

Integrating Food and Environmental Security into Business Operations



Institute of Agricultural Management
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Land Management: Sustainability Dilemmas

- Resilience of global food supply
- Binding environmental targets
 - Policy foregrounding environment over food production?
 - But ambiguities and contradictions
 - Farming's negative portrayal
- Unprecedented adaptation
 - Breadth and scope of management actions
 - Uncertainty, e.g. novel technological solutions
 - Land-use changes
- Lower agricultural support (in real terms)

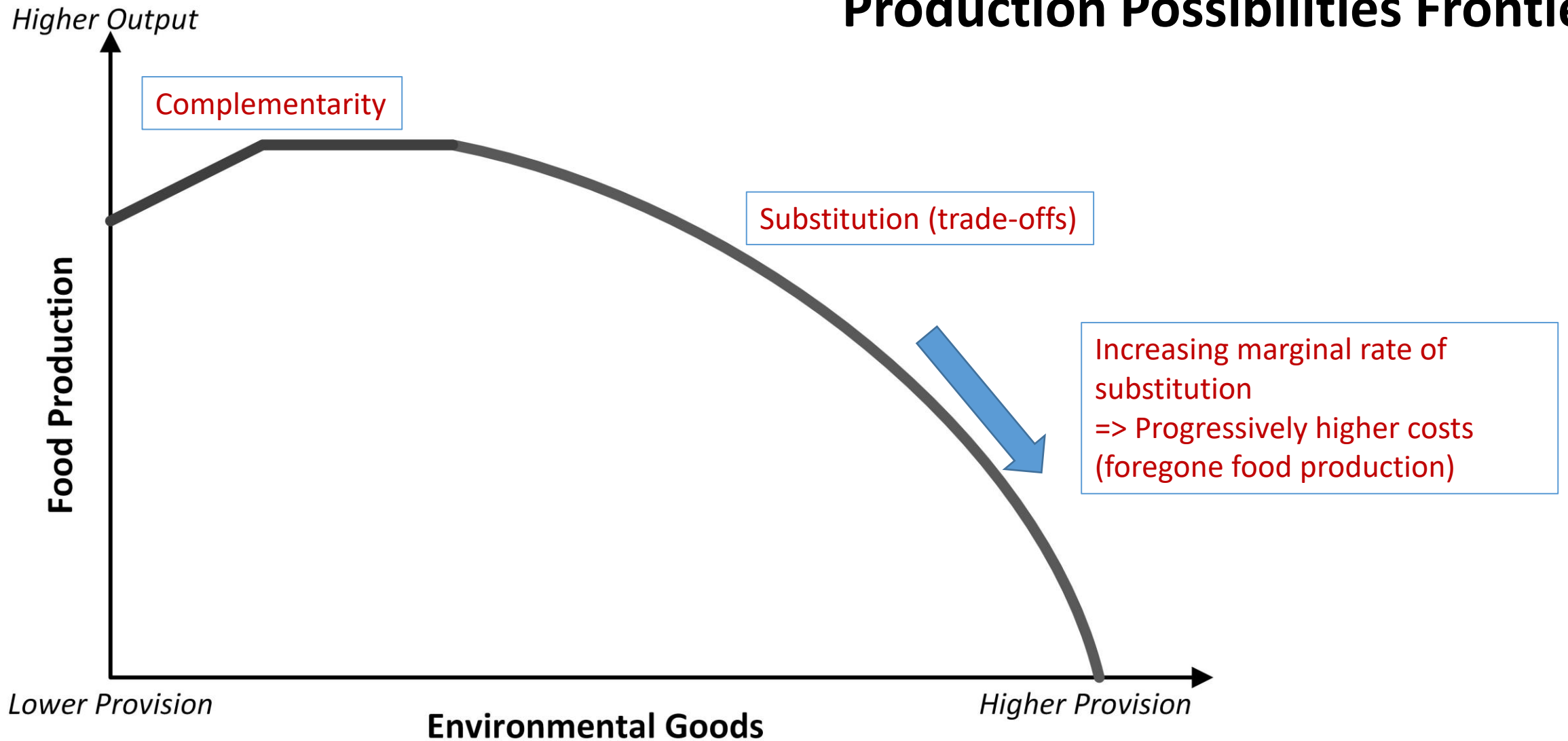


Outline

- Challenges → opportunities
 - Monetising public goods in land management
 - Food production economics
 - Sustainability credentials
 - Producer power in supply chains
- Three themes
 - (1) Land use planning decisions
 - (2) Addressing efficiency gaps
 - (3) Shifting the possibilities frontier

Conceptualising Land-Use Planning Choices

Production Possibilities Frontier



(1) Where on the Production Frontier?



