No-Tillage: From Bernese Cantonal Promotion To Swiss Federal Agricultural Policy

Wolfgang G. Sturny and Andreas Chervet

Soil Conservation Service, Canton of Berne, Ruetti-Zollikofen, Switzerland

Corresponding author: wolfgang.sturny@vol.be.ch

Introduction
Since the late 1950s agricultural production on arable land has been strongly intensified. Switzerland is characterized by sloping and undulating areas as well as a cool and wet climate with annual precipitations of 1000 mm and more. Therefore, soil erosion is a major concern in arable farming. In addition, axle-loads of farm machinery have increased significantly during the last decade resulting in pronounced soil compaction and decreased soil quality. A strategy of action introducing a practicable cropping system, which combines the conservation of natural resources with economic benefits, was required. Conservation agriculture – in particular “zero tillage” based on Manitoba experiences from the early 1980s (Sturny, 1982) – fulfils both these criteria.

In the Canton of Berne, conservation tillage is being encouraged with financial incentives since 1993 (Schwarz et al., 2007) – including a farmer-to-farmer approach. Innovative private contractors made a valuable contribution to promoting no-tillage techniques among farmers. At the same time, countrywide awareness about no-tillage was successfully raised through consulting, publications, field trials and demonstration plots, field days as well as the national discussion platform SWISS NO-TILL (http://www.no-till.ch). The area under no-till increased constantly, reaching 17,000 ha or nearly 5% of the arable land (Schneider et al., 2010).

Adoption of No-Tillage Practices
Substitution of non-selective herbicides: Winter wheat – using one-third of the seed density – and corn precision planting, respectively, directly into an established cover crop mixture: using or not a knife roller. The green manure plants freeze off in winter and provide a protection against soil erosion, pesticide runoff, and nitrate leaching, among others. A selective herbicide treatment in post-emergence will control hardy plants in spring.

Profitability / Sustainability
Yields and archived records of the field operations provide the basis for cost-effectiveness calculations. For each crop grown from 2009 to 2014, the direct costs (seed, fertilizer and plant protection products) as well as the machinery costs and the employment of third parties were compiled. Soil tillage, seeding, crop maintenance and harvesting are carried out with commercial machines by contractors. The profit margin I is obtained by subtracting the costs from the revenues. The profit margin II includes the profit margin I plus ecological contributions such as proof of ecological performance, extenso, resource efficiency and integrated production. Both systems are being established further and optimized with regard to environmental sustainability and by significantly reducing the application of glyphosate (Sturny et al., 2007).

Soil Support Program
The Soil Support Program launched in 2009 is based on a three-pillar principle. Following completion of the program in 2015, the 11 measures should be economically feasible without additional incentives and be pursued further.

Conclusions
On a national level within the agricultural policy and the payments framework for 2014-2017, a new tool including “payments for efficient use of resources” was introduced in 2014 providing several measures derived from the Bernese incentive Soil Support Program.

References