

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy
Benjamin P. Warner

Will defend his dissertation

**Barriers and Limits to Adaptation Among Smallholder Rice
Farmers in Northwest Costa Rica**

Abstract

This is a study of the plight of smallholder rice farming in Northwest Costa Rica. More specifically, this is the story of 689 rice farms, averaging 7.2 hectares each and totaling just less than 5,300 hectares within the largest agricultural irrigation system in Central America. I am able to define the spatial bounds of this study simply, but one would be mistaken to think that this simplicity transfers to a search for rural development solutions in this case. Those solutions lie in the national and international politics that have allowed a select few to pick winners and losers in Costa Rican agriculture in the face of risks of global changes.

This study was designed to answer four questions in the context of this case. Taken as a whole, the answers to these questions may provide insight into the sustainability of smallholder agriculture in Northwest Costa Rica. These questions are:

1. How did we get here? (How were the development goals of the largest rural development-oriented irrigation project in Central America undermined?)
2. Why are smallholder rice farmers, targeted by an industrial-based rural development program designed to spread risks evenly among all farmers, negatively impacted by risks from global changes while other more powerful farmers, presented with the same risks, profit?
3. What are adaptation limits in smallholder rice farming in the region? Do farmers perceive themselves as crossing these limits given plausible impacts of future global change risks? Why or why not?
4. How do socio-economic determinants of adaptive capacity among smallholder farmers in Northwest Costa Rica determine their ability to avoid adaptation limits in the face of the impacts of multiple global change risks?

I found that water scarcity among smallholder farms between 2006 and today was the product of the adaptations of other, more powerful actors in 2002 to threats of Costa Rica's ratification of the Central American Free Trade Agreement. I demonstrate how the adaptations of these more powerful actors produced new risks for others, and how this ultimately prevented the rural development program from meeting its development goals. I reflect on my case study to draw conclusions about the different ways risks may emerge in rural development programs of this type. Then, I focus on the household level and show that determinants of successful adaptation to one type of global change risk may make farmers more vulnerable to other types, creating a "catch-22" among vulnerable farmers adapting to multiple global change risks. Finally, I define adaptation limits in smallholder rice farming in Northwest Costa Rica. I show that the forced abandonment of livelihood security and well-being, and of the unique "*parcelario*" identities of rice farmers in this region define adaptation limits in this context. I also show that farmers do perceive future adaptation limits, but the increasing complexity of plausible risks may challenge their ability to effectively appraise successful adaptation strategies to these risks.

Friday, April 18th, 2014
10:00 a.m.
WGHL, 481

Faculty, students, and the general public are invited.

Supervisory Committee:
Dr. Dan Childers, chair
Dr. Hallie Eakin, member
Dr. Joshua Abbott, member
Dr. Arnim Wiek, member