Decision factors:

- Relative financial margins
- Regulatory constraints
- Risk
- Preferences

Land-Use Planning

- Quantifying trade-offs
 - Farm specific
 - Resources and capabilities
 - Farming system effects
 - 'Best-fit' environmental management practices
 - Adjustment costs for new activities (e.g. forestry)
- Relative margins of conv. enterprises vs. environmental goods
 - Expected outlook (long range) incl. risks
 - Opportunity costs
 - Tactical responses to shocks (e.g. fertiliser price spike)

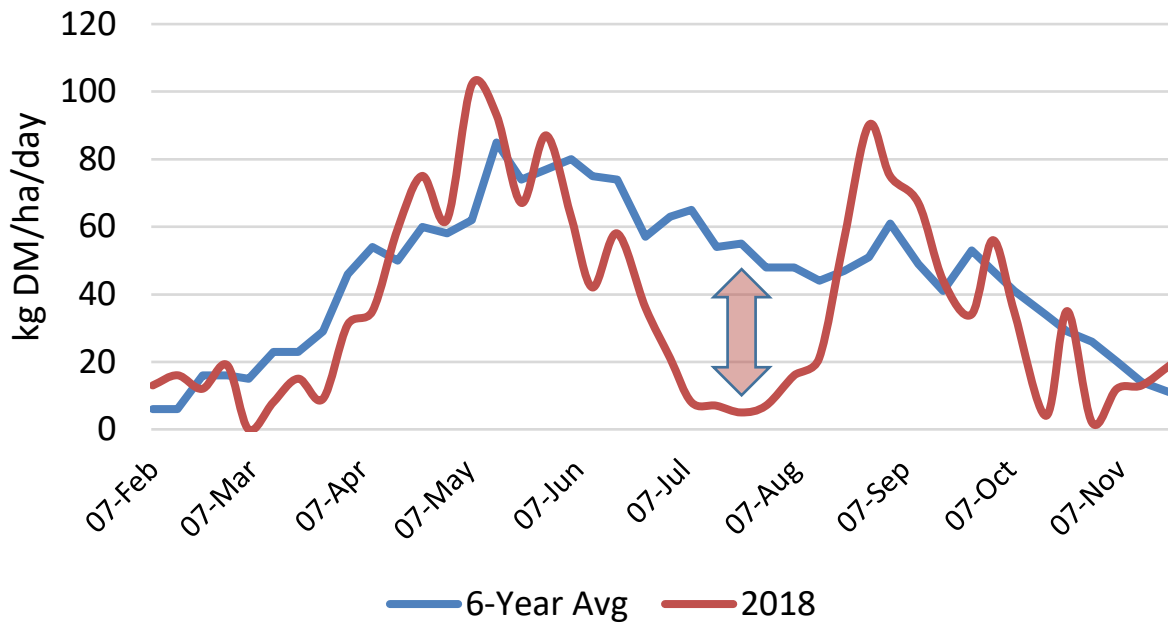
Climate and Future Food Prices

- Effects of both climate change and climate policy (global)
 - Curtailing production (esp. livestock products)
 - Global population growth
 - Sustainability credentials in trade (e.g. carbon border adjustment)
- Tighter supply and higher prices
 - Rebalancing of power in supply chains
 - MIT modelling: +20-30% food prices by 2050 through GHG mitigation policies (Paltsev, 2012)
- Also: managing increased frequency of extreme weather events
 - Build resilience

Climate: building resilience to extremes?

