RATING-SRC ("Reducing environmental impacts of Short Rotation Coppice (SRC) through evidence-based integrated decision support tools") is an ERA-NET Bioenergy project dealing with the impact of SRC of willow and poplar on the environment. The partners involved were from Germany and Sweden: Swedish University of Agricultural Sciences (SLU), who coordinated the project, Chalmers University of Technology, Johann Heinrich von Thünen-Institut (vTI) in co-operation with Göttingen Soil Initiative (GBI e.V.); University of Göttingen, Dep. of Soil Science of Temperate and Boreal Ecosystems (PGZ); Bureau for Applied Landscape Ecology and Scenario Analysis, Göttingen (BALSA), University of Rostock and Beckmann Institute for Bio-production technology lines e.V. (BIOP Institut). Other general information for the project can be found in http://www.ratingsrc.eu/.

SRC with willow and poplar is an agricultural crop for production of biomass for heat and/or electricity. A rapid increase of agricultural land cultivated with SRC has been projected in the short-term in several European countries. As a perennial crop, SRC differs from arable crops in physical traits and management practices, and a large-scale shift from "conventional" arable crops to SRC will have implications on a range of environmental issues. Research conducted within RATING-SRC provided with scientific evidence to evaluate the impact (positive and negative) of SRC on soil, water and biodiversity, and also proposed ways to mitigate negative and increase positive impacts.

Field experiments were conducted in commercial SRC plantations in Sweden and Germany were all above-mentioned factors were investigated in common. Concerning phytodiversity, vegetation composition in 15 SRC plantations (willow, poplar) and in adjacent land-use units (grasslands and also forests) were investigated. The main findings suggest that SRC has positive effects on phytodiversity compared to arable land in terms of species number and diversity, and that in particular in regions with dominating arable land use SRC can positively contribute to landscape species diversity of vascular plants (γ diversity). Zoodiversity studies in two SRC plantations (poplar) and in adjacent arable land were conducted looking at avian fauna and ground beetle assemblages. The total number of breeding birds is increased in SRC compared to adjacent land uses, and SRC were proved poor in species diversity and abundance for specialized bird species and ground beetles. Structural diversity was found to promote faunistic diversity. For the impact on soil, studies on carbon and trace elements (16 commercial willow SRC plantations in Sweden) and for organic composition and microbial community (willow and poplar SRC in Germany and Sweden) showed that C storage and soil organic stability are higher in SRC and support C sequestration in the soil, and that Cd concentrations in the soil are significantly lower in SRC than in common arable crops. Groundwater quality (NO_3-N and PO_4-P) was also investigated in these willow fields; NO_3-N leaching to groundwater is substantially lower from SRC than from arable crops, but leaching of PO_4-P is not. In all, leaching of PO_4-P and Cd in soil of SRC were not affected by sewage sludge applications. Groundwater recharge studies suggested that recharge decreases when SRC replaces grassland, but such effects are not significant in catchment level.

Based on the above results concerning the impact of SRC establishment on the environment, a series of general recommendations to optimize SRC practice, achieving sustainable management while aiming at highest biomass production, were developed (the most important are presented below):

- Establish SRC in homogenous arable landscapes to achieve highest positive effects on phytodiversity
- Variable SRC structures (shoot age, species/clones, area shape) and habitat diversity (intensive land use mixtures) to increase ecotone area and thus biodiversity (phyto- and zoodiversity)
- Cultivate SRC in fields located close to N sources (animal farms, wastewater treatment plants etc) to decrease N outflow to adjacent water bodies
- Establish SRC on fields with initial low C and high Cd soil concentrations to improve soil quality
- Harvest more frequently and cultivate SRC for at least 3 cutting cycles to achieve the above
- Recycle nutrients via municipal waste residues (no effect on groundwater and soil quality)