

# ***Review of IFPRI Reports on Land Use Change Emissions***

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# ILUC Modelling

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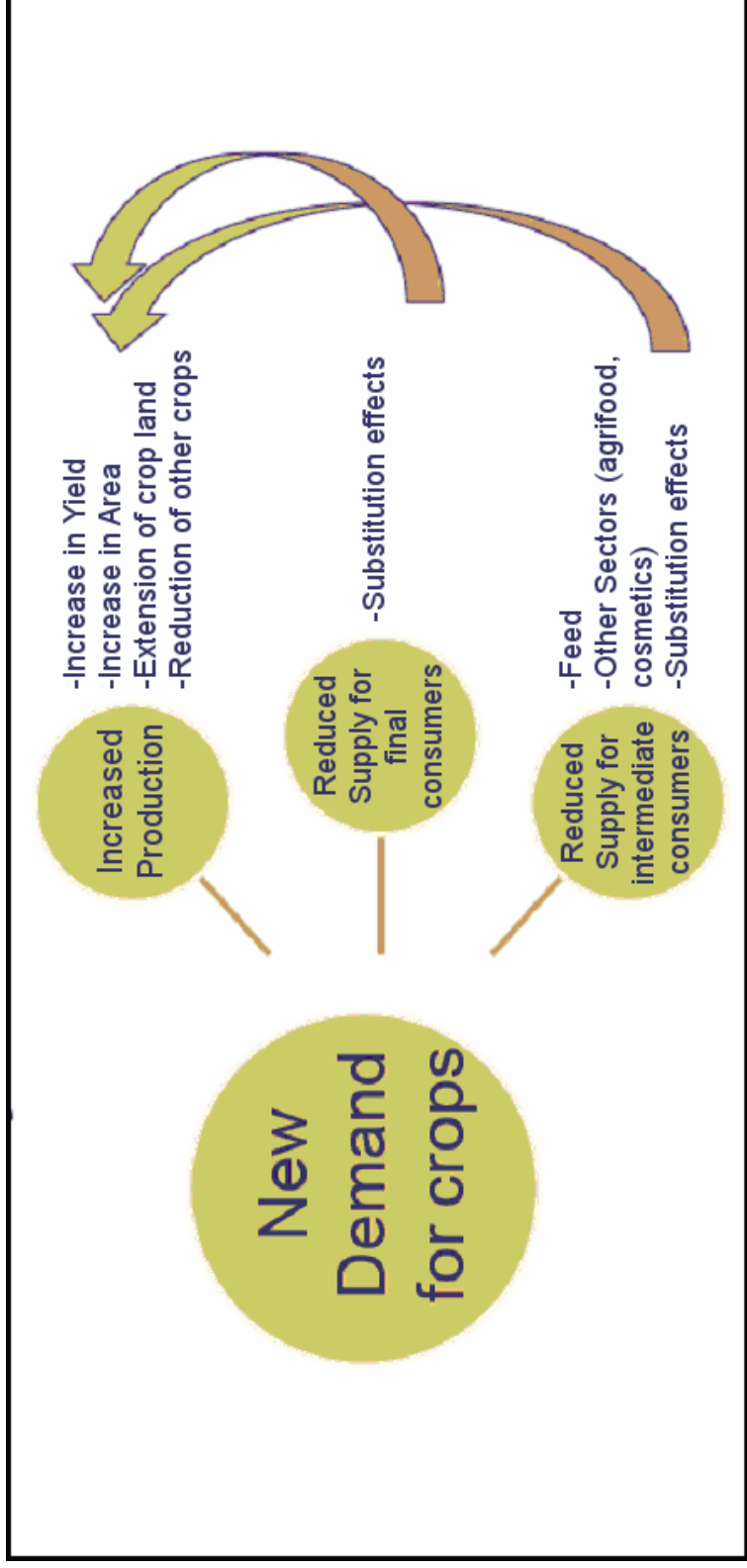
- Indirect Land Use Change estimates are derived using complex econometric models that have been modified to include the emerging biofuels sector and their impact on land use patterns.
- These models have thousands of variables, many of which have little data to support the chosen values.
- It is widely accepted in the econometric modelling community that the models need to be validated.
  - Little, if any, validation has occurred with the ILUC models.

# ***This Review***

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- This work reviewed the input parameters and the results of the ILUC modelling undertaken by the International Food Policy Research Institute (IFPRI) using the MIRAGE model for the European Commission.
- It relied on two reports published by IFPRI and the data files that have been made public.
- The MIRAGE model is a computable general equilibrium model that uses the GTAP database.
- The IFPRI modellers acknowledge that the model has some limitations.

# The ILUC Hypothesis



## ***What Wasn't Modelled***

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- No restrictions on land expansion. Ignores impact of RED and RFS2 in the US with their restrictions on land expansion.
- No changes in the rates of improvement in technology assumed.
- No restraints on feedstock even though the finished fuel produced from the feedstock may not meet EU quality specifications.

# The Findings

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- While the MIRAGE model has some unique improvements over some of the other models being used to estimate ILUC emissions, it does have a significant number of issues.
- Many of the issues with the model are very significant and have a large impact on the estimated values.

# The Land Inventory

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- The land in the model is divided into four categories: cropland, pasture, forests, and unmanaged land.
- The cropland category is based on land that produced crops.
- It excludes land that was used to produce fodder, land that was fallow, and land that was temporarily idle.
- This excluded land, that is available for an expansion of crops without land use change emissions, amounts to about 400 million hectare.
  - Or one third of the existing cropland,
  - Or 225 times the projected land requirement to meet EU biofuel requirements.

## What Kind of New Land is Used

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- Models like MIRAGE utilize a function called CET (constant elasticity of transformation) to determine how much of the new land is forest and how much is pasture.
- The empirical evidence and the limited amount of work that has been done to determine these factors suggest that the value for pasture should be 20 to 30 times the value for forests. IFPRI has used the same value, thus grossly overestimating the forests converted and inflating any land use emissions.

# Elasticity Factors

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- IFPRI underestimates the yield of crops on new land. Other models have become much more sophisticated in how the yield is determined rather than using a guess, which is what IFPRI have done. The results is an over estimation of ILUC values by 25 to 50% in MIRAGE.
- The model uses very low intensification elasticity factors, and order of magnitude less than used in California ILUC modelling. It doesn't account for double cropping potential in many regions.

# The Oilseed Sector

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- The data in the model underestimates the oil and meal produced from most crops, this increases the calculated land requirements.
- The operation of the oilseed sector is overly simplistic. This is a problem with the GTAP database. Recent changes to GTAP more accurately reflect the structure and functioning of this sector, it allowed for trade in oilseed meals. The impact of the new structure in GTAP reduced biodiesel ILUC emissions by 80% in the latest model runs in California.

## Other Issues

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- There is a lack of transparency in the calculations of emissions from soil. The results couldn't be duplicated.
- There is a great deal of uncertainty in emissions from expanded palm oil production. New data in the past year suggests lower values than used in the latest report.
- A twenty year amortization period has been used, this is consistent with EU regulations but is totally arbitrary.
- The sum of the individual crop ILUC factors is 11.5% greater than the modelled total impact.

# Conclusions

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- ILUC modelling is a new field and much more work needs to be done on the models and their databases before there can be any confidence that the results are realistic.
- Once the obvious issues with the models have been addressed, the model results will need to be validated by comparing the results to actual changes in land use patterns resulting from the past decade of rapid growth in biofuel production.
- Only when there is alignment between model results and observed changes will the models be appropriate for decision making.



Thank You  
Questions?