroscope experts captured around ten times more flies in the monitoring traps than they had in previous years**

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### **Making a start**

Knowledge on the biology and distribution of this pest is essential for mounting an effective control strategy. Together with the cantons, Agroscope has been implementing a nationwide monitoring programme with traps since 2011. All research and extension activities are implemented across all crops and throughout Switzerland, as well as in active exchange with other experts. In addition, producers have been brought on board to refine the monitoring and control strategy.



tests the efficacy of preventive measures as well as the protective effect of nets and other artificial barriers. Slaked lime and other rock powders are tested, since it is presumed that these products reduce oviposition. In addition, mass trapping is being further optimised in berry growing and tests are conducted to determine whether this technique might also be useful for stone fruit and grapes. Agroscope is also testing the effectiveness of 'attract & kill', which specifically induces pests to ingest insecticides by means of food baits. In the long term, however, Agroscope would also like to increase the influence of natural antagonists such as small parasitic wasps.

All of this is meant to help improve current control strategies and discover new and more sustainable ways of working with practitioners to curb the spotted-wing drosophila's appetite for fruit ■



### Strategy search on all levels

Unfortunately, 2014 showed that under high infestation pressure, it is difficult to protect at-risk crops from the spotted-wing drosophila. For this reason, Agroscope has set up a task force together with the FiBL (Research Institute of Organic Agriculture) whose aim is to develop new approaches to control in stone-fruit, berry growing and viticulture with all players from practice, commerce, extension, enforcement and research. Agroscope



### **Apps Make Agroscope Know-How Available in the Field**

In the field, Agroscope information is usually only accessible via a smartphone or tablet. That's why Agroscope is now offering Agrometeo for smartphones. The Website provides quick access to pest and pathogen forecasts as well as to weather

data. A further tool is the spray-calculator app for Android and Apple-iOS enabling farmers to calculate the correct spray dosage. The performed calculations can be saved, retrieved and e-mailed.



### **Protected Site: Field Trials of Genetically Modified Plants**

Agroscope has set up a fenced and guarded test field in Zurich on behalf of the Federal Government. The Protected Site is open to Swiss researchers wishing to carry out basic or applied research. In

2014 the University of Zurich launched a field trial with GM wheat lines. The Protected Site allows researchers to study the opportunities and risks of genetic engineering for agriculture.



### **LegumePlus: Targeting Bioactive Substances**

Certain fodder legumes such as sainfoin and birdsfoot trefoil contain bioactive constituents that optimise protein use in ruminant nutrition, reduce methane gas emissions, control parasitic worms, and improve the quality of foods of ruminant

origin. The LegumePlus Project which conducts research in these areas ends in 2015, and its findings are eagerly awaited. Further projects with European partners are planned.



### **Actively Controlling Hole Formation in Cheese**

How are holes formed in cheese? The Cheese Quality Research Group demonstrated for the first time that plant particles trigger the formation of holes. Such particles are unintentionally introduced into the milk during the milking process

and cause full-scale hole formation. The addition of around ten milligrams of plant particles per metric ton of milk enables effective control of the number of holes in the cheese, which is very important for Swiss cheese.





## Bridge-Builders between Town and Country

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**Around 110,000 horses, ponies and donkeys kept on 18,000 farms as well as 150 different breeds from around the world, a number of them also bred – this is ‘Horse Country Switzerland’ in figures. Challenges in the Swiss horse industry are numerous, with the focus here being on two in particular: the decline in the number of foal births, and land-use planning.**

Once an engine of national economies, despite mechanisation and the arrival of the digital age the horse has not disappeared, and now generates different forms of income in rural areas. Today, horses are first and foremost our valued companions in leisure and sport. It is not least of all for this reason that the horse is an important bridge-builder between town and countryside.

Previously the almost exclusive preserve of men, the horse industry in western Europe is nowadays strongly shaped by women. Changing welfare demands and animal protection regulations are among the consequences of that trend.

