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Agroscope

Harnessing Agricultural Ecosystem Services, Reducing Environmental Impacts, and Increasing the Resilience in Swiss Agriculture using Agroforestry Systems

Kay S., Baur R., Herzog F.

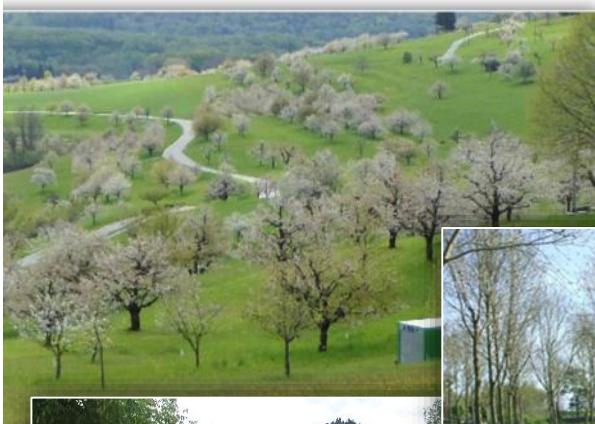
Agroscope
Research Division Agroecology and Environment
Switzerland

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Background: Why Agroforestry?

- Combination of trees, shrubs, woody elements ...
- ... and agricultural production (arable or livestock)
- Integrated on the same field

