

Applied Research Partnerships with Developing and Transition Countries

Swiss Universities of Applied Sciences and Universities of Teacher Education

Project title

Resource-Conserving Agriculture

Thematic focus

Agriculture, Resource conserving, mixed crops, undersowing

Project location

Chisinau, Balti, Moldova

Swiss Institution

Swiss College of Agriculture (SCA), Zollikofen
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Partner Institution

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Description

Moldova is the poorest country in Europe and has barely recovered after the collapse of the Soviet Union. Farmers are battling with low produce prices and exorbitant costs for production goods (fertilizer, plant protection and fuels). It is particularly difficult for family farms, which should have received assistance when the country was privatized. A consequence of the continuing crisis is a wide-scale rural exodus. The aim of the project „Resource Conserving Agriculture“ is to develop an agricultural production system which will yield satisfactory harvests using a minimum of fertilizers and plant protection, and where farmers can produce the energy they need themselves.

Scientific experiments and strip trials on farms have attempted weed control through leguminous undersowing, and by using nodule bacteria of the legumes to produce nitrogen for the farming system. By mixing "Gold of Pleasure" (*Camelina sativa*) an age-old oil plant with traditional crops, will also be used to provide the fuel needed on the farm. Participating institutions from Moldova as well as researchers from Switzerland can benefit from collaborating in research.

Development relevance

The aims of the project are included in the Millenium Development Goal 7.A: "Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources". Not only can natural resources be conserved, but CO2 emissions can also be reduced through undersowing plants and mixed crops.

The Millenium Goal 1.B is also central to our project: "Achieve full and productive employment and decent work for all, including women and young people". Higher incomes, particularly in rural areas, can reverse the effects of the rural exodus.



Countryside close to Chisinau. Much of the land is not farmed (fallow) because prices of produce are low, production costs high, and opportunities limited. The blue areas indicate fallow land.



Infrastructures, machines, and equipment are in poor condition.

KFH

Rektorenkonferenz der Fachhochschulen der Schweiz
Conférence des Recteurs des Hautes Ecoles Spécialisées Suisses
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Swiss Agency for Development
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Main features of the project

Field trials were carried out in Moldova and Switzerland with focus on the research questions. In addition to trials on small plots of land, there were also large-scale field trials on commercial farms. From the outset, importance was placed on practical implementation by introducing so-called "on-farm research" methods. An exchange of experience and knowledge transfer between the participating institutions were also central. Although it is certainly important for partners in Moldova to have contact with research institutes in Western Europe, Switzerland, too, can benefit from cooperation with institutes in Eastern Europe (e.g. new gene pools in plant breeding). A number of semester, Bachelor, and Master theses have already been written on the project or are being written.

Important results

- Statistics attest a guaranteed decrease of weeds and an increase in harvest in Moldova by undersowing legumes into summer cereals.

Results from scientific trials (4 replications) in Chisinau 2008-2010

Number of weeds / weight (g)

Spring barley alone 38.0 / 2.5 (100%)

Spring barley + Alfalfa 16.2 / 1.2 (43% / 48%)

Spring barley + White clover 17.4 / 1.4 (46% / 56%)

Spring barley + Alfalfa + White clover 12.8 / 1.6 (34% / 64%)

Yield

Spring barley alone 1713 kg/ha (100%)

Spring barley + Alfalfa 2173 kg/ha (+460 kg = +27%)

Spring barley + Alfalfa + White clover 2174 kg/ha (+461 kg = +27%)

Spring barley + White clover 2077 kg/ha (+364 = +21%)

- Mixed crops achieved yields which were sometimes comparable, sometimes higher than with previously used methods.
- In Switzerland, too, several research-focussed experiments were carried out each year and assessed. The results were very interesting, and have attracted attention in both practice and research.
- The project approach and initial results were introduced at the International Symposium "Innovation transfer in agricultural activities in the context of climate change and sustainable development" in November 2009 in Chisinau and were met with great interest.
- Implementation was successful. Several farms are already undersowing alfalfa (*Medicago sativa*) into their cereals - with good results.
- The years 2009 and 2011 were extremely hot and dry in Moldova so that most of the experiments could not be assessed.
- Partners from Moldova attended a work-week in Switzerland in the summer of 2009. Valuable contacts were made with researchers in Switzerland and old, but well-maintained machines and equipment were transported to Moldova, where they are of great help for the research.
- A lot of student papers were completed successfully.
- In September 2011 a Memorandum of Understanding between the "Aleco Russo" Balti State University and the Swiss College of Agriculture was realized. Areas of collaboration: Joint development of applied research, joint publication of research results, support in the student exchange, promotion of exchange of professors and researchers.



Undersowing (here, alfalfa in summer barley) eliminates the need for weed control, and the legumes provide the soil with nitrogen for the next crop.



With mixed crops, resources are put to better use. Above: "Gold of Pleasure" (*Camelina sativa*) and peas. Camelina keeps down the weeds, provides oil and protein, and supports the peas, preventing them from falling. Peas provide protein.