The keeping and using of horses requires substantial grassland acreage and infrastructure, which is why there are conflicts time and again within the agricultural zone concerning compliance with zoning requirements.

Challenges facing the Swiss horse industry are numerous. Last year, employees of the Swiss National Stud Farm, a research division of Agroscope, dealt inter alia with issues con-

cerning the declining numbers in horse breeding, as well as how best to optimise the framework conditions for horse keeping in connection with land-use planning.

### **Fewer and fewer foals**

Horse breeding has always occupied a special place in livestock production: The production of horses has never been primarily about food production, but about the provision of ‘horsepower’. In the 21<sup>st</sup> century, no one in Switzerland or western Europe still needs original horsepower. In this context, the statement that there are more horses in Switzerland today than ever before therefore seems paradoxical.

For years now, the birth figures for Swiss-bred horses have been declining – down 20 % between 2002–2012, with approx. 4800 foals born in 2013. The most important breed raised is the Franches-Montagnes, which accounts for slightly less than 60 % of births. A growing horse population and a decline in



**Horse boarding has the potential to develop into an interesting and lucrative branch of farming**



horse breeding – a further paradox? Breeding horses is time-, effort- and cost-intensive, and associated with risks. What’s more, the sales channels of yesteryear no longer exist, leaving breeders to face an extremely heterogeneous demand market on their own.

### **An attractive branch of farming**

Horses are roughage-consuming animals, and their breeding and rearing are soil-dependent

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◀ *Brigitte Strickler, Iris Bachmann and Ruedi von Niederhäusern assess the quality of the riding-arena sand.*



agricultural activities. The farming sector is far and away the largest supplier of housing systems and feed for horses, but the provision of boarding facilities for horses requires a particularly high level of social competence on the supplier's part. The quality of the available infrastructure and professional competence of the farmer are also crucial factors for success.



#### **A special case in land-use planning**

In terms of land-use planning, horse keeping represents a special case within agricultural activities. The introduction of two new articles in the Land-use Planning Law took this aspect and the increasing importance of the horse sector into account.

The amendments bring advantages for large agricultural businesses in particular. Horse boarding has the potential to develop into an interesting and lucrative branch of farming; it is even possible to switch over to this activity full-time. A simplification that benefits all horse keepers is the future ability to make concreted outdoor exercise areas larger than at present ■



### **3500 Visitors on the Open Door Days in Conthey**

The 2014 edition of the Open Door Days celebrating 70 years of agricultural research in Conthey was a great success. Around 3500 visitors came on the weekend of 30–31 August in order to explore the 25 information stations set up for the occasion. Presentations and exhibitions

took a lighthearted approach to highlighting Agroscope's important work at Conthey on berries, medicinal plants, greenhouse crops, apricots and other crops of the Alpine region for the whole of Switzerland.



### **Number of Habitats Determines Species Diversity**

The diversity of habitats is crucial for preserving species diversity in the agricultural area. Organic farms without targeted support measures such as additional biodiverse habitats have only slightly greater species diversity than

other farms, as shown by a study in Europe and Africa within the BioBio research project. The indicator set developed by Agroscope allows the state of biodiversity on farms to be recorded with reasonable effort and expense.



### **FOODBALL**

Evaluating the food intake of subjects taking part in nutritional studies remains problematic. Biomarkers measured in e.g. blood and urine samples are essential for the objective measurement of this parameter. To this end, the international consortium Food Biomarkers Alliance (FOODBALL), whose Swiss partners are

Agroscope and the University Hospital of Lausanne (CHUV), will be setting up a platform to facilitate the sharing of knowledge about human metabolites from foods. Objective data on dietary intake will lead to a better understanding of the impact of specific foods on health.



### **Pork-Fat Quality Re-evaluated**

In 2014 the entire pig industry underwent a system change to a more precise method of evaluating fat quality in pig carcasses. Since 1 July this has involved the determination of fatty-acid composition and the iodine value by means of near-

infrared spectroscopy. New limit values were developed which necessitated an overhaul of the feed recommendations for pigs by Agroscope, which hosts the reference laboratory for pork-fat quality.







