

# Internship proposal

1. **Student:** Marta Tarruella Cayuela
2. **Host:** AECF, ETH
3. **Internship Responsible person:** Prof. Dr. Robert Finger and Dr. Robert Huber
4. **Master thesis supervisor:** Prof. Dr. Ralph Winkler
5. **Start and end date internship:** 1<sup>st</sup> April 2022 – End of September / Beginning October 2022

## 6. Internship description:

**Background:** Climate change and its consequences pose a particular threat to agricultural productivity and rural livelihoods and climate change mitigation in agriculture has become a central concern for policymakers and scientists.

**Topic:** Assessment of the impacts of market-based instruments used by policy and industry can be leveraged to reduce greenhouse gas emissions in Swiss agriculture, contributing to climate change mitigation targets. The main 4 main research questions of the internship are:

- 1) How can greenhouse gas emissions in Swiss agriculture be reduced effectively and efficiently, minimizing trade-offs with other agricultural policy goals like food production, the provision of other ecosystems services, and farmers income?
- 2) Which economic instruments (label premiums, taxes, subsidies, and tradeable permits etc.) used by policy and industry can be leveraged to reduce greenhouse gas emissions under different scenarios of Swiss agriculture?
- 3) What is the role of behavioral factors and social interactions (e.g., in collective reduction efforts of farmers) for the efficacy and efficiency of economic instruments?
- 4) What are efficient policy mixes that combine both public and industry incentive schemes for farmers?

The project will be based on mathematical programming approaches using existing bio-economic and agent-based models on two spatial scales. First, a regional level analysis combining a farm-level optimization model (FARMDYN) and an agent-based approach (FARMIND) allows for assessing policy and market incentives considering detailed individual farm structures as well as farmers' behavioral factors (operating at farm to regional scale). Secondly, the agent-based sector model SWISSland simulates the effects of policy and market interventions on a national level. The research will show, how economic instruments for climate change mitigation in Swiss agriculture can be embedded in scenarios of a holistic food policy framework.

## **Activities:**

- Establishing assumptions about scenarios of exogenous input and output prices as well as other economic, environmental, and political developments for the bio-economic model (e.g., GHG emission goals, "feed no food" or "farm to fork")
- Definition of economic incentives and instruments used in the modelling exercise

- The harmonization of GHG emission factors
- Mathematical modelling
- Literature review
- Data and statistical analysis

**Learning outcomes:**

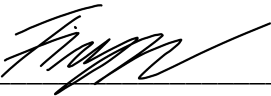
- Definition of scenarios for economic modelling
- Definition of economic instruments targeting climate change mitigation for Swiss Agriculture
- Deal with GHG emissions data

**7. Remaining coursework and thesis writing**

Autumn semester 2021	Spring semester 2022
Scientific Writing in English in the Natural Sciences, level B2/C1 (3 ECTS)	Internship at AECP group - ETH (30 ECTS)
Master Thesis (30 ECTS)	


**Signatures**

Prof. Dr. Robert Finger, AECP ETH





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Dr. Robert Huber, AECP ETH



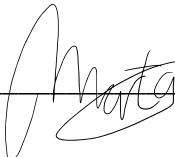

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Prof. Dr. Ralph Winkler, University of Bern




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Student: Marta Tarruella Cayuela




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