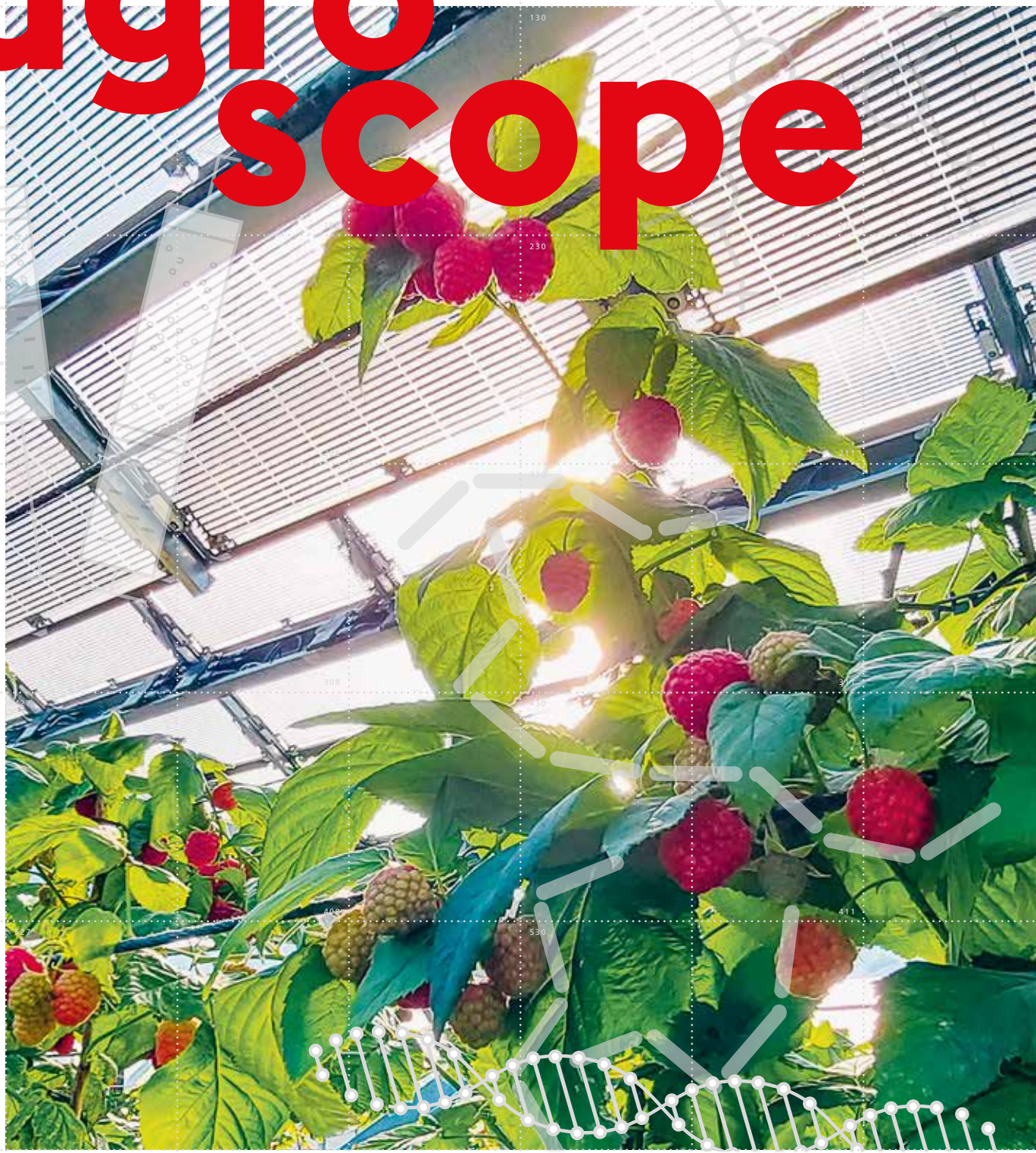
March 2022

# agroscope



Agroscope good food, healthy environment

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Federal Department of Economic Affairs,
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**Agroscope**



## Competence for Fruit and Berries

Together with partners, Agroscope develops methods for a sustainable fruit and berry production – for example in relation to agrophotovoltaics.

# Dear Readers,



Over 100: that's how many research projects Agroscope will carry out over the next four years (p. 16). All of them are linked to six key issues of Swiss agriculture: climate change, protection of natural resources, cost-efficient animal husbandry that meets the needs of animals, competitive food production, a sustainable and healthy diet, and development of agroecological production systems.

These issues are by no means new ones, but the way of approaching them is evolving. Agroscope aims to continue increasing the impact of our research in practice. The idea is to combine the invaluable skills of practitioners with those of our researchers. Our research must be based on the know-how and observations of the women and men in the field, on their motivations and their active, committed participation. This approach has a name: Co-Creation of Knowledge. New knowledge is created together in an ongoing dialogue, initiated as soon as a common challenge to be met is identified, in consultation with advisory services and other stakeholders along the value chain.

Agroscope's new test stations obviously fall within the scope of this participatory process. A recent example: since its creation, the new 'Fruits and Berries' Competence Network has brought together numerous stakeholders from the fruit production sector, all keen to become involved in experiments that they themselves have helped to develop (p. 4). Another example: yellow nutsedge control strategies have been evaluated and developed thanks to active collaboration between practitioners, researchers and the plant-protection services of six cantons (p. 20).

Here's hoping that this issue of Agroscope Magazine provides you with a stimulating and informative read. The contents reflect the 2022–2025 Work Programme and its 100 projects: packed, exciting and varied, as well as attuned to the concerns of producers and society.

