Cerulogy

Risk management

Identifying high and low ILUC-risk biofuels under the recast Renewable Energy Directive

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Introductions

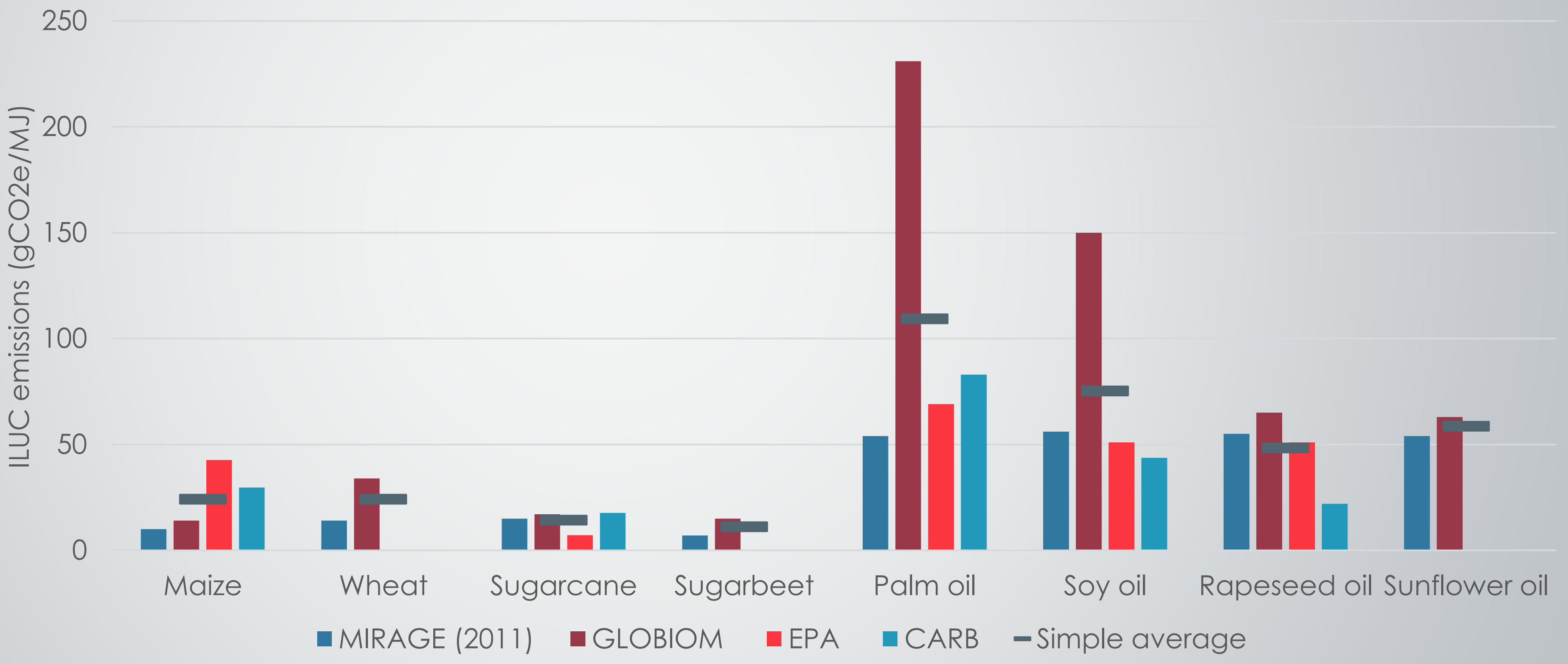
- Chris Malins
- Independent consultant at Cerulogy
- Previously:
  - Fuels Lead for the International Council on Clean Transportation 2010-2016
  - Communications Specialist for the UK Renewable Fuels Agency 2008-2010
- PhD in Applied Mathematics, Sheffield University