Irish dairy farm – drought impact

Lyons Farm Grass Growth: Avg vs 2018



Dairy Financial Performance

	Avg	2018	Diff
	<i>€ per cow</i>		<i>%</i>
Gross Output	2,530	2,329	-8%
Variable Costs	972	1,100	+13%
Gross Margin	1,559	1,230	-21%
Net Margin	693	364	-47%

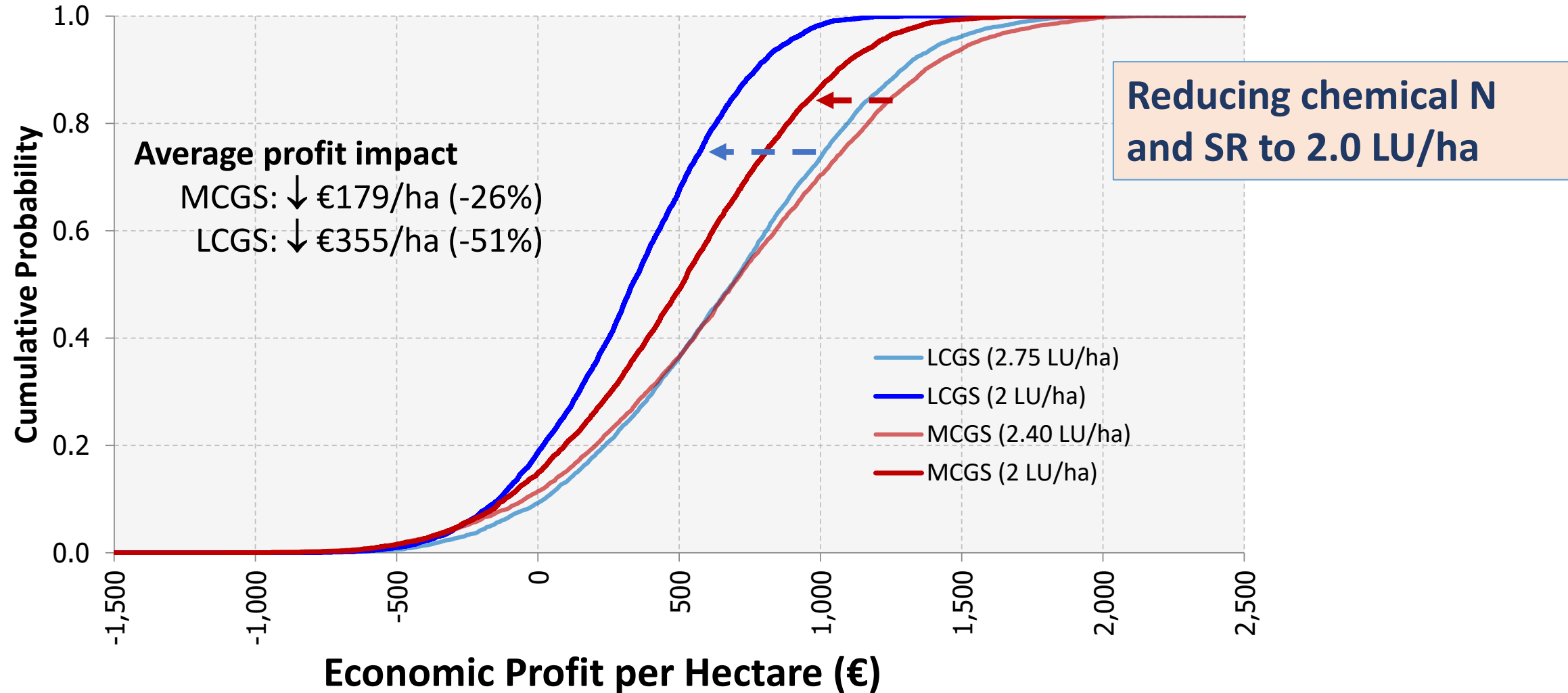
*Note: Output and input prices held constant
Simulated impacts using UCD Dairy systems model*

Agri-Environmental Schemes

- Rhetoric and reality
- Standard payment rates vs heterogeneity in farm costs

Illustration: Profitability impact of reducing Dairy SR

Comparing two efficient dairy systems: Low (LCGS) vs Moderate (MCGS) concentrate grazing systems



Agri-Environmental Schemes

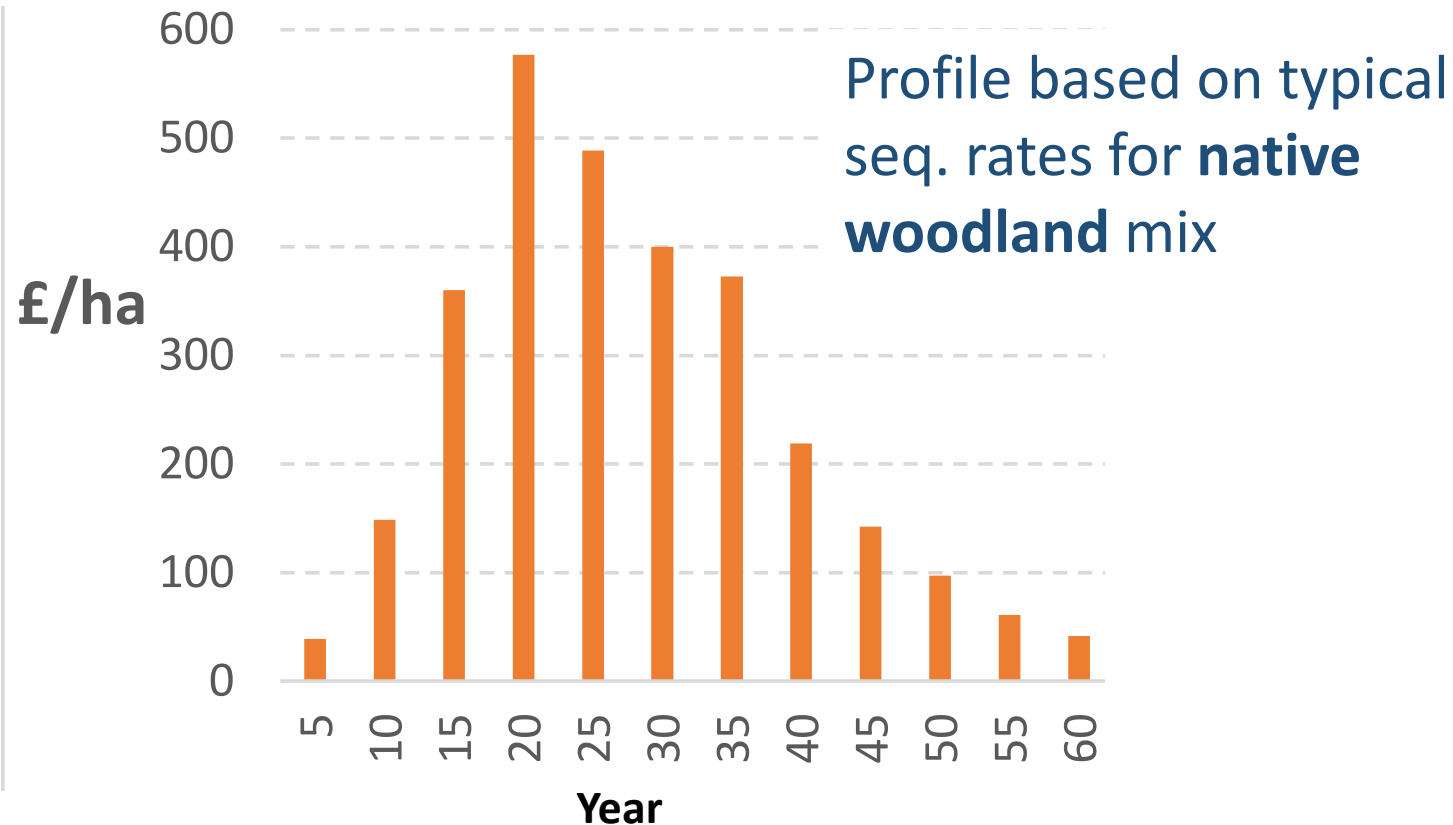
- Rhetoric and reality
- Standard payment rates vs heterogeneity in farm costs
 - Insufficient incentive: IF + C approach
 - Farmer's least cost measures vs environmental benefit
- High transaction costs
- Limited extent (% of farmers, land)
 - Fail to engage larger more intensive farmers
 - Highest uptake in areas with lowest environmental pressures
- Intertwined with income support objectives?