Manuel Boss,
Head of the 'Plants and Plant Products' Competence Division

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## New Competence Network for Fruit and Berries

A National Competence Network for Fruit and Berries has been established by Agroscope and the Swiss Fruit Association. The network pools the strengths of the Swiss fruit production sector to jointly tackle the challenges faced by the sector in the medium-to-long-term.

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# Agroscope Future projects Foods Environment Plant Production Agricultural Economics

**Agroscope is the Swiss Centre of Excellence for Agricultural Research,** and is affiliated with the Federal Office for Agriculture (FOAG). 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.

## Better Milk Price and Low Basic Ration Costs Make Grass-Fed Milk Cost-Efficient

Grass-fed milk production meets a customer need, and is linked to specific feed and animal-welfare requirements. An Agroscope study sought to determine the circumstances in which grassfed milk production is worthwhile.

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## How Much More Water Will Swiss Crops Need in Future?

Model calculations show how climate change will affect the water requirement for different crops grown on the Swiss Central Plateau. This will allow us to proactively plan for crop irrigation and adaptation to the changing climate.

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## Agroscope's 2022 to 2025 Work Programme

Agroscope's 2022 to 2025 Work Programme researches important challenges of the Swiss agriculture and food sector. The aim is to reduce existing trade-offs as far as possible.

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# Events

13–14 May 2022, Agroscope, Swiss National Stud Farm SNSF

### Equiday 2022 – Forage Production and Pasture Management

19 May 2022, Agroscope Reckenholz

### Swiss Soil Monitoring Network Conference 2022

28 May 2022, Agroscope Stone Fruit Centre Breitenhof

### Agroscope Breitenhof Conference 2022

The meeting place for the stone-fruit sector

31 May 2022, Agroscope Reckenholz

### 12th Life Cycle Analysis Platform for the Agriculture and Food Sector

21 Jul and 4 Aug 2022, Agroscope, Swiss National Stud Farm SNSF

### Thursdays at the Stud Farm 2022

Discover the Swiss National Stud Farm, the competence centre for equids

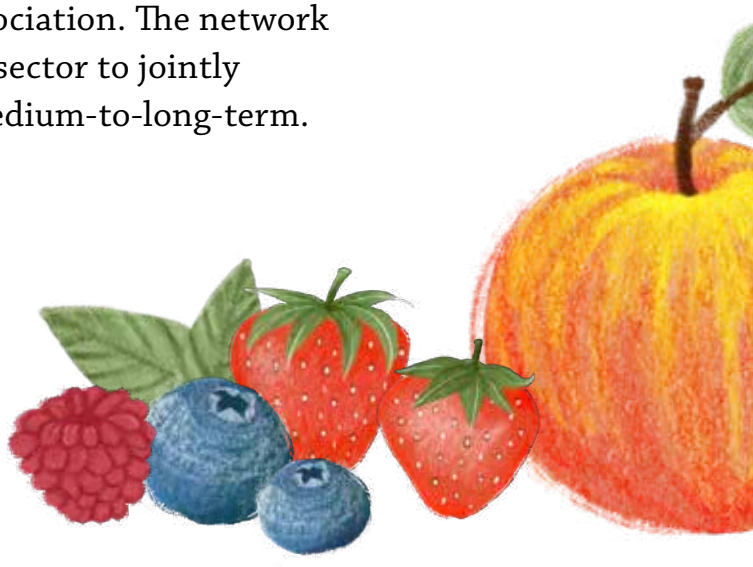
4 Oct 2022, Agroscope Tänikon

### 45th Agroscope Agricultural Economics Conference

All Agroscope events that are open to the public are advertised on our website.

# New Competence Network for Fruit and Berries

A National Competence Network for Fruit and Berries has been established by Agroscope and the Swiss Fruit Association. The network pools the strengths of the Swiss fruit production sector to jointly tackle the challenges faced by the sector in the medium-to-long-term.



The new National Competence Network for Fruit and Berries was launched in November 2021. A joint project of the Swiss Fruit Association and Agroscope, it is based on the principles of 'co-creation', where various stakeholders from research, practice, education, extension and industry come together to develop new knowledge. This close cooperation enables the pooling and expansion of the skills, knowhow and resources of the various actors (transdisciplinarity). This begins with the choice of research projects and extends to how the results are disseminated and the developed solutions are implemented. Manuel Boss, Head of the 'Plants and Plant Products' Competence Division at Agroscope, is a firm believer in the benefits this will bring: "Through the joint creation of knowledge, the Competence Network for Fruit and Berries will accelerate the development of solutions and enhance the impact of research work in practice. All stakeholders will benefit from this."

## Building up a strong network together

"The challenges and problems of the Swiss fruit sector are becoming increasingly complex, requiring the commitment of each individual and the pooling of competences" explains Ernst Lüthi, Chairman of the Steering Committee of the 'Fruit and Berries' Competence Network.

The challenges are of an ecological, societal and economic nature: consumers demand fruit of impeccable appearance and taste, produced according to the highest ecological standards and at a reasonable cost – and this against the backdrop of climate change, increasing pest- and disease pressure, and the fact that fewer and fewer effective plant-protection products are available for use.

## Medium- and long-term research projects

An initial meeting of around 30 experts from the Swiss fruit sector and other institutions was held on 22 November in Bern. Together, they defined, discussed and



Representatives of the Competence Network for Fruit and Berries: from left to right, Jimmy Mariéthoz, Christoph Carlen, Ernst Lüthi, Manuel Boss, Eva Reinhard, Edi Holliger. Photo: Johann Marmy (Agroscope).



fleshed out what they saw as the most relevant and innovative research projects. All the projects are of medium-to-long-term duration. The selected projects include the use of UV-C radiation for long-term protection of crops from mildew, and the promotion of agrophotovoltaics in fruit and berry production. Further topics are the development of alternative, more resilient systems for fruit production, and residue-free plant protection. The next step is for participants to define how the proposed projects will be implemented.

