

# Causes and consequences of adaptation choices in agriculture : comparative approach between crops and wine growing in the Rhine Valley (France, Germany, Switzerland)

Gaël Bohnert<sup>1</sup> and Brice Martin<sup>2</sup>

<sup>1</sup>CRESAT

<sup>2</sup>CRESAT, Université de Haute Alsace

November 22, 2022

## Abstract

Climate change is modifying the conditions of agricultural production. In particular, precipitations are redistributed in time and space. In the Rhine Valley, this results in prolonged and intensified dry and warm periods in summer on the one side, and wetter winters and heavy rain events on the other side (Riach et al., 2019). In agriculture, dry and warm periods can lead to severe loss in yields and revenue (Führer & Jasper, 2009), while heavy rains can cause erosion and mudslides (Heitz, 2009) and excessive humidity can damage soils (Falloon & Betts, 2010) and favors fungal diseases (Rosenzweig et al., 2001). These evolutions of the water cycle will probably get worse as climate change go forth, and cannot anymore be totally prevented (Averbeck et al., 2019). Adaptation is therefore becoming a vital necessity (Darnhofer et al., 2010). Nevertheless, adoption or not of adaptation measures is a choice which depends on several factors: geographical (accessibility of a water resource; spatial, pedological and topographic situation of the farm); technical (equipment, workforce, know-how); economical (financial capacities, possible subsidies); geolegal (according to the rules in place in different territories). But, it can also depend on the perceptions a farmer has of climate change and of the benefits of adaptation, which are partially constructed through networks (interactions with colleagues, customers or agricultural organizations), leading to various trajectories of adaptation. Moreover, the adaptation measures shall not only be considered through their determinants, but also through their consequences, especially in terms of maladaptation, spatial inequalities but also synergies with mitigation and other issues. We base on semi-structured interviews conducted with crops and wine growing actors in the Rhine Valley (shared between France, Germany and Switzerland). Consequently, we can operate an innovative double comparison, between sectors and between countries, which sheds light on the most influential factors. We also observe that some measures are controversial, and promoted or rejected according to the actors, their perceptions and interests, resulting in a heterogeneous landscape where the role of consumers and borders remains significant. And, sometimes, hinders adaptation.

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