Carbon Farming

- Forestry, peatland restoration
 - Hedgerows, soil management practices?
- Long horizon challenge
 - Permanent/irreversible
 - Voluntary markets
 - Uncertainty (seq. rates, replant, buy-back risks)
- Forestry economics: competitive with beef/sheep on marginal land
 - But barriers likely to hamper conversion

Woodland: Carbon Credits

Present Value of Estimated WCC cashflows



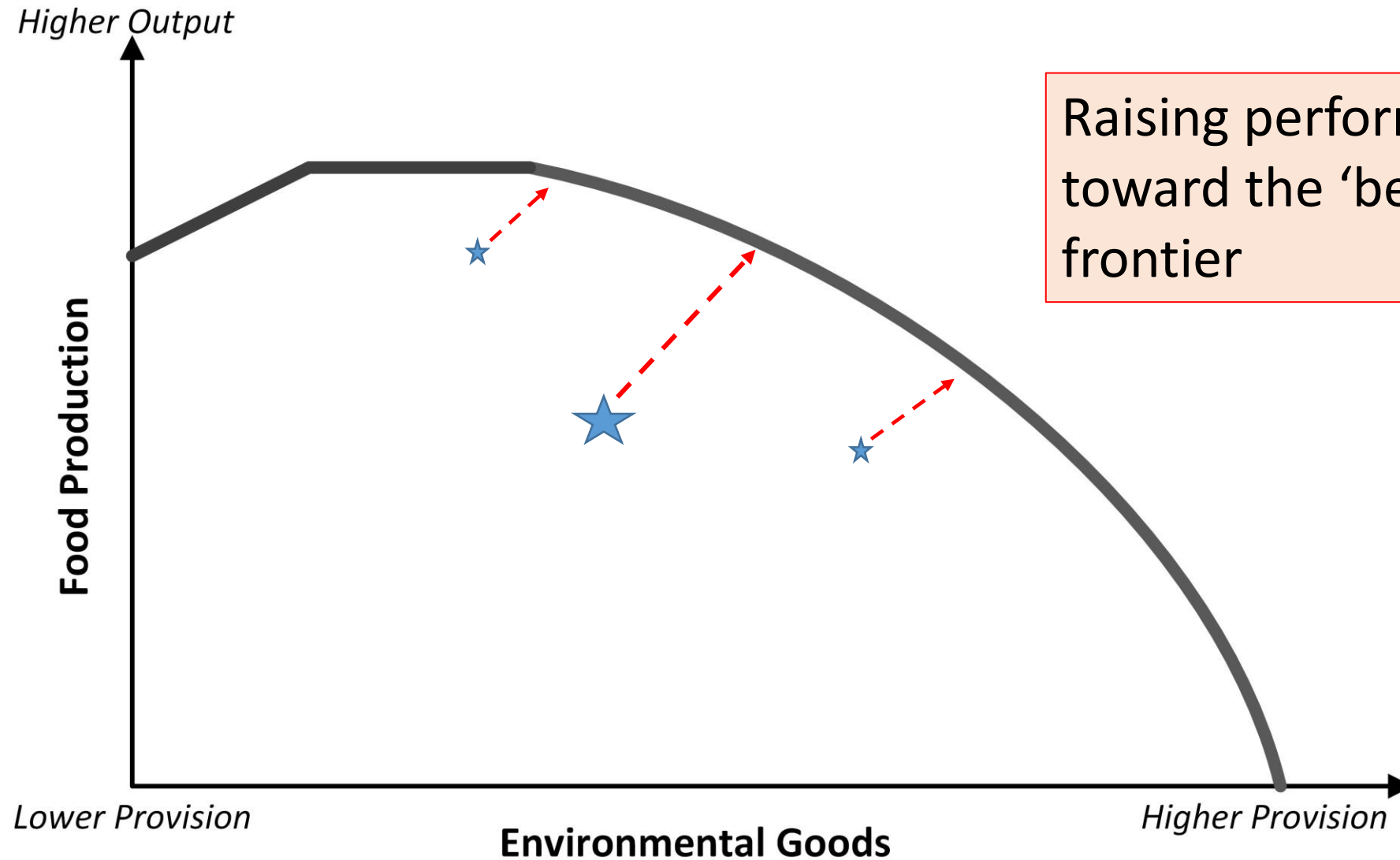
Assumptions:

- £20 per tonne of CO₂e
- Discount rate 5%
- Inflation rate 2.2% p.a. in carbon credit prices

Annual Equivalent Value of CCs:
£155/ha

Timber sales ?
Maintenance and mgt costs?