## Growing the network

So far, around 40 stakeholders from the Swiss fruit sector and other organisations have expressed their interest in this new network, which is open to all private and public institutions (universities, universities of applied sciences, institutes, cantons, enterprises) wishing to contribute to sustainable fruit production. Contributions can be in the form of the provision of technical knowledge, experimental sites, infrastructure, financial or personal resources. New interested stakeholders can join the network at any time. —

## Partners

- Agroscope
- Swiss Fruit Association

Further information on the Competence Network for Fruit and Berries

Further information on the Experimental Stations

# Characterisation of a Plant-Based Cheese Alternative Based on Swiss Raw Materials

As part of the trend towards vegetarian and vegan products, Agroscope looked into the production of plant-based alternatives to soft cheese based on Swiss raw materials.

**Helena Stoffers, Margaux Peter, Hans-Peter Bachmann, Lotti Egger, Sébastien Dubois, Barbara Guggenbühl**

Over the last few years, the percentage of vegetarians, vegans and flexitarians has increased due to greater consumer sensitivity to ecological, nutritional, ethical and cultural factors. Food producers must therefore innovate in order to supply alternatives to foods of animal origin and meet these new consumer needs.

Today, the most popular plant-based alternatives to cheeses are soy- or cashew-based. The raw materials from which they are made are mainly produced outside of Europe. What's more, the producers of these plant-based alternatives often make use of food additives – for example, thickeners are added to obtain the desired consistency, as are flavourings to improve taste and flavour.

## Local, lower-additive, plant-based cheese alternatives

Agroscope has set itself the objective of developing a scientific basis for producing plant-based alternatives to these soft cheeses. Raw materials from Switzerland with as few additives as possible should be used. Another important criterion is that such products can be produced in a standard cheese dairy without major investment.



Mould-ripened nut-, lupin- and oat-based cheese alternative (Photo: Agroscope)



Left, the fresh product; centre, film-ripened product; right, mould-ripened product. (Photo: Agroscope)

In this study, products based on nuts, lupin flour and oats produced mainly in Switzerland were fermented with commercial cultures or lactic acid bacteria from Agroscope's strain collection.

The starter cultures had a significant influence on the intensity of the sensory attributes 'fermented', 'tart' and 'pungent'. Moreover, the addition of oat flour had a major impact on sensory profile.

Mould-ripened products had a lower water content than vacuum-ripened products. Furthermore, the fat, protein and lactic acid contents of the plant-based alternatives were lower than those of the mould-ripened soft cheeses. Future trials could be conducted by adjusting and refining the formulation, since this is the key to modifying the nutritional quality, sensory aspects such as texture, and functional characteristics of the plant-based alternatives to cheese.

Since the end product contains substantial quantities of fermentable sugars, there is an increased risk of fermentation defects and of the development of undesirable bacteria on the surface of the cheese. In subsequent trials, solutions will need to be pursued that are capable of rapidly fermenting all of the sugar present, such as starter cultures or surface cultures that are more suitable for the plant-based raw material. Other adaptations of the recipe, the development of appropriate cultures with a specific acidification and flavour profile as well as the targeted use of different spices are necessary in order to obtain marketable cheese alternatives. —

## Conclusions

- It was possible to produce a vegan product of promising quality from plant-based raw materials of Swiss origin, using simple technological equipment.
- The formula could be adjusted in future trials, since it is the key for modifying the nutritional quality, sensory aspects such as texture, and the functional characteristics of plant-based cheese alternatives.
- Other adaptations of the recipe, the development of appropriate cultures with specific acidification and flavour profiles as well as the targeted use of different spices are necessary in order to obtain marketable cheese alternatives.

It is important to remember that the plant-based alternatives manufactured in the present study cannot be compared with cheeses, as we are dealing here with two different products.

Scientific article on agrarforschungschweiz.ch:
Characterisation of a Plant-Based Cheese Alternative Based on Swiss Raw Materials



### Environmental Resources and Agriculture: Promoting Synergies, Reducing Areas of Conflict

Sustainable agriculture must be cost-efficient and conserve environmental resources. Often, however, agricultural production represents a burden on the environment – even though farming could benefit from increased resource protection and ecosystem services.

→ Agroscope Sustainability Conference 2022: Presentations




### Agroscope's Divico Grape Variety – a Continuing Success Story

The Divico grape variety has won several international awards for the second consecutive year. Divico is resistant to downy and powdery mildew as well as grey mould.



### Agroscope's New Cheese Ripening Method Passes Initial Tests

Agroscope has developed a new method for ripening cheese and filed a patent application for it. Initial tests at the implementing partners' are encouraging.

### Digitalisation Enables Targeted Fertilisation

Agroscope experts are using Smart Farming methods to test how the different areas of a field could be fertilised differently, according to need.

→ Video

### Fresh Digital Boost for Livestock and Agriculture

Agroscope and Identitas AG are testing a highly promising solar-powered sensor ear tag in a pilot trial. With the support of the Federal Office for Agriculture FOAG, they are determining if the ear tags are suitable for the electronic recording of outdoor exercise of cattle.



### Unusual Arable Crops to Make a Comeback

Agroscope aims to do its part to increase the diversity of crop rotations. As part of the Horizon 2020 project CROPDIVA, six arable crops are to be grown more widely once again.