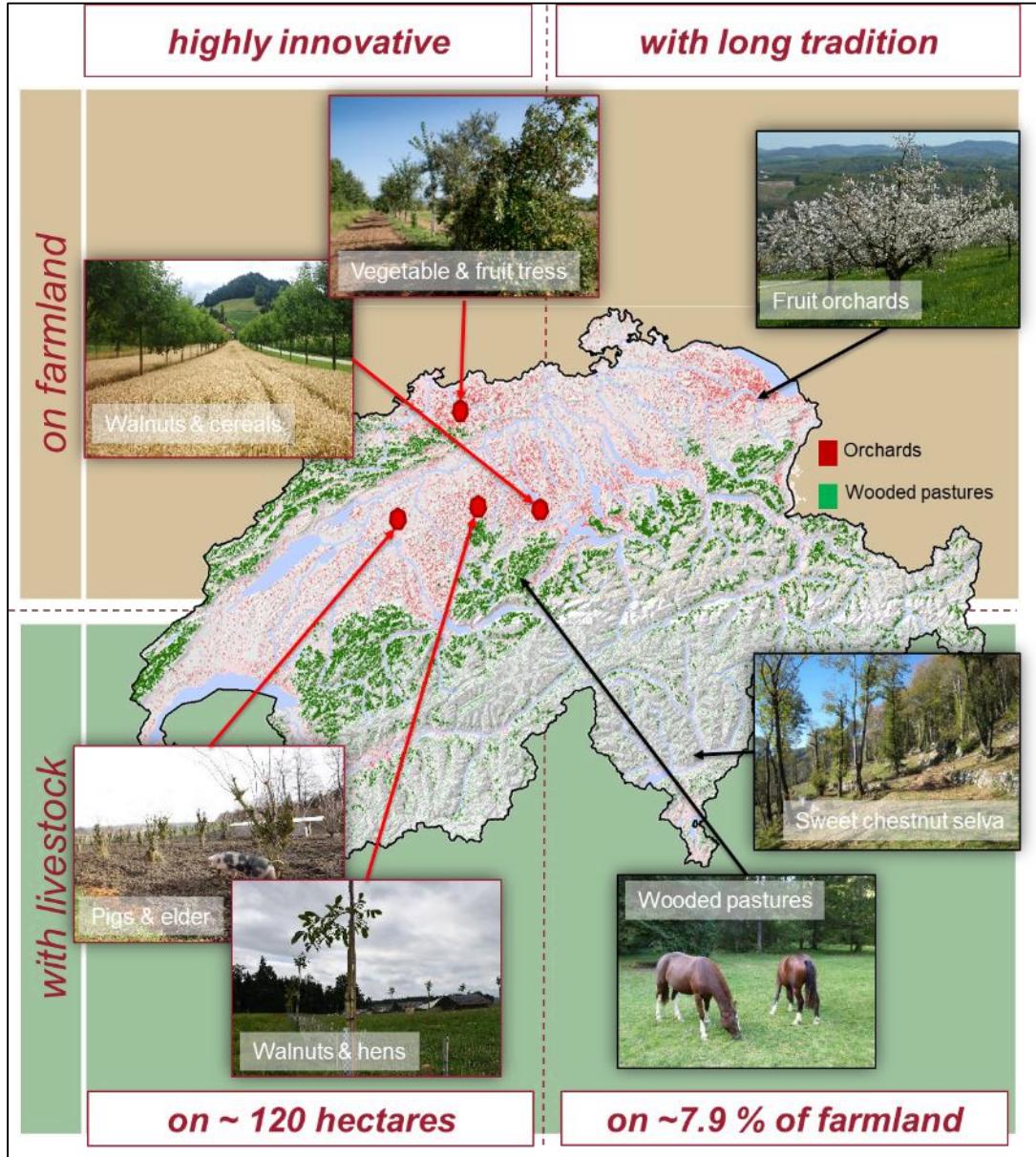


→ **provides Ecosystem Services** (Torralba et al. 2016, Hart et al. 2017)

- timber, food, and biomass production
- biodiversity
- soil fertility and nutrient cycling
- erosion control
- climate protection



Background: Agroforestry in Switzerland



All dies ist Agroforst!

Der Begriff „Agroforst“ beschreibt die Kombination von Bäumen und Pflanzen in der Sicht. In der Schweiz wird diese Landnutzform der Waldbauern im Jura, Kantonen Obwalden, welche die Kulturlandschaft unterschiedlich machen den Unterstrass-Feldkulturen. Die Agroforstsysteme in Kantonen Aggenstein sind ein Beispiel.

[Mehr Wissenswertes](http://www.agroforst.ch)

www.agroforst.ch
www.agroforesterie.ch

Agroforst-systeme

Hochstamm-, Wildobst- und Laubbäume mit Kulturpflanzen kombinieren

37 Agroforestry 2010 INNOVATION

Agroforestry with standard fruit trees in Switzerland

Important production and marketing information

Why plant fruit trees?

Fruit trees produce fruit which can be eaten fresh or processed into jams, jellies, syrups, etc. They also provide shade, shelter, and other benefits. In addition, fruit trees can be used to improve soil quality, reduce erosion, and increase biodiversity.

How to plant

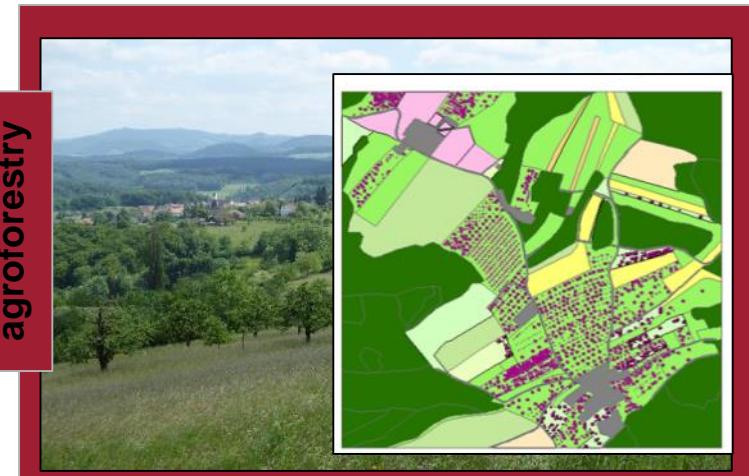
Planting fruit trees is relatively simple, but it requires careful planning and attention to detail. It is important to choose the right variety of tree for your location and to ensure that the planting site is suitable for the tree's needs.

