Forest expansion in the Swiss Alps: A quantitative analysis of bio-physical and socio-economic causes with an emphasis on structural change in agriculture

(National Research Programme NRP 48 "Landscapes and Habitats of the Alps")

Dr. Priska Baur (project leader)
Dr. Peter Bebi (co-applicant)
Dr. Ruedi Boesch (co-applicant)
Cornelia Fürstenau (Ph.D student)
Mario Gellrich (Ph.D student)
Dipl. Ing. ETH Claudia Schreiber (journalistic accompaniment)

Problem

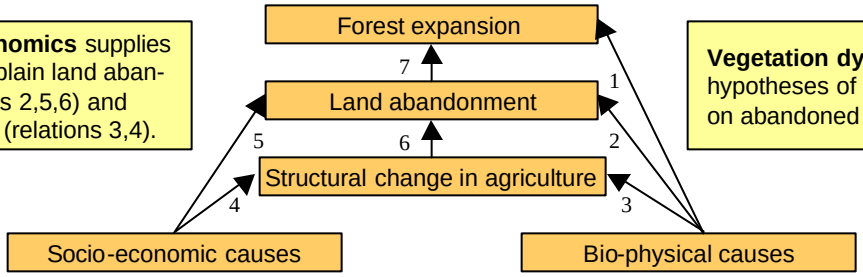
The forested area in the Swiss Alps has expanded by about 30% during the 20th century. The main reason for this development is the abandonment of agricultural land. Land abandonment is widely explained by farm labour migration. However, is there an ultimate relationship between the change in the number and size of farms and forest expansion?

Objective

We aim at identifying, disentangling and quantifying the relevant patterns and cause-effect relationships of land abandonment and forest expansion in the Swiss Alps with the help of newly available large quantitative datasets.

Theoretical framework, disciplines, and methods

Agricultural economics supplies hypotheses to explain land abandonment (relations 2,5,6) and structural change (relations 3,4).



Vegetation dynamics addresses hypotheses of forest expansion on abandoned land (relations 1,7).

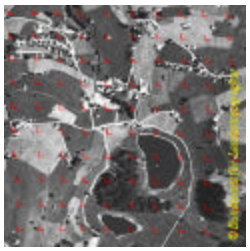
Spatial modeling allows the quantification of the relevant patterns and cause-effect relationships.
Two complementary database-approaches for different spatial and temporal scales are used: TAA and RAPAS.

Total area approach (TAA)

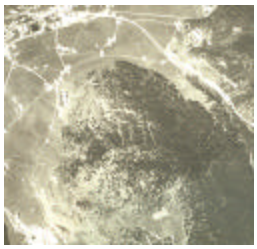
In TAA, existing data sets covering the complete area of the Swiss Alps such as Swiss National Forest Inventory, topographic maps, labour statistics or farm census data are used.

Repeated aerial photograph approach in selected areas (RAPAS)

In RAPAS, we investigate forest expansion in 2-3 case study areas. Where necessary, existing data are complemented by local surveys.



Swiss National Forest Inventory and Swiss Areal Statistics (TAA)



Aerial photographs Davos 1930 and Davos 1980 (RAPAS)

Networking

Dr. P. Brassel, WSL
Prof. Dr. H. Bugmann, ETHZ
Prof. Dr. P. Edwards, ETHZ
Ch. Ginzler, WSL
PD Dr. N. Gotsch, ETHZ
Dr. M. Hunziker, WSL
Dr. R. Kündig, ETHZ
Prof. Dr. P. Rieder, ETHZ
M. Roggli, Federal Office of Topography
Dr. C. Steinmeyer, WSL
Prof. Dr. U. Tappeiner, Europ. Akad. Bozen
Prof. T.T. Veblen, Univ. of Colorado, Boulder
Prof. Dr. R. Weibel, University of Zurich

Expected results

By making the drivers of forest expansion transparent, the project contributes to an improved decision basis for designing efficient political measures to control land-use change.

Birmensdorf, 11. April 2002