### Ichneumon Flies to Combat Comstock Mealybugs

Accidentally introduced from Asia, the Comstock mealybug damages apricot, apple and pear orchards in Switzerland, particularly in the Valais, by attacking the fruit and rendering it unsaleable. Its antagonist, the ichneumon fly, could help with control.

→ Web

### Biodiversity for an Agriculture of the Future (SHOWCASE)

Throughout Europe, new solutions for an agriculture of the future are being sought. Agroscope is taking part in the Horizon project SHOWCASE associated with the encouragement of pollinators and beneficial insects and with habitat and species diversity.

### Microflame and Hot Water for Weed Control

The microflame and hot water offer new ways of controlling weeds without herbicides, and are an alternative to laborious manual weeding, e.g. on organic plots. Agroscope and BFH-HAFL are developing and testing the new methods.

→ Video



### Challenges for Sustainable Soil Management – A Stocktake

The preservation of soil fertility and multiple soil functions faces various challenges both in Switzerland and throughout Europe. A survey carried out in Switzerland among people from practice, government agencies and research highlights problems and possible solutions.



### Controlling Problematic Plants on Summer Pastures

On alpine pastures, measures for controlling problematic plants are limited. Nevertheless, grazing offers many options, with goats e.g. able to reverse the advance of green alder.

### 2500-Year-Old Building Found on Agroscope Construction Site

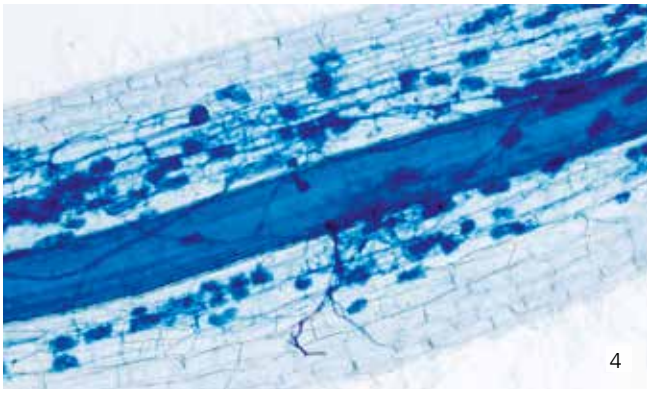
Workers on the Agroscope new-build laboratory construction site in Posieux have stumbled on a building dating back over 2500 years. As luck would have it, it is most likely a farm; the place where agricultural research is conducted today and will continue to be conducted in future was already an agricultural site in pre-Celtic times.

Further information on these topics









1 The lysimeter facility in Zurich-Reckenholz is used to investigate the water and matter balances of agricultural soils
2 Fruiting bodies of fungi | 3 Potato sprout
4 Detail of a root with mycorrhizal fungi







5 Animal-friendly housing for pigs is important for successful pork production
6 Agrometeo measuring equipment in Zurich-Reckenholz | 7 Analysing the $CO_2$ content of Chasselas wine samples
8 Greenhouse crops for vegetable-production research | 9 GPS device for Smart Farming applications







Cultivating potatoes in earlier times.









1 Making cheese for research purposes | 2 Reducing greenhouse-gas emissions from dairy cows with optimal feeding | 3 Agroscope investigates soil biodiversity

# “We not only want to research for practice, but with practice”

The agriculture and food sector faces various challenges. To develop sustainable solutions and reduce trade-offs, Agroscope’s new Work Programme increasingly focuses on system research and co-creation, says Eva Reinhard, Head of Agroscope.



### What are the greatest challenges facing the agriculture and food sector that are addressed in the 2022–2025 Work Programme?

Put in very general terms, the changing food-production environment. This includes climate change, the protection of natural resources such as air and water as well as biodiversity, and the eating habits of a growing population.

Today there are too many trade-offs in our production and food systems, for example between yield and ecological sustainability. We are therefore seeking ways to reduce these trade-offs as much as possible, without forgetting that the producers need to generate a sufficiently high income.

