



Institute for  
European  
Environmental  
Policy

# A rural bioeconomy to deliver for the climate

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Given the historic and ongoing use of biomass in the economy the question is - *Why the emphasis now on creating or transitioning to a bioeconomy?*



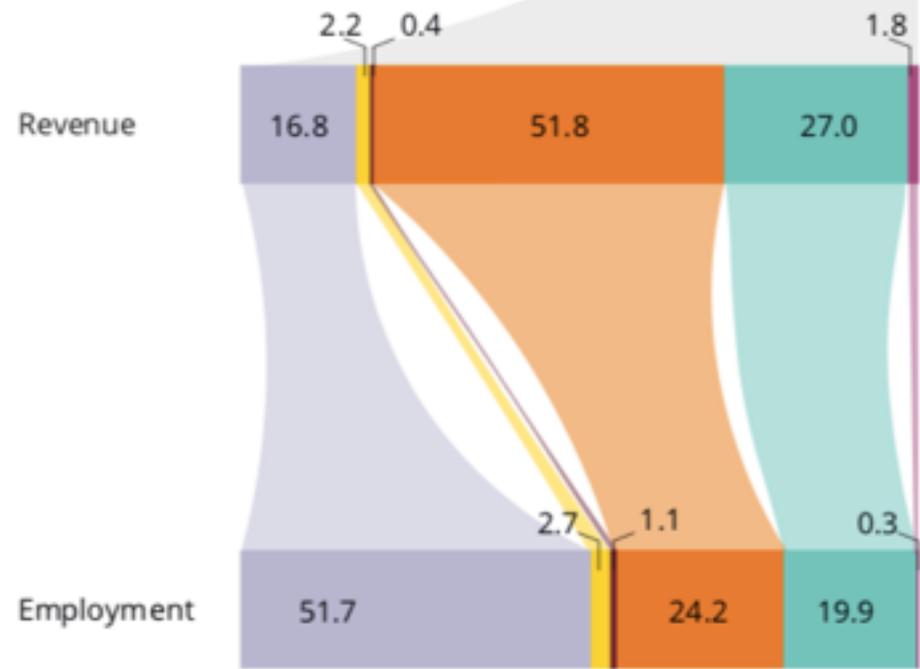
- **Innovation** - promote and respond to advances in scientific knowledge
- **Added value** - alternative opportunities for creating value from biomass
- **Environment and social justice** - opportunity for the bioeconomy to drive sustainable development

# Contribution of the bioeconomy in the EU (%)

Revenue



Bioeconomy revenue and employment (%)

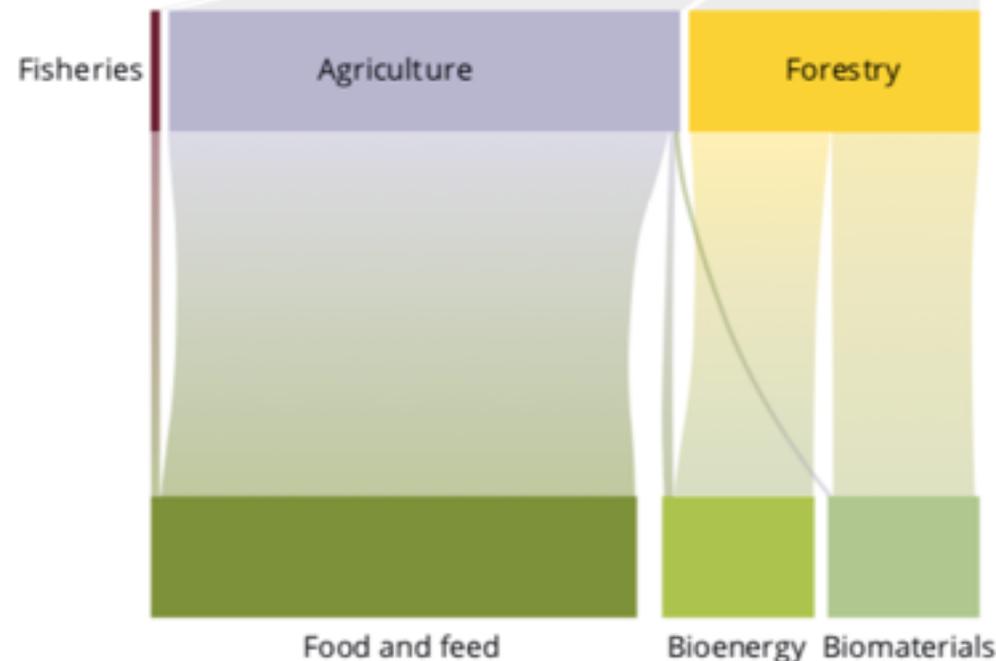


- Agriculture
- Fisheries
- Material production
- