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INSUSFAR - Economic performance and risk analysis of winter wheat composite cross populations and pure lines in low input cropping systems

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Due to climate change, the variability of abiotic factors in agro-ecosystems is expected to increase. Future cropping systems will have to be highly robust and self-regulatory in order to cope with extreme weather events and a growing influence of stochastic elements (Anyamba et al., 2014). A key to resilient cropping systems is seen in enhanced diversity (Howden et al., 2007). The INSUSFAR project, for the case of winter wheat (*Triticum aestivum* L.), analyzes the influence of intra-crop genetic diversity on crop performance under variable and changing environments. Yield and quality parameters of different winter wheat composite cross populations (CCP), with a high genetic diversity and high adaptability (Döring et al., 2015), are measured in both experimental and on-farm trials. Based on these data, economic risk analysis will be conducted. Risk analysis is based on a full cost accounting and budgeting approach. Economic key parameters such as yield and yield quality, product prices, and direct costs will be varied using Monte Carlo simulations (Kroese et al., 2011) in order to display stochastic effects and assess risk profiles of different crop production processes (CCP and pure lines). Model farms (experimental trial data) as well as real farm case studies (on-farm trial data) will be used to analyze the economic performance in terms of net income and net income stability of the different winter wheat production systems under organic and conventional management as well as for different site-specific conditions. The overall goal of this economic assessment is to draw conclusions on and give recommendations for optimum (site-specific) degrees of diversity in order to balance the trade-off between a potential short-term yield decrease and long-term yield stability when changing from homogeneous winter wheat varieties to diverse CCPs.

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