### What’s new compared to the last Work Programme?

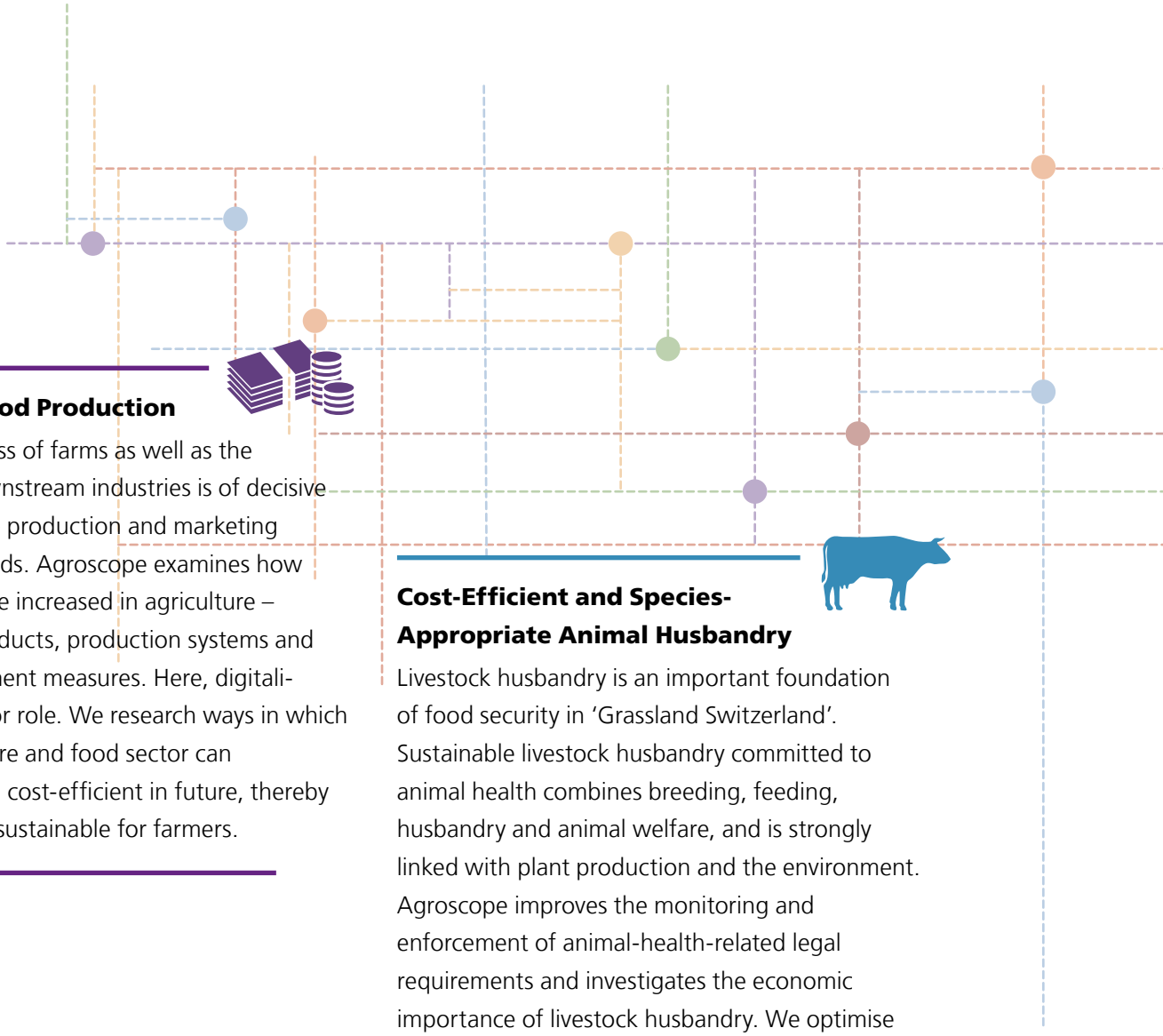
We are oriented towards practical issues rather than expert knowledge or teams of specialists. Together, we aim to develop economic, social and ecological production and food systems throughout the entire agriculture and food sector. In other words, the principles of agro-ecology are our core focus. And researching in the system also means involving consumers. In very general terms, research with co-creation has developed a much higher profile.

### What do you understand by the term ‘co-creation’?

For example, working together with various experts from different disciplines as well as with all of the stakeholders along the value chain to develop knowledge and solutions with minimal trade-offs. Of course, we’re also in the process of implementing our new site strategy, with the peripheral experimental stations – and co-creation is a requirement here. We not only want to research for practice, but also with practice. At all the experimental stations there is a partnership between Agroscope, the cantons, farmers, extension workers, agricultural associations, and SMEs in many cases. The experimental stations combine research and practice, for an agriculture and food sector that’s fit for the future.

# Agroscope focuses on six priorities

Agroscope's 2022 to 2025 Work Programme researches important challenges of the Swiss agriculture and food sector. The aim is to reduce existing trade-offs as far as possible.



### Competitive Food Production

The competitiveness of farms as well as the upstream and downstream industries is of decisive importance for the production and marketing of high-quality foods. Agroscope examines how value-added can be increased in agriculture – e.g. with what products, production systems and business management measures. Here, digitalisation plays a major role. We research ways in which the Swiss agriculture and food sector can continue to remain cost-efficient in future, thereby remaining socially sustainable for farmers.

### Cost-Efficient and Species-Appropriate Animal Husbandry

Livestock husbandry is an important foundation of food security in 'Grassland Switzerland'. Sustainable livestock husbandry committed to animal health combines breeding, feeding, husbandry and animal welfare, and is strongly linked with plant production and the environment. Agroscope improves the monitoring and enforcement of animal-health-related legal requirements and investigates the economic importance of livestock husbandry. We optimise sustainable animal production systems whilst bearing in mind that human dietary habits are changing.

Further information on Agroscope's 2022 to 2025 Work Programme

## Agriculture in a Changing Climate

Climate change is posing significant challenges for the Swiss agriculture and food sector: hot, dry summers and other extreme weather events are becoming more frequent. With its research on new plant production and animal husbandry systems as well as the breeding of robust plants and animals, Agroscope contributes to the continued productivity of the agricultural sector under changed climate conditions. This includes efficient irrigation and protection from harmful invasive organisms. We look for ways to further reduce harmful greenhouse gas emissions from agriculture as well as the negative environmental impacts of food.

## Protecting Natural Resources

Natural resources such as soil, water, air and biodiversity are the pillars of a healthy environment, but suffer under the intensive agriculture sometimes practised in Switzerland. Measures taken to date are not sufficient, for example, to stop the loss of habitats for flora and fauna. Agroscope analyses and measures above- and below-ground biodiversity, soil fertility and health, and the effects of agricultural production on surface waters and air. We develop methods for farming practice that harness genetic diversity and that protect natural resources as the foundations of an agricultural sector with crop yield security.

