THE IMPACT OF THE USE OF CHEMICAL CROP PROTECTION ON THE CO_2-BALANCE OF AGRICULTURAL CROPS (EX. COTTON)

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ABSTRACT

Effective crop protection supports the increase of photosynthesis of crops and thus enables a higher assimilation of CO_2 from the atmosphere. The greenhouse gas emissions caused by production and application of crop protection products are compensated several times by higher harvest yields and increased plant biomass. In the given examples for cotton production under different conditions, additional CO_2 assimilation as a result of chemical Crop Protection exceeded the emissions of greenhouse gas between 25 and 50 times. This balance turns even more positive if the efficiency of other agro-inputs (e.g. ploughing, sowing, irrigation, fertilizing, harvesting) and reduced land use change were accounted for.

INTRODUCTION

Cotton is known to be an “input - intensive” crop, and its relatively high requirement of crop – protecting agents has always been a matter of criticism. However, science, technology and modern growing practice have already lead to substantial reductions in the use of chemicals in cotton in recent past:
Nevertheless, in order to obtain viable productivity levels, Integrated Crop Management (ICM) requires the use of chemical Crop Protection, even as GM technologies, available in more and more geographies, have been instrumental in its reduction to levels far below than those in the past.

While the benefit of considerably limiting yield losses through chemical Crop Protection has been widely assessed, a lot of misconception prevails with regard to possible detrimental effects on the environment.

At times of widespread concern about climate change, CO_2 emissions as one of its major influencing factors, the need for increased agricultural production and limited natural resources, solid information on the CO_2 – balance of the use of agrochemicals and its related activities is certain to enrich the debate.
Combined findings of a Research Project conducted by Bayer CropScience and the “agripol – network for policy advice GBR, Berlin, Germany” are the subject of this presentation.

OBJECTIVE OF THE STUDY

Development of a sound and sophisticated methodology for quantification of the net balance of emitted and assimilated CO2 due to the application of chemical Crop Protection in agriculture.

Analysis of the CO_2 balance of selected crop protection products from Bayer CropScience and assessment of their overall contribution to agricultural green house gas emissions, respectively mitigation.

RESULTS

In the scope of the study 61 examples (16 countries / 14 crops) have been analyzed. The results of the study express all $C0_2$ emissions or energy consumption caused by the use of chemical Crop Protection , as well as their additional assimilation through increased plant biomass, as kg CO_2 (equivalent) / hectare. This Balance A usually yields factors of 25 and more.

Furthermore indirect, positive effects of protected plant biomass and higher yields on the efficiency of other technical inputs such as water- and fertilizer (Balance B), as well as savings of additional or alternative use of the land thanks to the increased productivity (Balance C) yield factors which are even considerably higher.

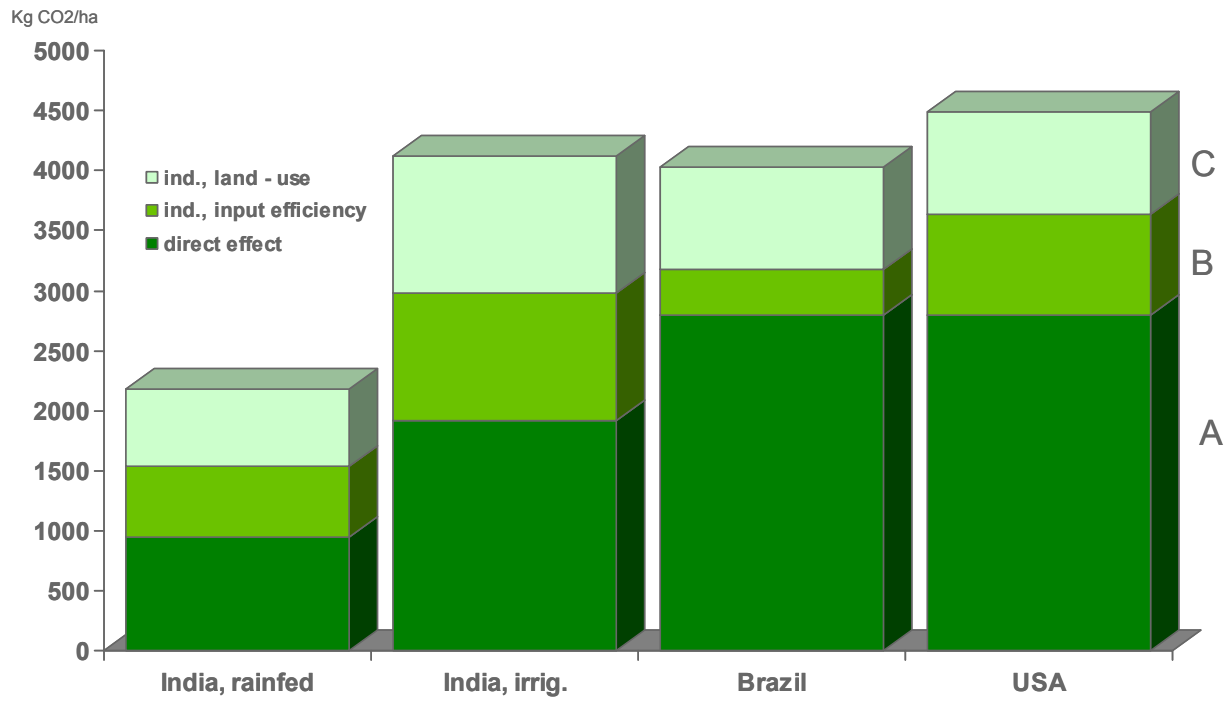

Figure 1. Increased Assimilation through higher Biomass, better Input Efficiency and Land – use Optimization

REFERENCES

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