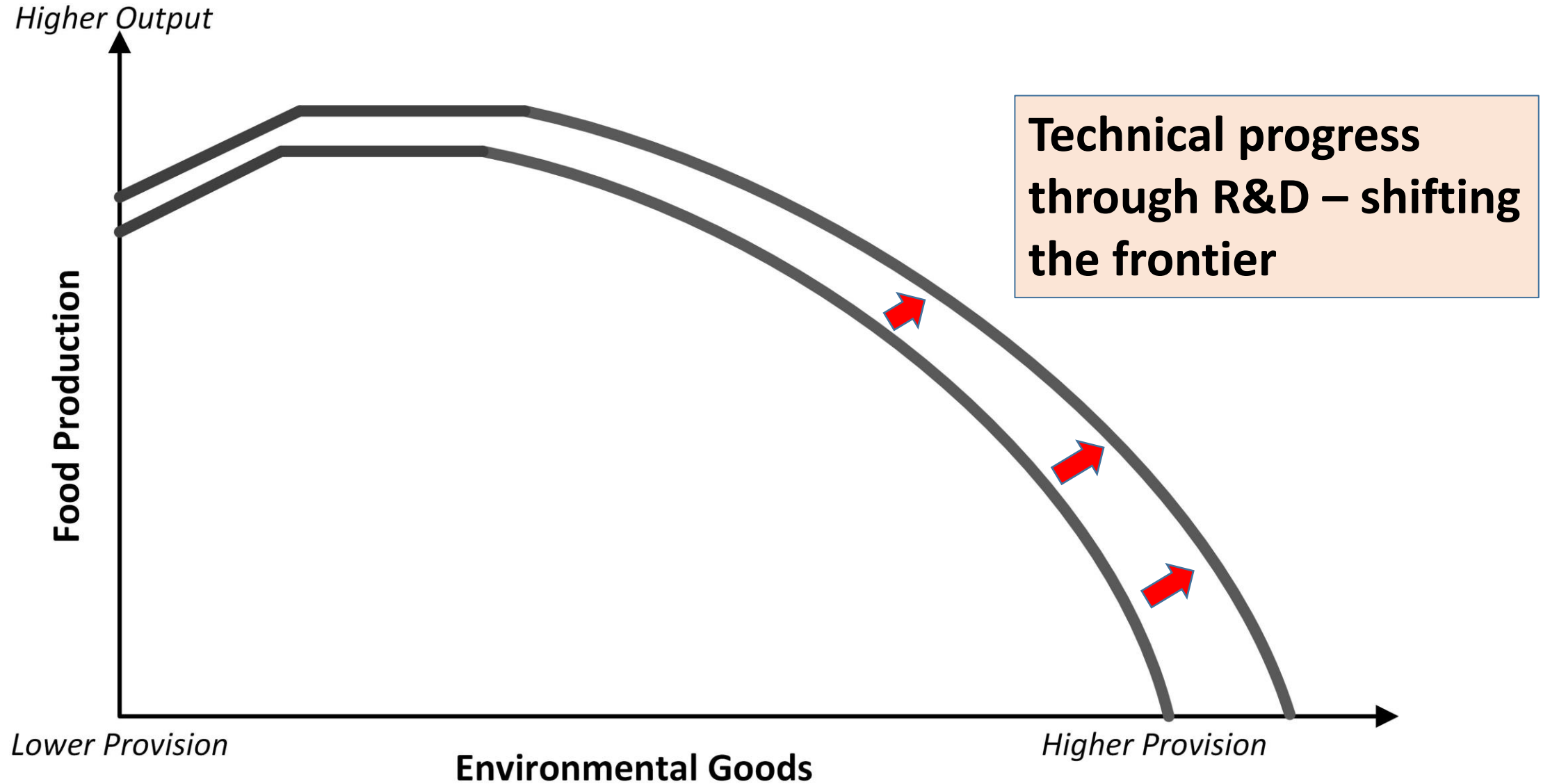
(2) Addressing Efficiency Gaps



Performance Measurement

- Sustainability benchmarking at farm-level
 - ‘Internalise’ targets and action plans
 - Measure and manage progress
 - A requirement for participation in support schemes?
 - Evaluation and adoption of best practices
- Evidence base for progress toward sustainability policy targets
 - e.g. Ireland: farm sustainability reports
- Facilitating knowledge exchange
 - Experiential learning for complex decisions

