Topic: Climate change – implications for strategies in policy and farming
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Benefits of climate modeling for actors along the food chain - reflections for further engagement between science and practice.

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In the agricultural practice in Europe climate aspects are still rarely influencing decision-making at farm level, other aspects as short- term economics and legislative constraints being more relevant. But also in Europe farmers are facing shifts in weather patterns with weather extremes, thus showing that there is a need for more information regarding climate change. In this regard models which are able to describe climate phenomena and possible options for (pre-)adaptation are becoming more and more valuable for the farming community. This is in particularly relevant for long -term investments like for livestock buildings or irrigation infrastructures, but also for the choice of crops and management practices and related machinery.
At the same time agriculture and in particular the livestock sector is pointed out as an important GHG emitent, in particular for methane. With the Paris agreement, EU Member States are asked to present strategies on how to reduce their emissions. There still is little knowledge about cost-effective measures to reduce emissions at national, and especially at regional and farm level. Here sophisticated, consolidated climate models, able to present possible pathways for emission reductions and in particular its costs can be a very helpful tool for the selection of cost-effective mitigation measures. But in order to have realistic model predictions that are accepted by practitioners, it is important that the scenario- building is done in cooperation with those actors which are in the end asked to base their decisions on them. For the actors along the food chain it is very important not only to get information regarding overall benefits and costs, but at operational level. Still too seldom climate models are used to provide sound information about structural effects induced by climate changes as well as by climate change policies. Another important aspect is the consistency of model outcomes - too often there is heterogeneity in the quantitative as well as in the qualitative model results affecting the trust in agricultural model ing, in particular if not sufficiently explained.
Here MACSUR has already made great progress by aligning scenario definitions and consolidations within and between crop, livestock and trade models, but still much work is necessary to further enforce the dialogue with stakeholders. This is particularly true for possible pathways to reduce livestock emissions without affecting productivity negatively - or even better looking for synergies. Another aspect that should be looked at in more detail are organic soils under agriculture land use and climate and water optimised fertilisation strategies.
Climate models cannot only help farmers and other actors along the food chain, including input and food industries as well as the retail sector to better consider climate aspects in their economic decisions, but are a very powerful tool for decision- makers and for future climate change policies. Here it will become even more relevant in future to address leakage effects.