

SÉMINAIRE

DES DOCTORANTS

Siwar Saadaoui: Unraveling Bioenergy Land Conversion Dynamics and Their Interplay with Carbon Storage and Biodiversity Constraints: The Interest Rate Matters

ABSTRACT

The global imperative for the renewable energy sources has put the cultivation of bioenergy crops in the spotlight as a potential avenue to mitigate climate change and generate negative emissions in association with carbon capture and sequestration. However, land conversion to such crops poses complex challenges, including the need to preserve biodiversity and ecosystem carbon pools while allowing farmers or landowners to maintain their revenues. This study provides a new metric for assessing the global scale potential of land that can be used with the least economic, carbon and biodiversity impact.

We used a multi-dimensional approach to assess different views of the opportunity cost of land at the pixel scale (5 arc-minutes) on a global scale. Our methodology is based on mapping land prices using the Net Present Value (NPV) method with standardized and country-specific interest rates worldwide, overlaid with maps of potential carbon content in ecosystem and biodiversity intactness index. By combining these different dimensions, we identified areas potentially suitable for bioenergy crops. A specific feature of our approach is to consider the effect of interest rate of 4.5% across countries with interest rates specific to each country in the world.

Narrowing down to the quartile of land with the lowest opportunity cost for each dimension - economic, carbon, biodiversity - we obtain a land potential for bioenergy production of 150 million hectares with a standardized global interest rate of 4.5%. Using country-specific interest rates to value land, the potential conversion area decreases to 110 million hectares. In addition, our correlation analysis between these factors revealed significant regional variability, underscoring the importance of tailored approaches to land valuation for bioenergy use.

This research introduces a new perspective on the impact of interest rates and environmental constraints on land valuation and its potential for bioenergy. It offers both local and global insights to guide strategies for the location of bioenergy crops, highlighting the importance of balancing economic value with carbon and biodiversity criteria. The results of the study could inform investment policies and sustainable development strategies, promoting a balanced management of land resources in the context of climate change.

[PHD PROJECT]

THURSDAY FEBRUARY 15, 4:30-5:30 - MEETING ROOM + ZOOM

ORGANIZERS: CLÉMENT BOYER, THIBAUT BRIERA, BERTILLE DARAN, SIMON JEAN & BAPTISTE PARENT