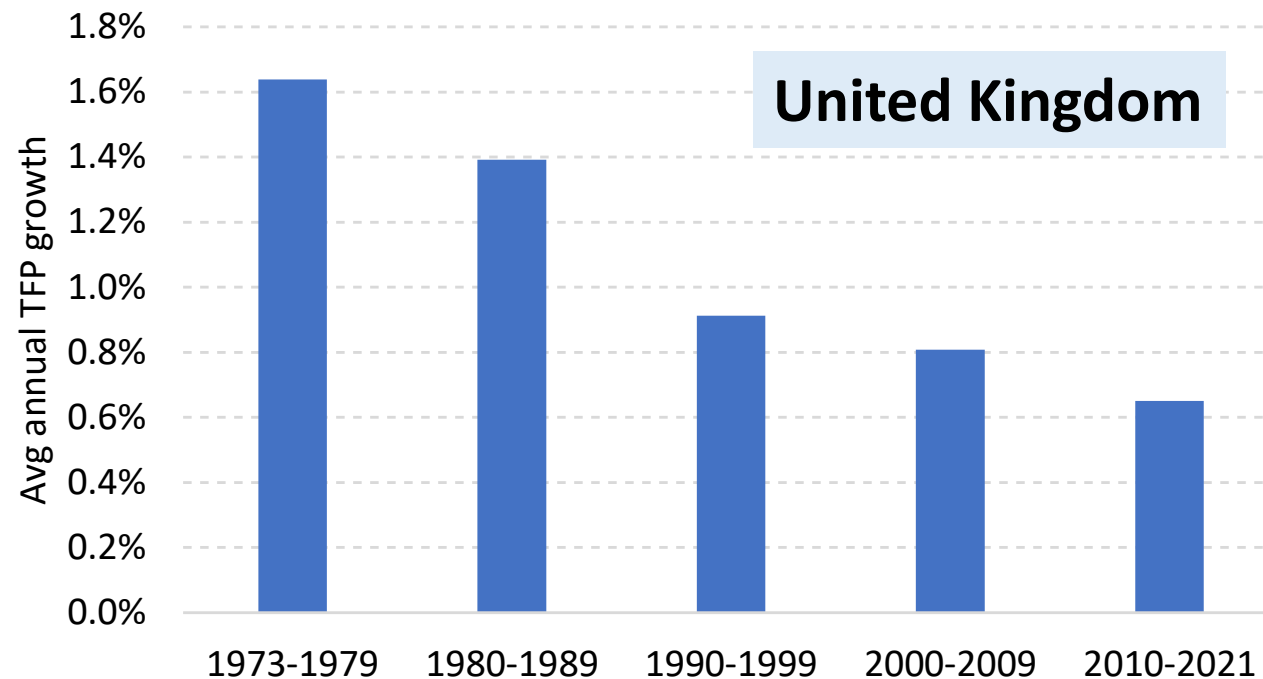
(3) Shifting the Frontier



R&D for technical progress

- Problem: declining real-terms public funding for agricultural research & innovation in high-income countries
 - And spread across more diverse set of challenges

**Declining
Agricultural
Productivity
Growth**



R&D for technical progress

- Challenge: slow productivity growth and plateauing yields
 - Natural Resources Productivity (Rickard, 2015)
 - New green(er) revolution (Beddington, 2010)
 - Solutions: translational research & co-design with farmers
 - Farming Investment Fund (esp. productivity grants)
 - Focus areas:
 - Soil health
 - Improved genetics
 - Livestock nutrition
 - Precision & information technologies
- Relatively scale neutral
- Scale economies
Financial and human capital investment

Concluding remarks

- Sustainability is about individual choices
 - Coherent policy signals (incentives)
 - Requires strategic perspective
- Binding environmental targets = high stakes
 - Proactive management responses vs more costly regulation (e.g. livestock reduction)
 - Reorientation of KT and advisory systems
- Researchers + farmers: solutions and adaptation processes
 - Natural resource productivity
- Challenges → Opportunities
 - New income streams
 - Environmental sustainability credentials in market positioning
 - Rebalancing power in supply chains



Thank You

