

Sustainability assessment of biofuels in Practice

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Overview

- Background: the drivers for biofuels
- Achieving Low-Carbon (GHG) Biofuels in Transport
 - Biofuels (LCA/WTT/WTW)
 - Uncertainties
- Sustainability impacts and trade-offs



Energy

- Energy related emissions contribute for over 2/3 of anthropogenic GHG
- 80% of emissions direct fossil fuel combustion
- Double edge
 - Energy needs and reduction emissions



Biofuels and sustainability

- Sustainability debate:
 - Land use
 - Fuel versus food
 - Environmental
 - social
 - economic
- } impacts (+ and -)



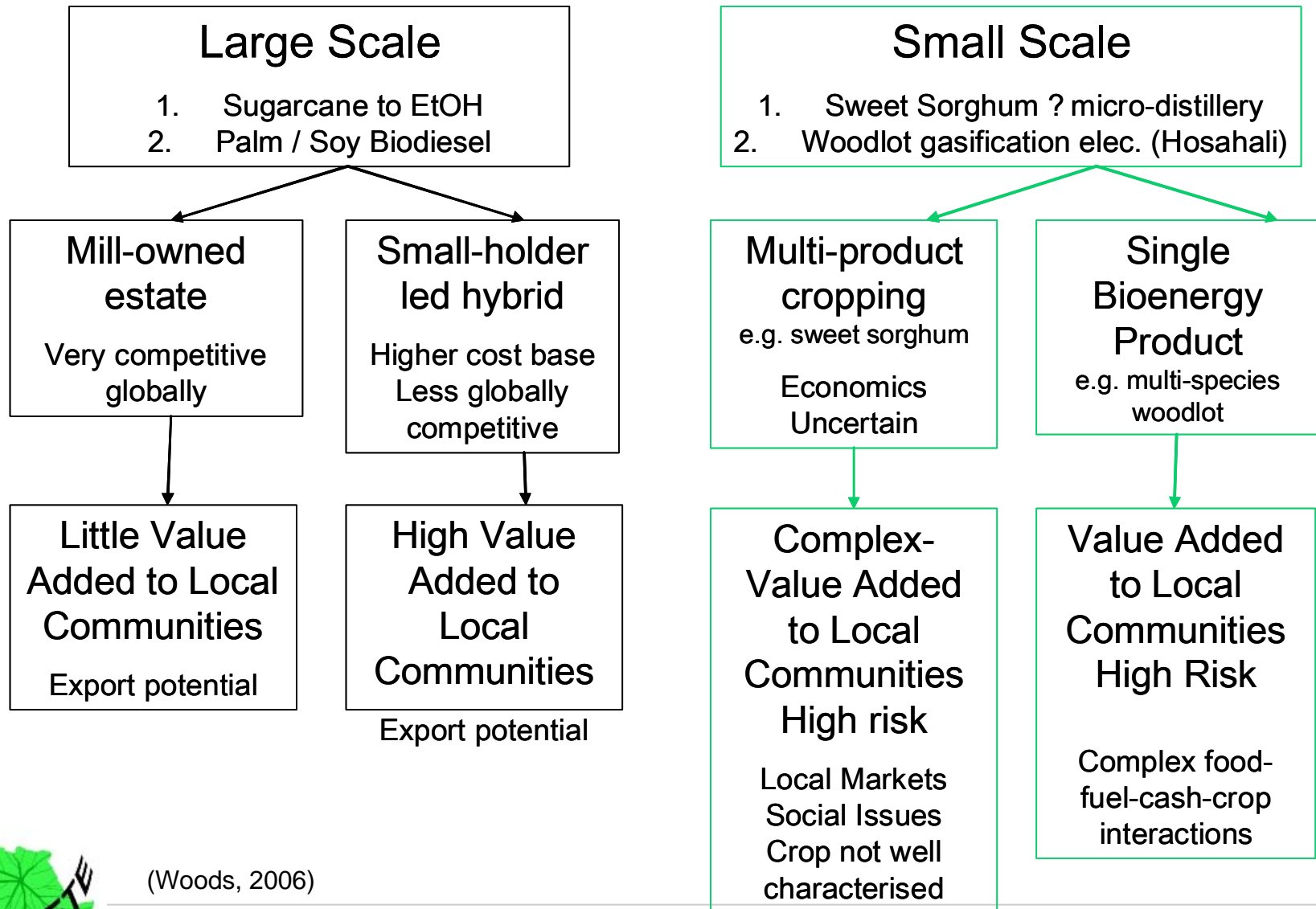
Drivers and Obstacles for Biofuels

National / Regional / Global	Local / End User
<ol style="list-style-type: none">1. Climate Change2. Energy Security3. Rural Development (Macro-economic costs)	<ol style="list-style-type: none">1. Usability2. Cost3. Environment e.g. air quality / health / welfare
<p>← Sustainability →</p> <p>health / welfare / environment</p>	



—J. Woods, 2007.