## Sustainable and Healthy Food

Current dietary habits are often unsustainable (food waste, high meat consumption) or unhealthy (highly processed foods rich in sugar and fat). Agroscope research supports the development of innovative, healthy and safe foods – e.g. dairy products, meat, bread, vegetables and fruits – from production, to processing, right up to consumption. We research together with consumers and develop life-cycle assessment methods that also take account of health aspects. In so doing, we help to advance a nutrition transition corresponding to the potential of the Swiss agriculture and food sector.

## Agroecological Production Systems

The predominant agricultural production systems in Switzerland – farming according to Proof of Ecological Performance (PEP), IP Suisse and organic agriculture – are not without their drawbacks. They need to be further developed in terms of their economic, social and ecological sustainability. With its research, Agroscope helps to optimise agricultural production, and hence plant protection according to agroecological principles. Agroscope also investigates new cropping techniques such as agrophotovoltaics, agroforestry and vertical farming under Swiss conditions. Together with various stakeholders, we develop practical production systems that take account of new societal concerns and reduce trade-offs to the greatest extent possible.

# How Much More Water Will Swiss Crops Need in Future?

Model calculations show how climate change will affect the water requirement for different crops grown on the Swiss Central Plateau. This will allow us to proactively plan for crop irrigation and adaptation to the changing climate.

**Sebastián Eisenring, Annelie Holzkämper, Pierluigi Calanca**



As climate change progresses, less rain falls in summer and crops need to be irrigated more frequently.



As climate change progresses it will become warmer, and less rain will fall during summer. Consequently, farmers can expect more water deficits. These deficits could be reduced by irrigation, provided that sufficient water resources are available.

## Model-based estimates of irrigation needs

Using the FAO method for estimating crop-specific irrigation needs, the changes in irrigation requirement that might be expected for the future were modelled based on current climate projections. The changes were investigated for various locations on the Swiss Central Plateau (Aigle, Basel, Bern, Changins, Güttingen, Payerne, Reckenholz) and for various vegetable, field and grassland crops.

## More irrigation needed, especially in the summer and autumn

The projections without climate-change mitigation (RCP8.5) show an increasing demand for irrigation for all crops and locations. For the investigated potato, iceberg lettuce and ryegrass crops, the estimated percentage increase by the time horizon of 2045–2074 is around 20%, and by 2070–2099 around 35%.

In absolute figures, the greatest irrigation needs are forecasted for the already-more-arid locations of Aigle, Changins and Payerne. From a seasonal perspective, irrigation needs rise the most in the summer and autumn months, whilst few changes are to be expected on average in the spring months.

## Benefits of planning climate-adaptation measures

The applied method offers a wide variety of options for use, e.g. in the planning of irrigation infrastructure projects, or for the development of alternative climate-adaptation measures such as the cultivation of more-drought-resistant varieties or crops. Far-sighted planning could reduce future water-use conflicts and prevent bad investments.

## Inclusion of field data and weather extremes essential

Further studies must take a closer look at existing model uncertainties and gradually reduce these through the inclusion of field data. In addition to changes in average irrigation needs, the effects of the increasing frequency of weather extremes must be examined further.

### Conclusions

- Without climate-change-mitigation measures, the Swiss agricultural sector's water requirement on the Central Plateau will generally rise according to the model estimates.
- For the crops discussed, the estimated percentage increase by the time horizon of 2045–2074 is around 20%, and around 35% by 2070–2099.
- The increases in irrigation needs are particularly noticeable in the summer and autumn months.
- The operationalised FAO method for estimating crop-specific irrigation needs offers potential for use in the planning of adaptation measures (e.g. irrigation infrastructure projects).
- Validations and model improvements aim to reduce uncertainties of the projections.

Scientific Publication:
Agroscope Science, 107, 2021, 1–55

# Yellow Nutsedge: What Control Strategies Work in Practice?

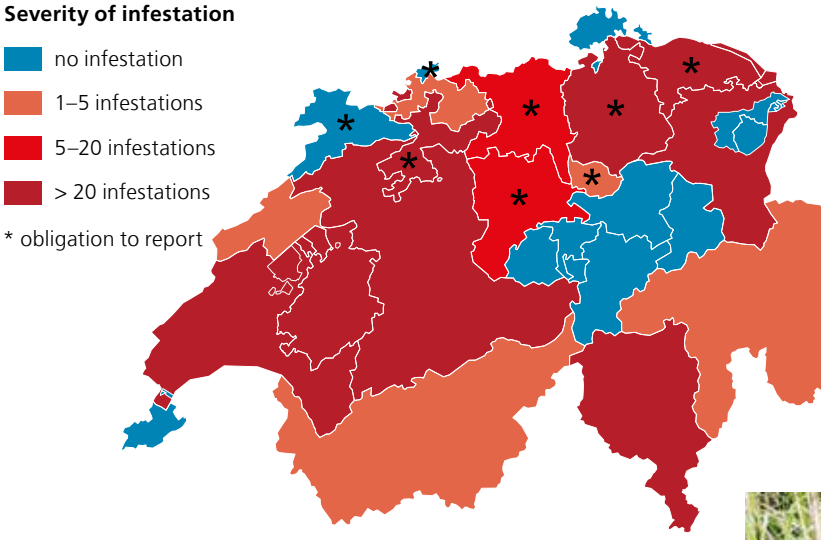
The invasive weed yellow nutsedge creates considerable problems for Swiss producers in arable and vegetable crops. In a four-year project, stakeholders from research and practice evaluated various control strategies on-farm.

**Alexandra Schröder, Jonathan Heyer, Markus Hochstrasser, David Brugger, Judith Wirth**

Yellow Nutsedge reproduces and spreads primarily by underground tubers, and can lead to substantial yield losses in arable and vegetable crops. The invasive weed has a very high multiplication potential, and has spread widely throughout certain regions in Switzerland since the 1990s.