https://scholar.google.co.uk/citations?user=Y16zidkAAAAJ&hl=en&oi=ao

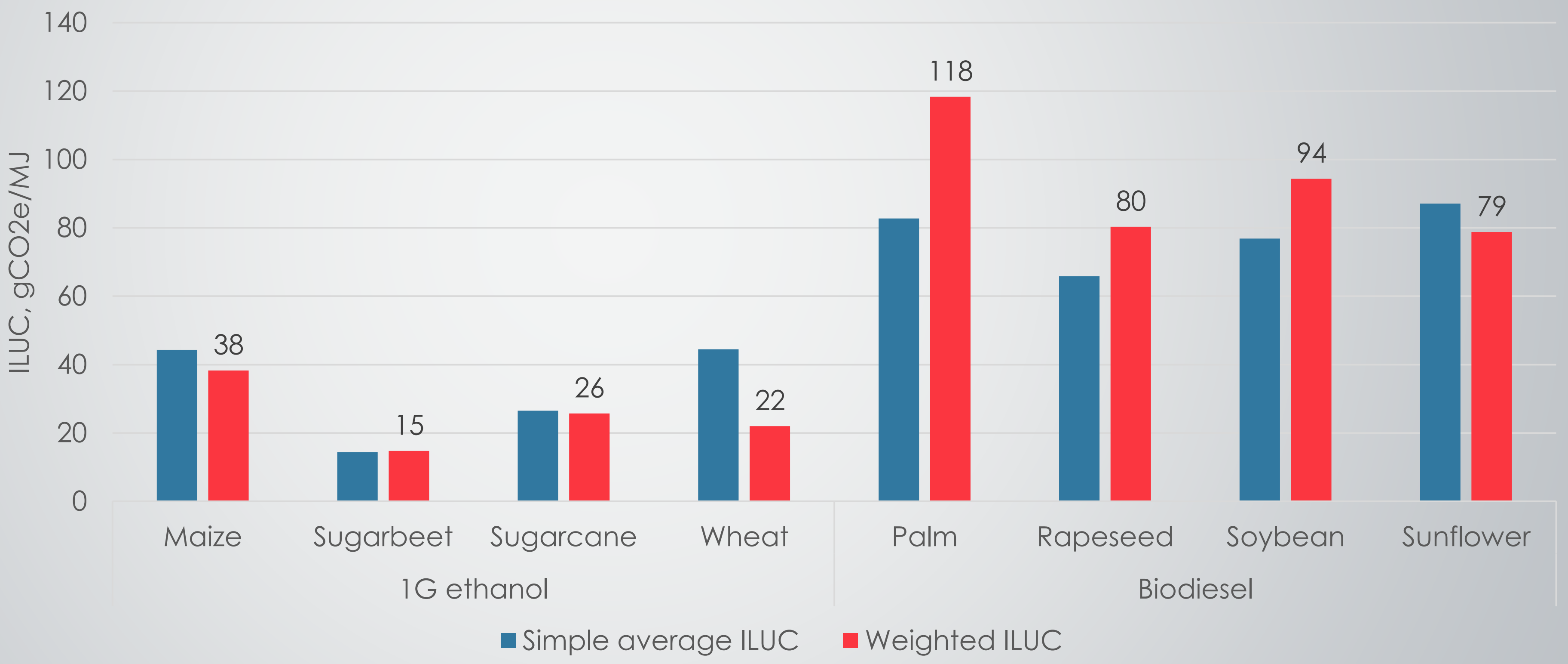
The report:

- Indirect land use change (ILUC) modelling results
- Identifying feedstocks that might be categorised as high ILUC-risk
- Building effective rules for certifying low ILUC-risk projects

ILUC results from main studies for EU/U.S. regulators



Results from a broader survey of literature (Woltjer et al. 2017)