Bioenergy Development Options



(Woods, 2006)



Implications

- Use of large-scale resources for bioenergy implies expansion of biomass supply:
 - Residues associated to agricultural commodity production and processing
 - Dedicated energy crops on available land





(Dalal-Clayton, 2004)



Essentials on the concept of sustainability

- A challenge to conventional thinking and practice
- concerning long as well as short-term well-being
- comprehensive (all issues in decision-making)
- recognition of links and interdependences
- an open-ended process, not a state
- links between means and ends
- global and context dependent



Approaches

- Life cycle assessment (LCA)
- Life cycle inventory (LCI)



Indicators → (ISO 14040)

- Footprint (Rees, 2006)
- Index Sustainable process index (Nardoslawsky & Niederi, 2006)

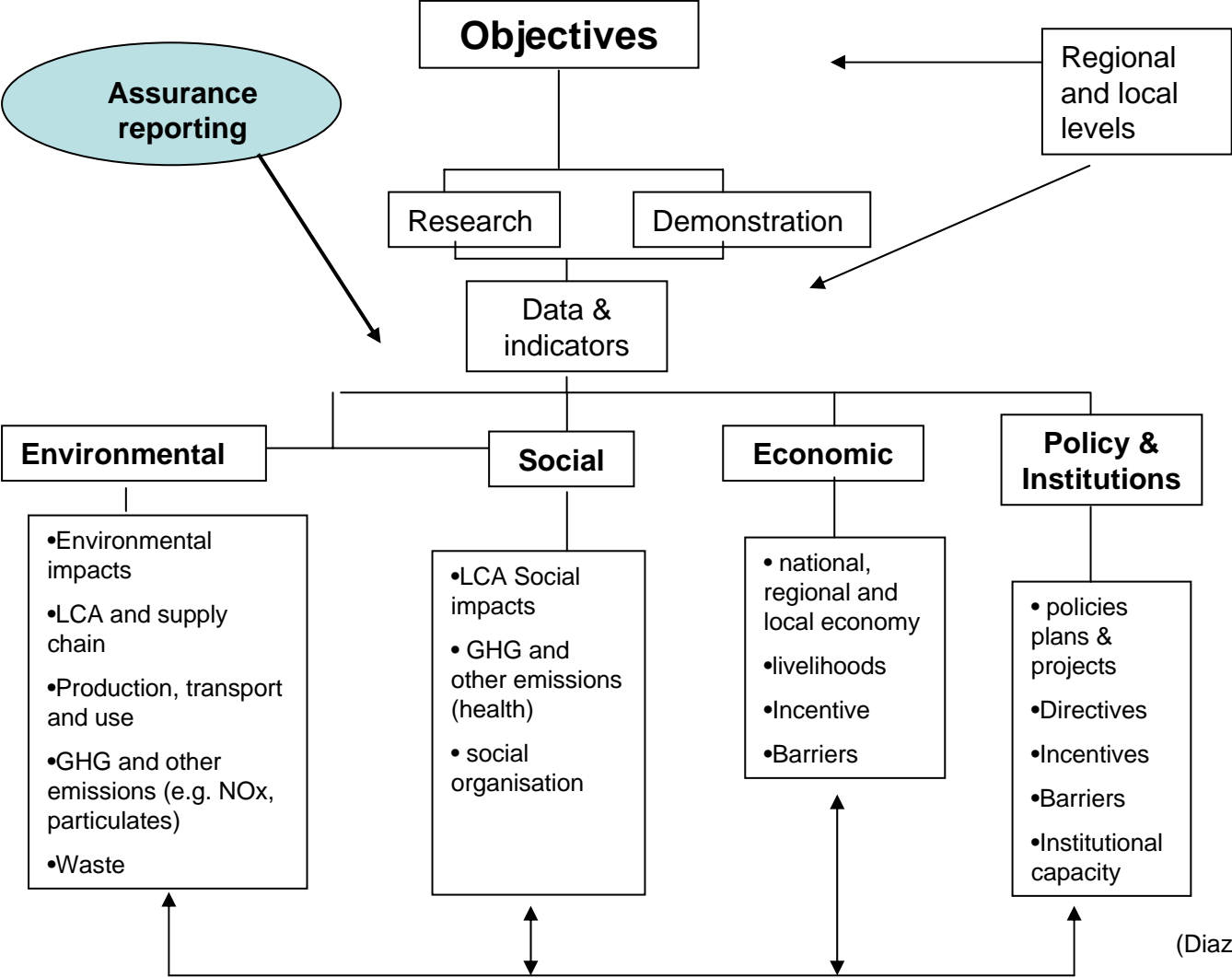


How?

- Standards, assurance, certification (different stages)
- Reward of good practice
- Monitoring
- CSR
- Accountability (stakeholders)