Practical information in English & national languages

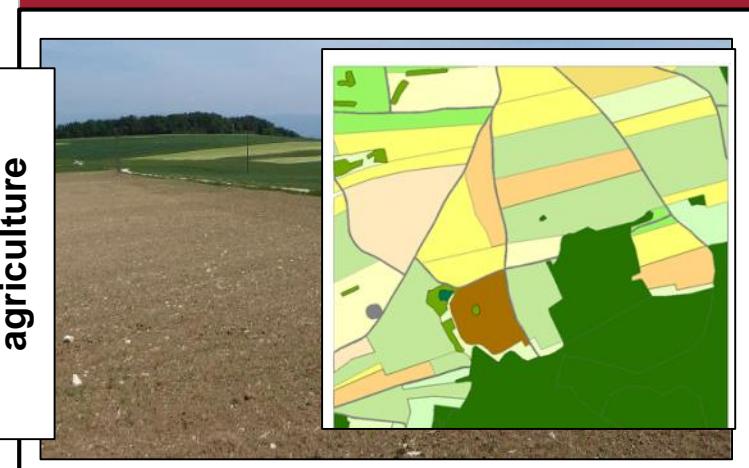


Research: Agroforestry landscape services

(Field)Mapping



Agriculture



Modelling



Biomass Production



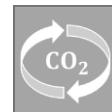
Groundwater Recharge



Nitrate Leaching



Erosion



Carbon Storage



Biodiversity (Pollination, Habitat Diversity)

Results

- higher carbon storage
- reduced nitrate leaching
- reduced erosion
- higher pollination services and habitat diversity

agroforestry

- higher annual biomass production
- higher groundwater recharge

agriculture

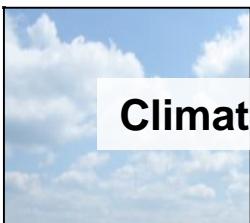


Application in Swiss Farmland - Environmental Objectives for Swiss Agriculture by the Swiss Government

Indicators



Biodiversity
& Landscape



Climate & Air



Water



Soil

Targets 2008

Preserve and promote

- biodiversity (species, habitats, functions)
- regional typical landscape scenery
- adequate watercourse corridors

Reduce

- GHG emissions ($-0.6\% \text{ yr}^{-1}$)
- nitrogenous pollutants (max. $25\,000 \text{ t N yr}^{-1}$)
- diesel soot (max. 20 t yr^{-1})

Mitigate

- nitrate in waters for drinking water (max. 25 mg N l^{-1})
- nitrate losses from agriculture (-50% against 1985)
- phosphorous losses ($> 4 \text{ mg O}_2 \text{ l}^{-1}$ lake water)
- impairments by pesticides
- Impairments by medications

Prevent

- contaminants in soils (problem Zn & Cu accumulation)
- erosion (max. 2 or 4 t ha^{-1})
- soil compaction

Status 2016

- First positive results visible (*agricultural biodiversity priority areas*), but ongoing negative impacts on species and habitats
- Reduction of air pollution in progress – targets not yet reached
- Reduction of water pollution in progress – targets not yet reached
- Reduction of soil preservation in progress – targets not yet reached