## Effect of Fermented Foods on Human Health

**Arising from a natural microbiological process, fermented foods have been consumed by humans for over 6000 years. Although the original aim of fermentation was to prolong the shelf life of foods, the addition of new organoleptic properties very quickly contributed to the explosion in the range of fermented foods. A health-related dimension now supplements their potential.**

Fermentation allows us to produce a great variety of foods. According to the latest estimates, fermented foods account for up to one-third of our diet. Thanks to the commissioning of the first experimental cheese dairy on its Liebefeld site in 1901, Agroscope can boast more than a century of expertise leading to the establishment of a bacteria collection of more than 13,000 isolates, the majority of them lactic bacteria. In 1907, Nobel prizewinner Elie Metchnikoff from the Pasteur Institute in Paris hypothesised that lactic bacteria could regulate bacterial composition, thereby prolonging human life.

Although these studies laid the foundation for probiotics research, scientists at that time did not yet have sufficiently powerful analytical tools to objectively evaluate the complexity of interactions between foods, the gut microbiota and the human metabolism. Studies documenting the health benefits of fermented foods – digestion and absorption of nutrients, vitamin synthesis, regulation of the immune system, protection against the proliferation of pathogens, regulation of intestinal flora – were supported by only a small number of health claims.

◀ *Grégory Pimentel examines blood samples via mass-spectrum analysis.*

### The 'omic' technologies

The advent of 'omic' technologies, with the first milestone being the complete decoding of the human genome in 2001, could well be a game-changer. With the help of bio-informatics, these technologies actually permit the analysis of the totality of molecules in a single category. The application of these technologies to food sciences (foodomics) and nutritional sciences (nutrigenomics) will henceforth enable detailed study of the way in which foods interact with our organism. Making use of these recent technological innovations, the field of activity 'Functional Nutritional Biology' aims to scientifically evaluate the nutritional and health potential of Agroscope's collection of bacterial cultures.

**Fermented foods account for up to one-third of our diet**

### Research in support of human health

Nutritional studies evaluating the impact of the consumption of fermented foods on the human metabolism are currently being conducted at Agroscope. Since milk is an ideal vehicle for delivering bacteria and fermentation products to the human organism, the choice of the foods to be used in these studies fell on dairy products. The molecular composition and genomic content of the bacteria in the products used are measured by both metabolomics and genomics techniques. Measuring the metabolic response of participants in these studies involves a large battery of analyses: measurement of clinical-chemistry serum parameters (glucose, insulin, triglycerides, cholesterol), serum metabolome quantification, quantitative measurement of



port the scientific process that will allow us to investigate the health and nutritional effects of fermented products.

### Cooperation and networks

Such an ambitious project demands intensive collaboration in national and international networks such as Nutrichip (EPFL), Function Fermented Food (CHUV), Food Biomarker Alliance (JPI) and Nutrition Researcher Cohort (NuGO). The innovative, transdisciplinary and translational approach taken from 'functional nutritional biology' is an integral part of Agroscope's vision, the aim of which is to develop the necessary scientific knowledge to make use of healthy foods from Swiss agricultural production, and consequently to promote the competitiveness of the Swiss food industry at the national and international level ■



the 25,000 RNA molecules from the blood-cell genome, genetic characterisation of the composition of the faecal microflora. Furthermore, the human studies are supplemented by *in vitro* studies on digestion and the intestinal transport of nutrients.

The strength but also the challenge of this research strategy lies in the combining of the results of all these analyses in order to derive holistic information to replace the molecular reductionism that prevailed in the past, thereby leading to a more physiological interpretation of the results of the nutritional studies. A first stage consists in developing the analytical tools described above. In a second stage, these tools can then be used to sup-

### **AgEng Congress 2014: Agricultural Engineering Ensures more Efficient Use of Resources**

How does agricultural engineering affect humans, animals and the environment? And how can agricultural engineering be further optimised for the benefit of increased resource efficiency? These questions were investigated by around

350 people from science and industry at the Congress of the European Society of Agricultural Engineers, held for the first time in Switzerland from 6–10 July 2014, and with which event the Society celebrated its thirtieth anniversary.