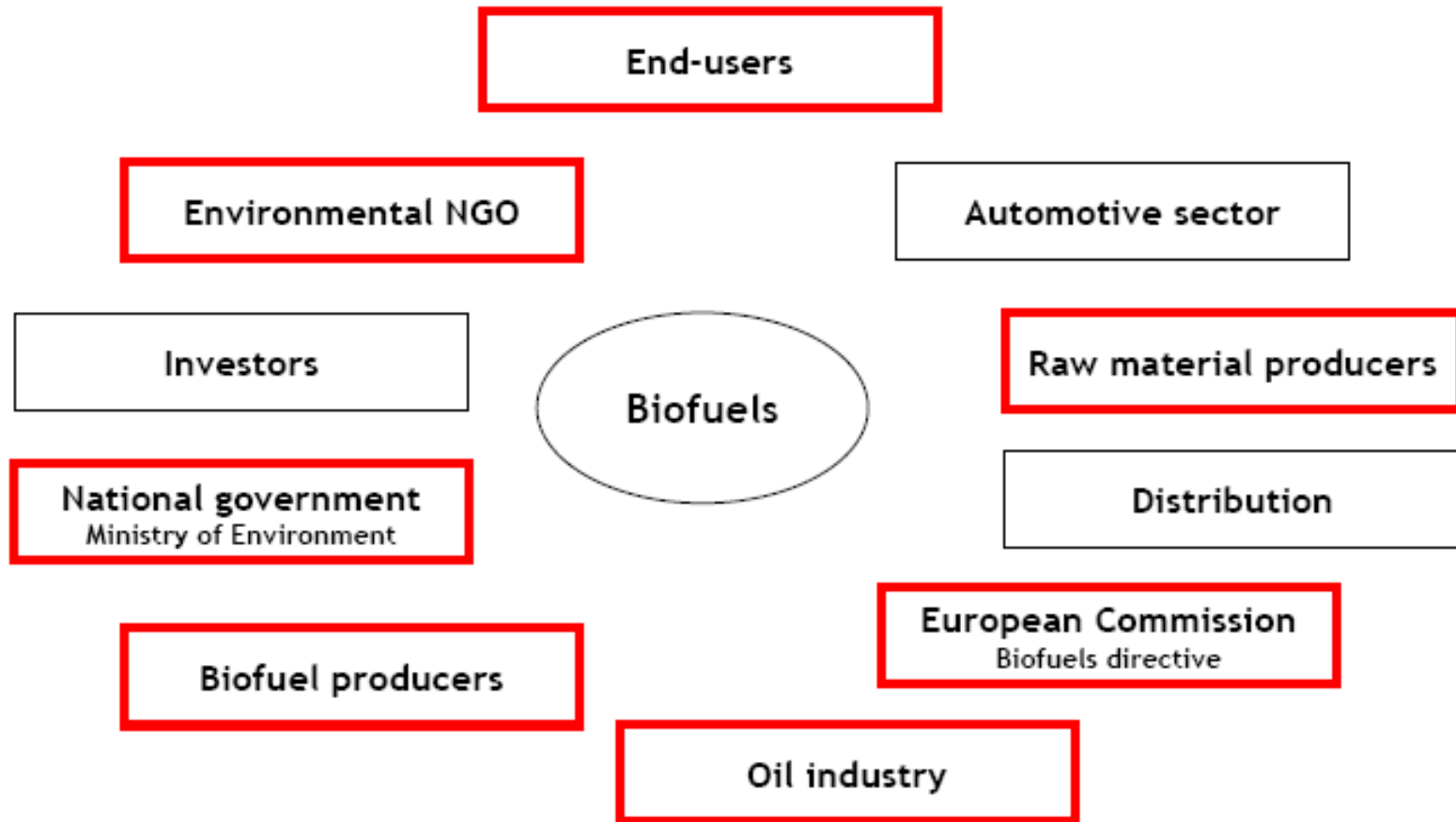


FRAMEWORK



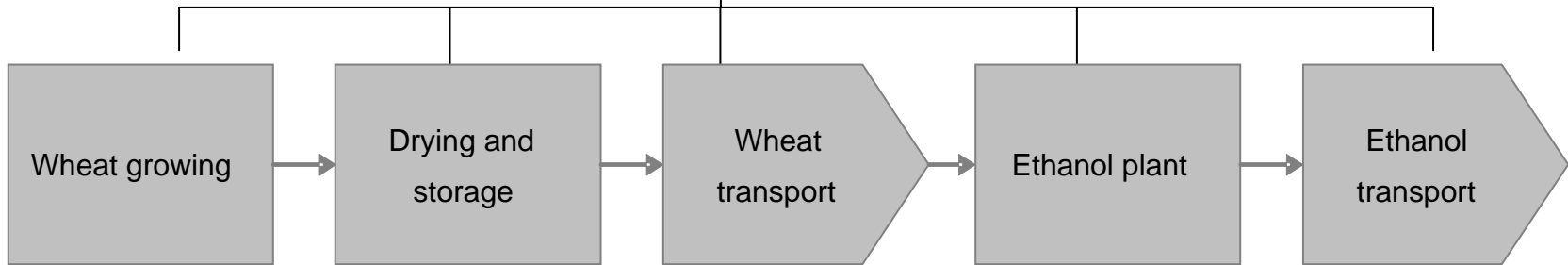
Overview of stakeholders in biofuels systems

(Senternovem, 2005)



Bioethanol

GHG