## Developing and implementing effective control methods

There is no single measure or easily implemented method for controlling yellow nutsedge. Developing and implementing successful control strategies for infested fields is therefore a matter of urgent necessity. The most promising approach is a combination of different, coordinated measures. Great attention must also be paid to the unintentional spread of yellow nutsedge. In order to keep uninfested fields nutsedge-free, agricultural contractors must be informed of the presence of the weed, and all machines must be cleaned after use on an infested field. In addition, nationwide reporting and mapping would make an important contribution to the systematic nationwide control of yellow nutsedge in Switzerland.




Current spread of yellow nutsedge in Switzerland. Source: Nationale Koordination Erdmandelgras (=National Coordinating Body for Yellow Nutsedge), Alexandra Schröder (status as at 2021).

## Project for evaluating control strategies

In a four-year project, the Federal Office for Agriculture, Agridea, sectoral and producer organisations, cantonal agencies, the Swiss Farmers' Union and Agroscope combined forces and evaluated the situation. Using a 'co-creation' approach, different control strategies were



compared and the tuber development in the soil was monitored on 21 infested sites in six cantons. The control measures used were chosen jointly by the farmers and the cantonal extension services, then implemented under the personal responsibility of the farmers. Agroscope monitored yellow nutsedge infestation. For each site examined, the following was recorded: crop grown, herbicides applied and type of soil cultivation.

### Crop rotation, soil cultivation and herbicides combat yellow nutsedge

Maize cultivation with the right accompanying measures is best suited for yellow nutsedge control. On the farms successful in controlling yellow nutsedge, maize was generally sown late (up to mid-June), after repeated soil cultivation of the entire field and treatment with Dual Gold (S-Metolachlor). In addition, herbicides were applied post-emergence. Repeated soil cultivation before the sowing of maize, at the 2-to-5-leaf stage of yellow nutsedge, damages the young nutsedge plants or moves them to the surface, where they dry out. This is a highly effective approach, preventing the formation of new tubers.



Yellow nutsedge in cereal stubble.

In some cases wheat cultivation led to a significant decrease in tuber numbers, whilst in other cases the infestation remained constant. Provided that intensive use is possible, sown grassland can reduce or even suppress this weed. Glyphosate only has a good effect on young nutsedge plants (up to the 3-leaf stage). Application therefore only makes sense in the case of small spots of infestation.

### Conclusions

- It is very difficult to eradicate infestations of yellow nutsedge, but with suitable methods, tuber density in the soil can be significantly reduced (by more than 90%).
- With low infestation levels or first-time infestations, there are good chances of eradication.
- Yellow nutsedge can be most effectively managed in maize.
- Successful control is always a long-term process over several years, requiring the combination and professional execution of different methods.
- Nationwide reporting and mapping could play an important role in preventing the further spread of yellow nutsedge in Switzerland.
- Regular consultations for farmers are essential, since controlling yellow nutsedge is a very complex, time-consuming and expensive undertaking.
- It is important to get the message across that farmers are not powerless against yellow nutsedge, even if there is no one single effective control method.

Scientific article on agrarforschungschweiz.ch:
Yellow Nutsedge: What Control Strategies Work in Practice?

# Better Milk Price and Low Basic Ration Costs Make Grass-Fed Milk Cost-Efficient

Grass-fed milk production meets a customer need, and is linked to specific feed and animal-welfare requirements. An Agroscope study sought to determine the circumstances in which grass-fed milk production is worthwhile.

**Daniel Hoop**

Surveys confirm that animal welfare is an important requirement of Swiss consumers. Accordingly, the IP-Suisse grass-fed milk label is becoming more common in retail outlets. It is therefore important for dairy farms to understand whether grass-fed milk production is economically worthwhile for them, and whether the higher milk price compensates for additional costs.

## Study examines cost-efficiency of grass-fed dairies

This study evaluated the costs and performances of ten grass-fed-milk producers at the production-branch level. Using model calculations, the costs compared to those of dairy farms producing pasture-fed and silage-fed milk without a 'grass-fed milk' label were calculated and compared in terms of cost-efficiency, bearing in mind the surcharge for grass-fed milk.

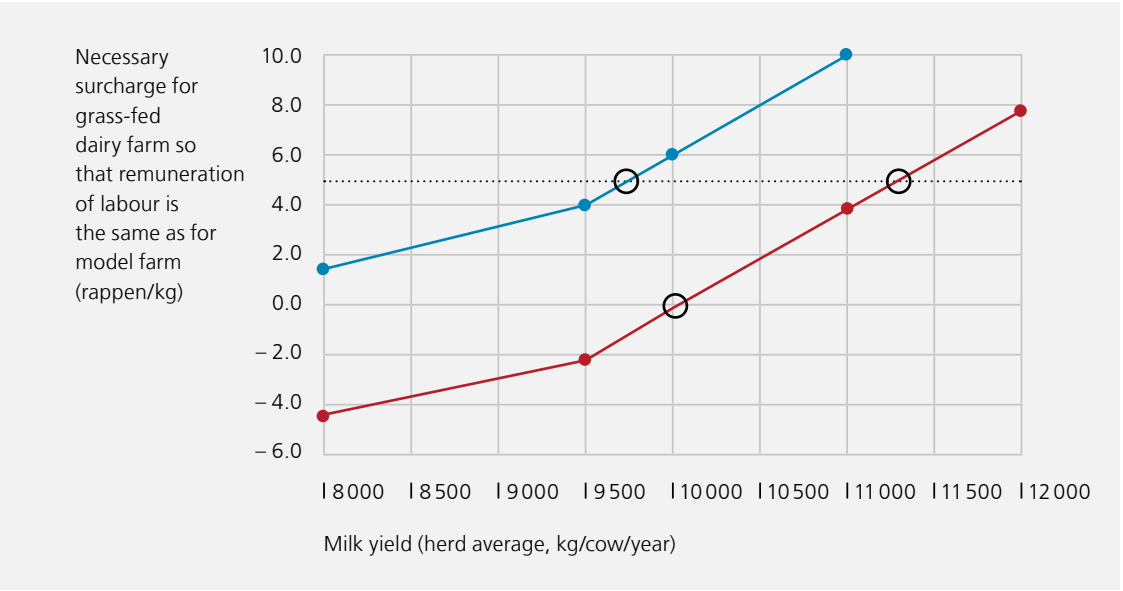
Thanks to the label, the grass-fed dairy farms studied – which correspond more or less to the average grass-fed dairy farm in the plain zone in terms of size and milk yield – receive a surcharge of 5 rappen/kg milk, thereby obtaining a milk price of 64.9 rappen/kg. Further revenue is obtained through the sale of animals and the receipt of direct payments. Thus, payments of 107.9 rappen/kg partially offset full costs of 128.9 rappen/kg, corresponding to a cost recovery ratio of 84%. Remuneration of labour is CHF 16.90 per hour with a milk yield of 7660 kg per cow and year.

