Chances and challenges of agroforestry systems

Introduction to agroforestry in Switzerland

Organics Europe Youth Event 2022, Johanna Rüegg, 1.9.2022
Traditional agricultural landscape in the region

Arisdorf BL, 1926

Arisdorf BL, 2016

Adapted from Mareike Jäger, pictures: Swisstopo.ch
Traditional agroforestry systems in Switzerland

- High stem fruit orchards & grazing cows
- Chestnut-pastures in Ticino
- Forest-pastures in the Jura
→ multipurpose, synergies, increased productivity
# Functions of trees and agroforestry

<table>
<thead>
<tr>
<th>Productive</th>
<th>(Agri-)Environmental</th>
<th>Socio-cultural</th>
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<tbody>
<tr>
<td>Fruits</td>
<td>Shade</td>
<td>Protection for animals and humans</td>
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<td>Nuts</td>
<td>Weed control</td>
<td>Pleasant working conditions</td>
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<td>Seeds</td>
<td>Regulation of pest and diseases</td>
<td>Healthy and diversified food</td>
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<td>Condiments</td>
<td>Nitrogen fixation</td>
<td>Possibility of innovation for producers</td>
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<td>Honey</td>
<td>Biomass for mulching and nutrient recycling</td>
<td>Species of high cultural or social value</td>
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<td>Stimulants</td>
<td>Carbon storage</td>
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<td>Medicine</td>
<td>Erosion control</td>
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<td>Flavourings</td>
<td>Water retention</td>
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<tr>
<td>Colouring</td>
<td>Making water and nutrients available from deep layers</td>
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<td>Fat</td>
<td>Windbreaks</td>
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<td>Fodder</td>
<td>Stable microclimate</td>
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<tr>
<td>Energy wood/wood</td>
<td>Maintain native biodiversity and habitats</td>
<td></td>
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<tr>
<td>Fine wood</td>
<td>Reforestation of degraded areas</td>
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</tbody>
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FiBL
Multistrata system in the tropics (SysCom Bolivia)

Traditional systems for many food crops and later also for commercial crops as cocoa and coffee

- By-crops for self consumption
- Climate adaptation, mitigation, biodiversity, nutrient cycling

Challenges
- Shade tree management
- Management and markets for diversified by-crops

FiBL

Picture: Marco Picucci, FiBL
Silvoarable agroforestry (Agroforestry in Austria)

10 years old system with Black walnuts and mulberries

- Biodiversity, climate, nutrient leaching…
- Additional products

FiBL

Picture: Theresia Markut, FiBL
Silvoarable agroforestry (Agroforestry in Austria)

11 years old poplar hybrids

- Biodiversity, climate, nutrient leaching…
- Wood production

FiBL

Picture: Theresia Markut, FiBL
Silvoarable system (BioDiVerger)

Low-input orchard (low-stem) with vegetable production according to principles of permaculture and agroforestry

• High biodiversity
• Good regulation of pests
• Increasing gross margins

FiBL

Picture: Johanna Rüegg, FiBL
Multistrata system  
(GAFAM, INRAE  
Restinclières, France)

Adult walnut trees in a apple plantation – Research plot

→ Influence on architecture of apple trees?
→ Photosynthetic activity?
→ Allelopaty?
**Silvopastoral system (ECORCE)**

Grazing of sheep in orchards and vineyards
- Utilization of the grass/cover crop
- Weed control

**Challenges:**
- Cupper toxicity
- Tree debarking

**FiBL**

Picture: Martin Trouillard, FiBL
Silvopastoral system (Agro4esterie)

Structuring poultry and pig parks with trees and bushes

Use of ramial chipped wood as litter near the buildings

• Nutrient and soil fertility management
• Animal welfare

Credits: Projet CASDAR Parcours volailles
Silvopastoral system (Agro4esterie)

Fodderhedges with trees and shrubs

• Optimize production on same surface
• Extend grazing period
• Animal welfare (i.e. medicinal plants, shelter)

Credits: Jérôme Goust
Agroforestry – still many open questions for practitioners and scientists
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