

MÄRLÄNDER, BERNWARD*, JULIA FUCHS, HEINRICH REINEKE and NICOL STOCKFISCH, Institute of Sugar Beet Research, Holtenser Landstr. 77, 37079 Göttingen, Germany. **Environmental impact of sugar beet production in Germany.**

ABSTRACT

Environmentally sound cultivation methods for crop production in general and for sugar beet cultivation in particular are recurrently discussed within the EU in relation to the sugar regime. The debate is going on between society, politicians and the agricultural community and focuses on the legally regulated protection of environmental goods soil, water, air, and biodiversity. Thus, there is an urgent need for reliable data about sugarbeet cultivation regarding performance, environmental impact, efficiency, cost structures of farms and flows of material and energy. Furthermore, prices for sugar beet were reduced as a consequence of the reform of the EU sugar regime, and an efficient sugar beet cultivation gains in importance.

Objective of the joint project on environmental effects of sugar beet cultivation was to provide information about the diversity of cultivation systems in Germany and to evaluate cultivation exemplarily on a nationwide level. For that purpose, interviews were conducted with 109 farmers about sugarbeet production on 285 field sites in 2004. This data base was analysed in different projects which comprise indicators for environmental impact, eco-efficiency and profitability of sugar beet cultivation. In this regard, efficiency criteria were calculated for soil tillage, fertilizer application, pesticide use and harvest at field site level, i.e. energy input for tillage (GJ), N-fertilizer rate (kg), standardized treatment index of pesticide use (STI) and soil tare (t) were considered as process specific inputs and were related to calculated sugar yield (CSY). These four efficiency criteria were aggregated to an over-all efficiency index. Field sites with a low over-all efficiency lay minimum in three processes below the arithmetic mean, field sites with a high over-all efficiency lay minimum in three processes above the arithmetic mean. As an example, N-fertilizer application was selected to show that efficiency is easier to rise by reducing the input level than by increasing CSY. Additionally, genetic gain will increase CSY steadily, but only in a slow manner and with smaller effects on efficiency. Based on these results, new strategies for extension work to optimize inputs can be developed. As a reduced input does not necessarily imply a diminished output and in addition further yield increase is likely, the basic conditions for a more efficient sugar beet cultivation are excellent.