### **'LA VIGNE: Maladies fongiques' Published in 2014**

The magnificently illustrated 'Maladie fongiques' – volume I in the LA VIGNE series – gathers together the latest knowledge in the field, highlighting Agroscope's crucial contributions to this important agronomic subject. This volume meets the expectations of scientists, educators, students and extension workers. The series picks up the baton for 'La

Défense des plantes cultivées', a veritable bible of agronomy, published for the first time in 1943 by Payot, republished seven times since then, and out of print since 1979 – so the wait has been a long one! The second of the planned four volumes, which is devoted to grapevine pests, will be published at the end of 2015.



### **Medals Awarded for Excellence in Research**

Agroscope's wine research starts in the vineyard. The grapes are harvested, analysed and vinified to be tasted by experts. In this way, traceability is ensured and results are comparable. For a crop influenced by terroir, regional specificities must be respected. The Agroscope vineyards throughout the wine-growing ar-

eas of Switzerland vouch for this. The best wines are presented in competitions, allowing an unbiased judgement. In 2014, silver medals were taken at Expovina International with the Pinot Noir Barrique 2012, the Gamaret-Garanoir 2013 and the Rosé de Pinot Noir 2013 – three wines from Wädenswil.



### **Multi-Actor Approach Strengthens Search for Practical Solutions for Fire Blight**

The plant disease fire blight is a priority problem in Swiss fruit production. Research needs to develop practical solutions for antibiotic-free management of fire blight. Agroscope leads the project 'Together against Fire Blight' (2014–17) in

collaboration with the Schweizer Obstverband ('Swiss Fruit Association') and the Federal Office for Agriculture. Various actors from the sector contribute to the research activities as well as financially.





## State Accounts 2014

Statement of Financial Performance	Accounts 2013 in CHF	Accounts 2014 in CHF	Divergence 2014/2013 in CHF	Divergence 2014/2013 in %
<b>Functional earnings</b>				
Financially impacting	23,316,875	21,607,187	-1,709,688	-7.33 %
Non-financially impacting	1,069,069	413,832	-655,237	-61.29 %
<b>Total Revenues</b>	<b>24,385,944</b>	<b>22,021,019</b>	<b>-2,364,925</b>	<b>-9.70 %</b>
<b>Functional expenditure</b>				
Financially impacting	140,751,469	139,147,801	-1,603,668	-1.14 %
Non-financially impacting	4,690,317	4,977,577	287,260	6.12 %
Service accounting between offices	50,864,325	49,800,378	-1,063,947	-2.09 %
<b>Total Functional expenditure</b>	<b>196,306,111</b>	<b>193,925,756</b>	<b>-2,380,355</b>	<b>-1.21 %</b>
<b>Statement of Investments</b>				
Investment income	71,761	15,507	-56,254	-78.39 %
Investment expenditure	4,793,329	4,525,507	-267,822	-5.59 %
<b>Reserves</b>				
Creation of earmarked reserves		93,776	93,776	
Use of earmarked reserves	85,500	170,000	84,500	98.83 %
<b>Third-Party Funds</b>				
Acquisition of third-party research funding	15,822,954	14,759,260	-1,063,694	-6.72 %

## Sites

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## Key Figures 2014

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**963** people on average were employed by Agroscope in 2014 based on financially impacting expenditure.

**414** of these were women, corresponding to a 43% share.

**61** trainees were also employed, accounting for 6.5% of the total workforce.

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**1413** items were published during the year under review.

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**2951** classes and lectures at universities and technical colleges were given by staff during the past year.

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**14.8** million Swiss francs of outside funding were obtained for research by Agroscope in 2014.

## Addresses

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