High ILUC-risk feedstocks

- Feedstocks "for which a ***significant*** amount of expansion is observed into high carbon stock areas"
- High carbon stock areas:
  - Wetlands
  - Continuously forested areas (> 30% canopy cover, trees > 5 metres)
  - Land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%
- High ILUC-risk ≠ high modelled/expected ILUC emissions…
  - …though they may be correlated. Conversion of low- to moderate-carbon-stock land can still drive high ILUC emissions.
- No further guidance in the Directive on what is 'significant'

Potential high ILUC-risk feedstocks

- Review literature on high deforestation-risk commodities
  - Soybeans and oil palm consistently identified – sometimes sugarcane and maize
- Review FAOstat data:

	Global crop harvested area expansion, 2012-2015	Gross crop expansion in countries with forest land use reduction > 20% of cropland increase	
	ha	ha	%
Maize	10,402,704	2,839,435	27%
Oil palm fruit	2,410,361	2,179,434	90%
Rapeseed	1,482,829	29,632	2%
Soybeans	16,288,826	8,535,916	52%
Sugar beet	179,588	1,953	1%
Sugar cane	945,026	533,272	56%
Sunflower seed	1,765,087	42,574	2%
Wheat	11,517,053	1,276,625	11%

- Soybean, oil palm and sugarcane identified as potentially high ILUC-risk

Direct evidence of conversion of high carbon-stock land – oil palm

- Numerous studies document oil palm planting following deforestation, notably in Indonesia and Malaysia but also in South America and (to a lesser extent) Africa
- Studies also document peat drainage in Indonesia and Malaysia
- *Estimate that currently about 32% of global oil palm expansion associated with deforestation, and about 23% with peat drainage*

Direct evidence of conversion of high carbon-stock land – soybean

- Soybean in South America routinely associated with deforestation, but a moratorium in Brazilian Amazon has affected that dynamic

		Fraction of global soy expansion	Fraction of expansion associated with deforestation
Brazil	Caatinga	3%	8%
	Cerrado	19%	14%
	Mata Atlântica	7%	8%
	Pantanal and Pampa	6%	8%
	Amazônia	7%	1%
	Total Brazil	**44%**	**9%**
Argentina		11%	9%
Paraguay		4%	57%
Uruguay		3%	1%
Total Latin America		**62%**	**12%**

- Still estimate at least 7% of global soy expansion is deforestation linked

Direct evidence of conversion of high carbon-stock land – sugarcane

- A large part of sugarcane expansion (43% from 2012-15) is in Brazil
- Remote sensing studies have shown very little direct association of sugarcane to deforestation in Brazil
- No evidence found of a large deforestation impact in other countries with major sugarcane expansion

Which feedstock should be categorised as high ILUC-risk?

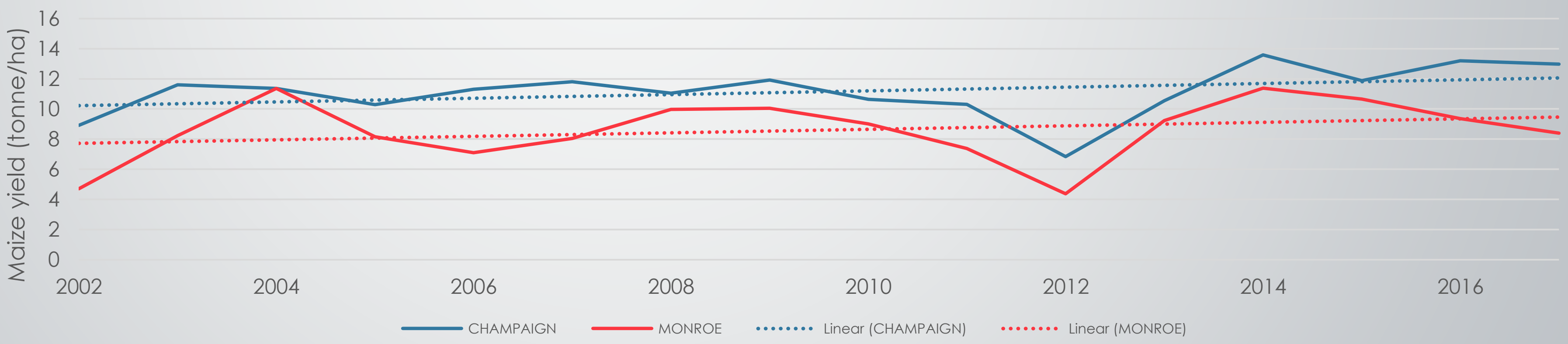
- The final decision will depend on the interpretation of the word ‘significant’
- The report includes an estimation of co-product-adjusted CO_2 emissions per megajoule from high carbon-stock land conversion for soy and palm oils
- Very strong case to categorise palm oil as high ILUC-risk
  - We recommend extending that treatment across all co-product oils (palm oil, palm kernel oil, PFAD)
- Strong case to categorise soy oil as high ILUC-risk
- No comparably strong case for other feedstocks considered

