

Evaluating the Efficiency of Cotton Cultivation Considering Climate Change Challenges - Abstract

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Summary

Climate change affects in a severe way the agricultural activities. Among the most impacted crops is this of cotton, as this type of cultivation requires the excessive use of water and of agro-chemical products leading to negative impacts in arable fields (biodiversity loss, soil degradation, water pollution). Apart from the difficulty of the cotton farmers to adapt to climate change, there are also issues having to do with their potential to contribute to the mitigation of the phenomenon due to the excessive use of energy inputs. Although 'crop-specific-payment' for cotton will continue to be granted to producers under the upcoming Common Agricultural Policy 2021-2027, there is an extensive discussion about requirements that should be fulfilled, especially those concerning environmental protection, reducing agro-chemical use and focusing on the establishment of ecofriendly practices for farmers. Therefore, the challenge of efficiency in agricultural practices acquires a high importance for farmers as it actually defines the long-term sustainability of their holdings.

Aiming to evaluate resource use efficiency of cotton cultivation, a three-part questionnaire has been designed, containing demographic characteristics of the interviewee, amounts and values of all inputs involved (seeds, plant protection products, energy and water), as well as overall revenue after the end of the season accordingly. Collected data have been analyzed using Data Envelopment Analysis (DEA) so as to assess the performance of different cotton farms. Input-oriented DEA approach has been selected in order to perform analysis under the scope of minimizing production costs and in economic, energy and environmental terms. Analysis focuses on the input slacks of each producer in order to identify any excessive use of inputs which jeopardizes the global target of sustainable agricultural production. The results indicate that only few farmers achieve high efficiency scores. On the other hand, the majority of farmers should follow new approaches for achieving the same output with lesser inputs, while others should search for new alternatives. Any quantitative reduction of agro-chemical and water use can help the sector to better adapt to climate change but also to mitigate its emissions as it is directly related with the improvement of carbon and water footprint records. All in all, the paper may help farmers to understand their competitive position when climate change targets of production are

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being set and provide them with quantitative targets for improving their efficiency and hence their sustainability under a challenging environment.

Keywords: Data Envelopment Analysis; cotton; sustainable development; climate change.

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