## Switch pays off in certain conditions

The data allows us to calculate how high the surcharge for producers of grass-fed milk would need to be for them to achieve the same remuneration of labour as other forms of production with higher concentrate use and higher milk yields.

It can be seen that, even without a surcharge, the average grass-fed dairy farm is better off than model farms with year-round silage and a milk yield below 10,000 kg (intersection between yellow line and zero line of the y-axis in the graphic). This is primarily due to the lower basic-ration costs thanks to summer grazing. With a surcharge of 5 rappen/kg, the grass-fed dairy farm achieves the same remuneration of labour as a silage-fed farm with a milk yield of 11,300 kg a year. Without a surcharge, grass-fed farms would be less well-off than pasture-fed farms






Pasture-based milk production is characterised by a high proportion of fresh fodder in the summer ration, a high proportion of grazing, and the absence of soy in the ration.

using higher amounts of concentrates (blue line always runs above zero line of the y-axis). Because of the surcharge of 5 rappen/kg, however, they are better off than pasture-fed farms with milk yields of under 9800 kg (blue line runs below the value of 5 rappen/kg up to a milk yield of 9800 kg). This study was co-funded by Schweizer Tierschutz STS and IP-Suisse.

Scientific article on agrarforschungschweiz.ch:
Better Milk Price and Low Basic Ration Costs Make Grass-Fed Milk Cost-Efficient



## Conclusions

- When only minor adaptations of the production system are necessary, the switch to grass-fed milk production is cost-efficient due to the surcharge of 5 rappen/kg.
- If concentrate use must be reduced in order to meet requirements for the label, an economic analysis is necessary.
- The switch to grass-fed milk production based on a high-performance strategy (possibly combined with year-round silage) is probably not profitable, and may also not be easily achievable. This is because the animal genetics may not be suitable, or because it may not be possible to sell or repurpose existing buildings, machinery and facilities for feed preservation, which thus continue to have a negative effect on the economic result.

# Agroscope: Aiming for Number One in Research for the Agriculture and Food Sector



**Christian Flury has headed the 'Corporate Strategy Agroscope' Staff Unit since 2018. He is committed to ensuring that Agroscope exploits its full potential to find solutions for the agriculture and food sector.**

"Agroscope possesses enormous potential. We must exploit this potential to the full" explains Christian Flury. The 51-year-old agronomist has headed the 'Corporate Strategy Agroscope' Staff Unit since 2018. His main remit is Agroscope's overall strategy and the implementation of the Future Project.

## Alpine pastures instead of kindergarten

Christian Flury grew up in Seewis in the Prättigau (canton of Graubünden). Between the ages of five and seven he was able to spend the spring and autumn up until Christmas on his grandfather's alpine pastures. He recounts with a smile that the teacher tasked his cousin of the same age to pray for things to go well for him, although "the teacher was aware that I had it better than her."

Flury studied agricultural economics at the ETH Zurich. As the tutorial assistant of Peter Rieder, then Professor of Agricultural Economics and Policy, he was invited to write a dissertation on the future of mountain agriculture directly after completing his final year undergraduate project. His stint as a researcher was short-lived, however, since after completing his doctorate he became head of the interdisciplinary Greifensee Project. He also founded a private agricultural and regional economics consulting firm.

## Using potential

Flury started off at Agroscope in 2007 as head of the AgriMontana research programme. Programme management with reference to strategy opened the doors of the 'Corporate Research Agroscope' Group to him in 2014. "It's important that we collaborate even more extensively in future. The Future Project sets the course to that effect. And if we make use of the associated potential, I count it as a win" he explains. "A possible achievement would be Agroscope presenting a new cropping system to agricultural practice in 2025, thanks to system research."

The father of two school-age children, he recharges at home and through various outdoor activities. "My children often ask me what we do, and why. That helps me to formulate good arguments" states Flury with a smile. As for his vision for Agroscope: "We have good people and cover the most important topics. Our ambition should be to become number one in Switzerland for solutions for the agriculture and food sector." —

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**“We want to work together to develop economic, social and ecological production and food systems throughout the entire agriculture and food sector. Researching within the system also means involving the consumer.”**

Eva Reinhard, Head of Agroscope

▸ Interview, page 15

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