Low ILUC-risk certification

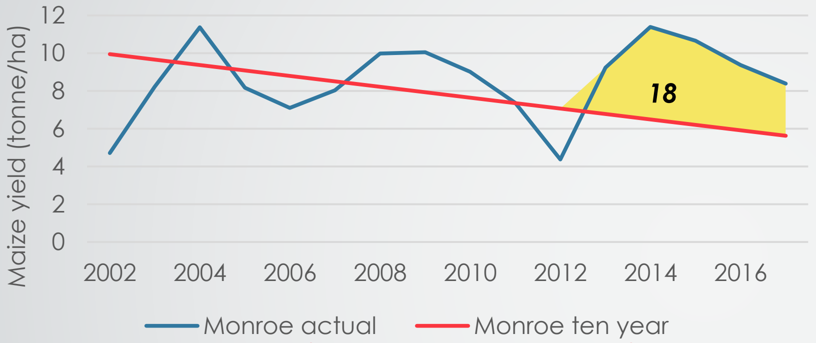
- Discussed since at least 2008
- Biofuels, the “feedstocks of which were produced within schemes which avoid displacement effects of food and feed crop based biofuels, bioliquids and biomass fuels through improved agricultural practices, as well as the cultivation of crops on areas which were previously not used for cultivation of crops”
- Feedstocks for which displacement effects are ***avoided***
- The Roundtable on Sustainable Biomaterials already provides a ‘low ILUC-risk’ certification framework
- Focus on two challenges in certification:
  - Measuring productivity gains, limiting free-riders, demonstrating additionality

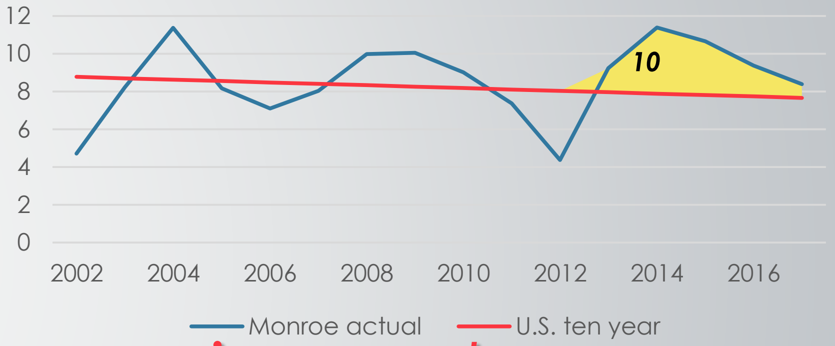
Yield and variability

- Most proposals for low ILUC-risk yield improvement projects:
  - Set a baseline yield
  - Compare delivered yields to that baseline – credit the difference
- Problem: natural yield variability makes baselining difficult and is large compared to likely yield gains on many projects