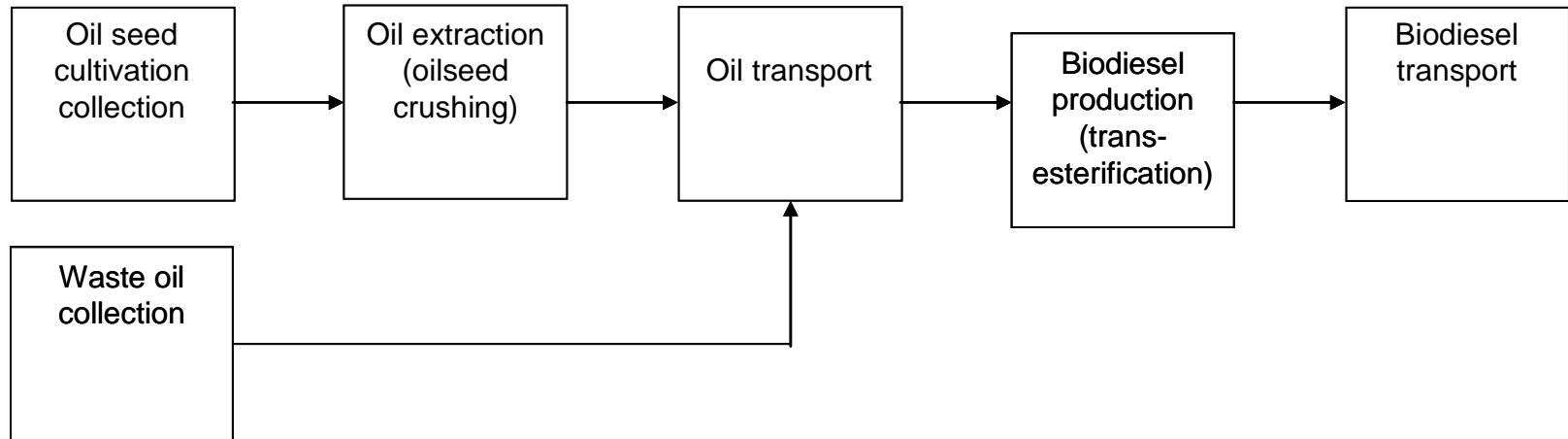


- land use
- biodiversity
- Resources (biomass)
- C conservation
- soil
- water (availability and quality)
- Waste (agriculture competition)
- By-products & co-products
- GAP