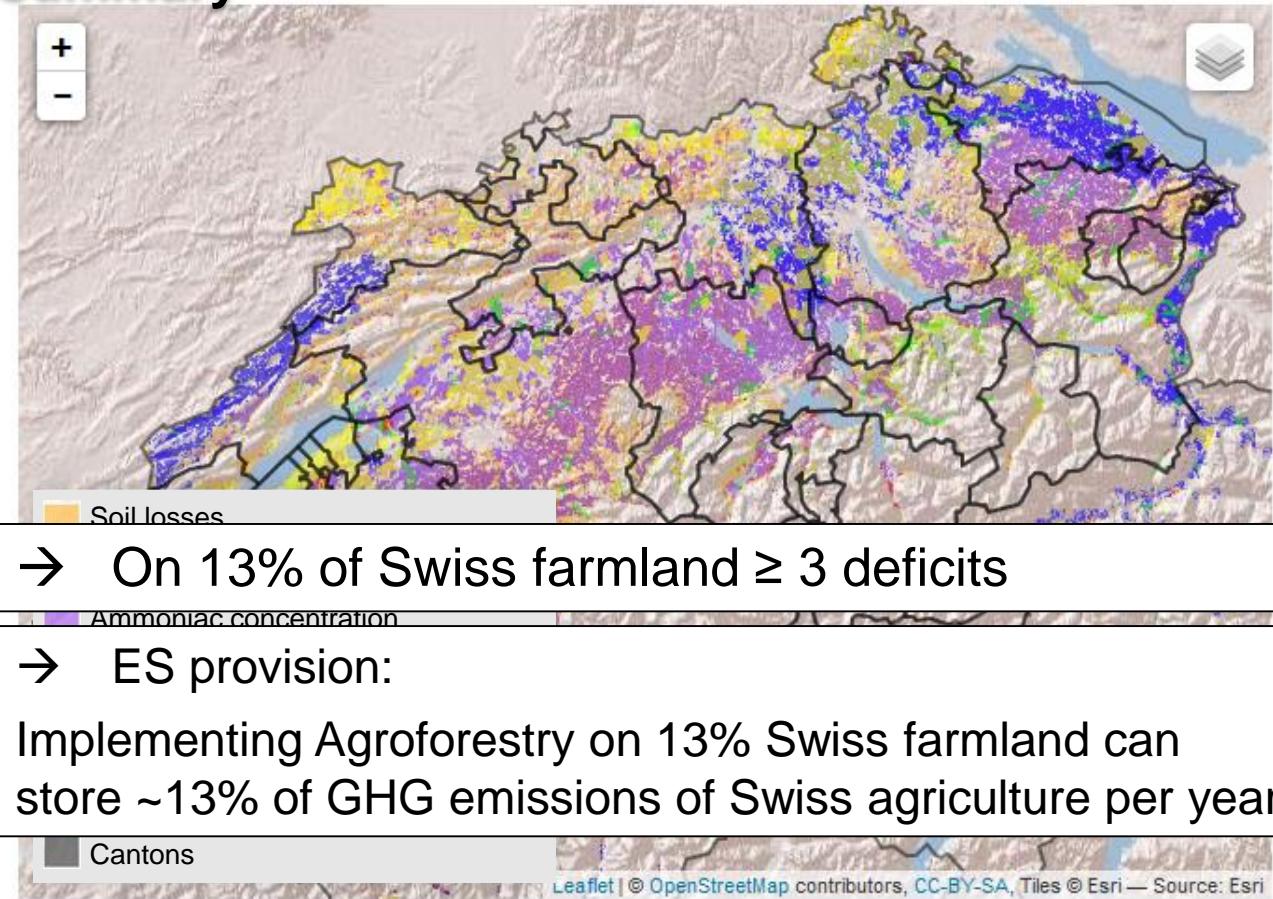


Application: Farmland Environmental deficit areas

Environmental Maps

- Patchy wildlife corridors
- Low honey bee pollination coverage
- Low pest control index
- Fragmentary water course corridors
- Ammonia concentration
- Nitrate surplus
- Phosphorous surplus
- Soil losses (erosion)
- Temperature rise
- Precipitation changes

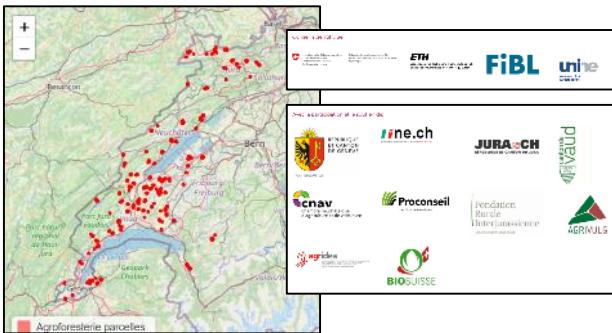
Summary





Next steps

Implementation and Scientific Monitoring



Resource project «Agro4esterie»

- 140 farmers in 4 cantons
- 240 ha agroforestry in environmental deficit areas
- Scientific monitoring of impact on soils, water, biodiversity, economics, socio-cultural effects
- Duration: 2020-2028

Broad Application

Practical Information for farmers on www.agroforst.ch or www.agroforestriech

Discussed as tool and funding scheme in the **Swiss Agricultural Policy 2022** (AP22+) for

- Biodiversity promotion
- Resource protection (water, soil, air)
- Climate mitigation

Research

Horizon 2020 Projekt:
«AGROMIX»



- AGROforestry and MIXed farming systems-Participatory research to drive the transition to a resilient and efficient land use in Europe



EJP soil CM2:
«CarboSeq»

Biodiversa Project **«SALBES»**



- Scenarios for Agricultural Landscapes' Biodiversity and Ecosystem Services



Thank you for your attention

Sonja Kay, Robert Baur, Felix Herzog

Sonja.Kay@agroscope.admin.ch

Robert.Baur@agroscope.admin.ch

Felix.Herzog@agroscope.admin.ch

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