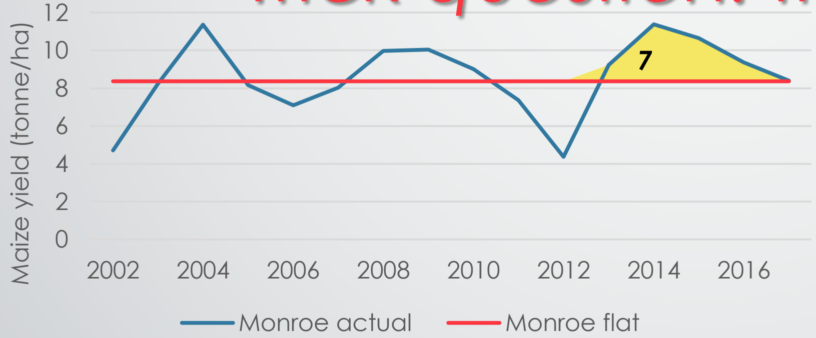


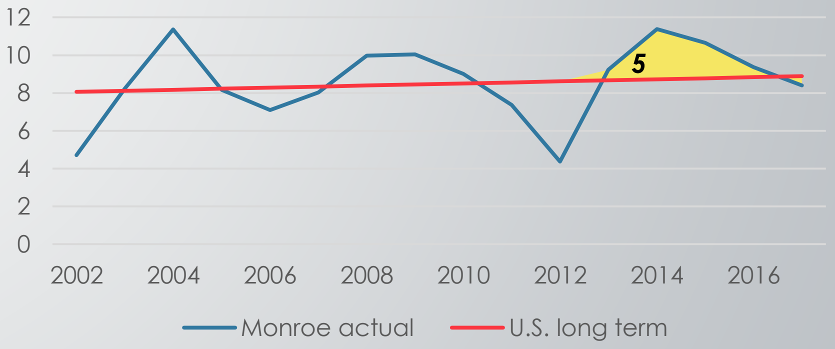
Example – how much low ILUC-risk maize in Monroe County 2013-17?





Trick question: the answer is none!





Implication: cannot rely only on observed yield for crediting

- Project plan should include an evidenced prediction of impact of the productivity intervention
- Crediting should be based partly on showing successful implementation, regardless of delivered yield
- Maximum crediting limited to be consistent with action taken
- Make credit award more consistent and reliable
- Requires regular audit to ensure productivity measures are sustained
    - Persistent poor realised yields could be evidence of project failure

Free-riders and additionality

- Displacement is avoided if and only if the feedstock produced is additional to the feedstock that would be produced without a low ILUC-risk project
- Any project able to produce certified feedstock without actually increasing feedstock production is a 'free-rider', e.g.:
  - New oil palm plantation on shrubland that was already planned
  - Maize production above baseline due to weather
  - Implementing double cropping that would have happened anyway
- ICCT have shown that the free-rider potential is large
- Setting effective additionality requirements allows us to reduce (or eliminate) the free rider potential

Additionality

- The CDM provides an additionality assessment tool
  - Demonstrate at least one of:
    - Project is first of its kind
    - Project would not be financially viable without certification
    - Project faces non-financial barriers that can be overcome by engagement in certification
  - Demonstrate project is not required by regulation, and if the project is already common practice explain why this case is special
- Using the CDM tool, potentially rewritten to better reflect issues in low ILUC-risk certification, is the most robust way to assess additionality
- Some studies have proposed relaxed additionality tests
  - E.g. Ecofys suggested in 2016 that any project in a region with a biofuel mandate would be automatically counted as additional
- No proposal we reviewed appears to be robust or adequate (create large free-rider potential)
- The report discusses some proxy additionality measures that may be able to show that projects were 'probably' additional
- Great caution should be exercised in relaxing additionality rules

Conclusions

- We know from modelling that ILUC is a major issue
- The high ILUC-risk framework offers an opportunity to manage the worst cases
- Our analysis shows there is a strong case to categorise palm oil and soy oil as high ILUC-risk
  - ~4.2 million tonnes of palm oil demand; ~1.1 million tonne soy oil demand
  - Reduced palm oil demand avoid up to 200,000 ha deforestation; 150,000 ha peat loss
  - Reduced soy oil demand avoid up to 20,000 ha deforestation
- The low ILUC-risk concept provides a framework to certify fuels that avoid displacement
- For low ILUC-risk certification to work, it must include appropriate measurement protocols and robust additionality demonstration

Thanks!

