

# Essays on rural household decision-making under climate risk

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## VALORIZATION ADDENDUM

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The addendum on the valorization of this doctoral dissertation is added in compliance with article 23.5 of the “Regulation governing the attainment of doctoral degrees at Maastricht University” decreed by resolution of the board of deans, dated 3 July 2013.

The outputs of this dissertation assist informed policy making to facilitate the realisation of the Sustainable Development Goals (SDGs) of the United Nations at individual, household and societal or national levels. At individual-level, the main findings of Chapter 2 show that climate shocks deter human capital formation of children. The impact of climate shocks, particularly drought, on child schooling is mediated through child illness. The most significant mechanism is households’ lack of financial capacity to pay for the medical treatment of their ill children during drought seasons. In the incidence of illness, female children are in a disadvantaged position since parents seem to disfavour them when it comes to allocating resources for medical treatment. Moreover, households employ female children’s labour for non-farm activities during shock periods. Consequently, the schooling outcomes of female children are more likely to be negatively affected by climate shocks. The findings of Chapter 2 imply for policy actions to achieve goals 3, 4, and 5 of the SDGs. In the context of drought prone SSA countries, the effectiveness of policy and programme interventions that attempt to close the gender gap in schooling can be enhanced if due considerations are given to improving health and reducing labour use of female children.

Chapter 3 and Chapter 4 take the household as the unit of analysis and attempt to address research questions that are in line with the targets under SDG 1, 2 and 13. In Chapter 3, the main focus is identifying the design features of an environmental policy to induce climate actions at household level to enhance their climate resilience through facilitating their capacity to adapt to and mitigate the effects of climate shocks. The chapter presents empirical evidence on how incentive-based policy choices can affect climate actions on private lands as demonstrated by agricultural households’ willingness to plant trees on their farm plots. Incentives are justified considering the liquidity constraints rural households face coupled with the time lag to realise the

financial and environmental benefits of their investments in climate actions. In this respect, desirable land use decisions improve the households' income and food production, and simultaneously provide environmental benefits such as reducing agricultural greenhouse gas emissions, carbon sequestration and improving the microclimate. As such, with the right policy, agricultural lands in SSA have the potential to render the triple benefits of food production, biodiversity conservation and carbon sequestration.

Chapter 4 reveals that agricultural households' access to formal climate risk transfer institutions change the way they perceive the world and thus induce a shift in their risk preferences towards less risk-averse attitudes. Ultimately, households are able to adopt high-risk high-return agricultural technologies that may enable them enjoy virtuous cycle of increasing income. Hence, policy efforts that enable rural households in SSA manage climate risks can bring out desirable economic behaviour that accelerates the process of dragging poor and vulnerable people out of poverty traps.

The findings of all the chapters of the dissertation have also implications for societal and national level poverty eradication and economic development efforts. Educating female children can lay the foundation for creating a society with empowered women who have equal access to resources and opportunities to lead the kind of life they value. Hence, based on the second chapter, human capital investments in female children can have longer-term aggregate desirable effects on nutrition, education, health and managing population growth. The third empirical chapter explores the policy options to transform conventional land-intensive agricultural activities, which support most SSA economies, into a sustainable agriculture with higher productivity and positive environmental spillovers. This transition not only reduces rural households' susceptibility to the effects of climate shocks but also puts them at the centre of the solution to the climate change challenge. Projecting the relevance of the findings of the fourth chapter beyond the household level, economic behaviours of households can also determine accumulation of human, physical and financial capital at meso and macro levels. Societies comprising households that are characterised by risk taking may attain low productivity gaps and income inequalities.

Chapter 3 and Chapter 4 are presented in the UNU-MERIT annual internal conference series. With the aim of reaching scientific community, policy makers and practitioners outside the UNU-MERIT, all chapters of the dissertation were presented in international conferences such as: the agricultural greenhouse gas emission and food security - connecting research, policy and practice in Berlin; the World Bank's land and poverty conference in Washington D.C.; the 4th agroforestry congress in Montpellier; and Venice summer school conference on poverty, inequality and their associations with disaster and climate change in Venice. Furthermore, Chapter 2 is published as UNU-MERIT working paper #2019-052. Chapter 3 and Chapter 4 have been published in reputable peer-reviewed journals. Chapter 3 is published as "Haile, K.K., Tirivayi, N., and Tesfaye, W. (2019). Farmers' willingness to accept payments for ecosystem services: The case of climate-smart agroforestry in Ethiopia. *Ecosystem Services*, 39: 100964", and Chapter 4 as "Haile, K.K., Nillesen, E., and Tirivayi, N. (2020). Impact of formal climate risk transfer mechanisms on risk-aversion: Empirical evidence from rural Ethiopia. *World Development*, 130: 104930".