- Labourers rights & Working conditions
- Child labour
- Gender (women participation)
- Land use rights
- Livelihoods
- Use of resources (FvF)
- Health & Quality of life
- Education and skills
- Technology acquisition & transfer
- Climate change risks, vulnerability and adaptation



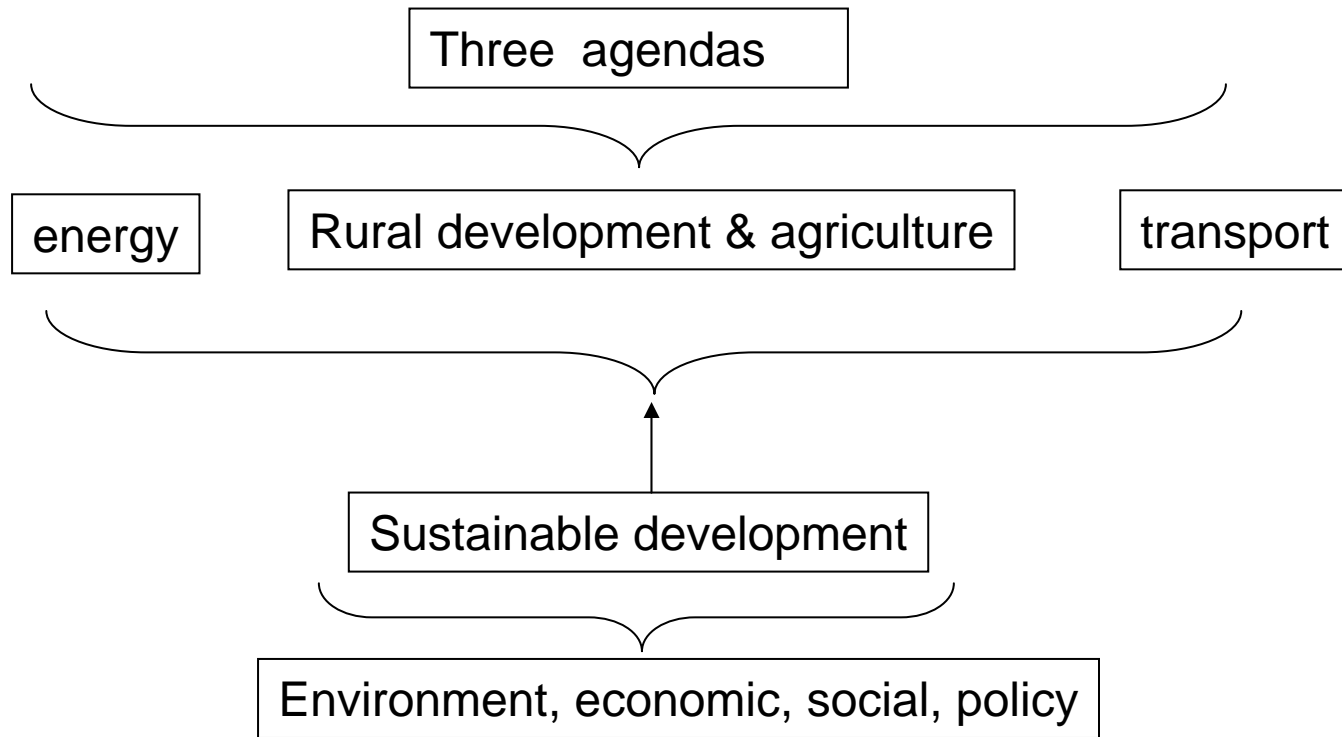
Biodiesel



- Economic value of resources
- Local economy
- Production level (small/large scale, family/small owners)
- Gender
- Investment (funds)
- Trade (incentives and barriers)
- Market
- Costs of production/ certification
- Scale production considerations
- Climate change risks
- Poverty reduction
- By-products co-products
- Rural development

- National, regional and local legislation
- National, regional and local PPPs
- International considerations
- Institutional capacity
- Political incentives & barriers
- Lobbying

Main challenges



Main challenges and opportunities

- Land availability / biodiversity (FvF)
- Policy review
- Increase statistical data
- International consensus (differences on definitions and assumptions)
- Certification/assurance (UK, Europe, local)
- R&D new/available feedstock and technology
- How to ensure 'good not bad'?
- Rural development



Thank you