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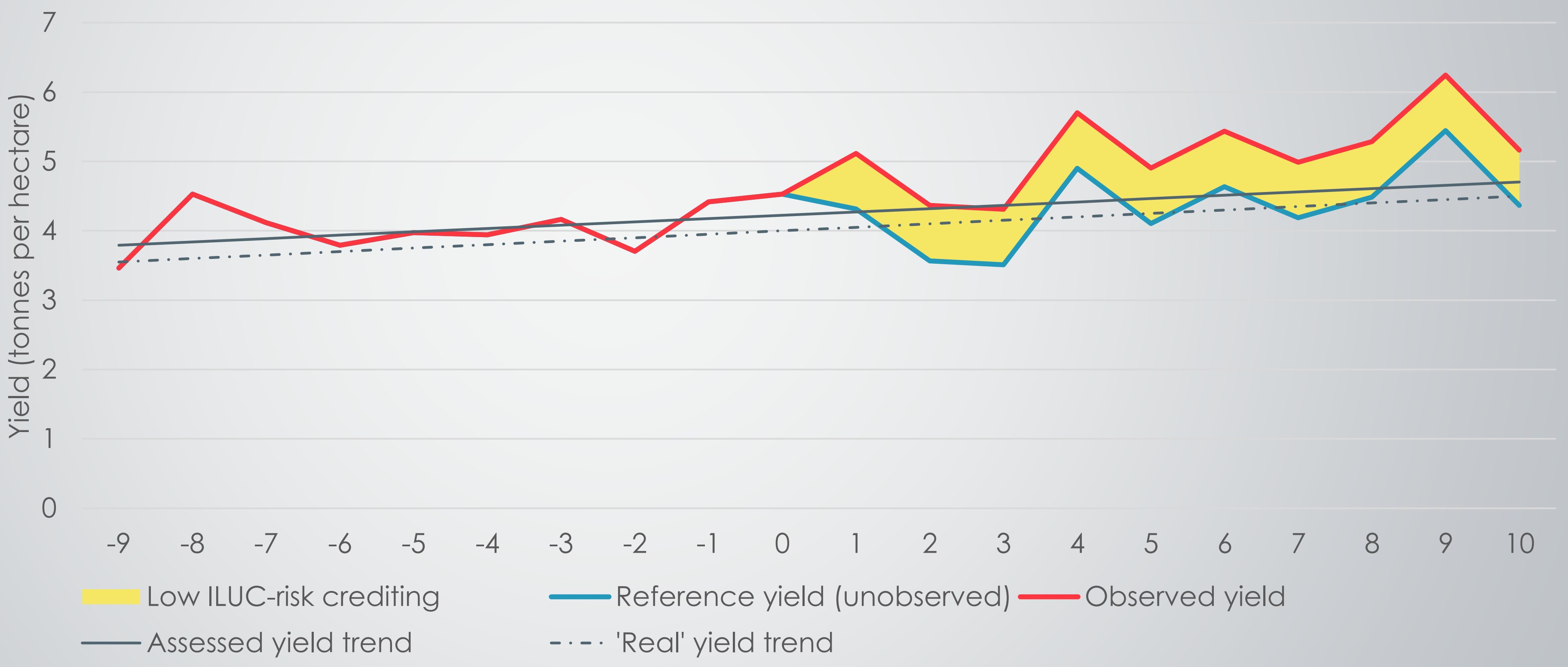
Crediting yield gain – delivered yield gain



Crediting yield gain – compare to baseline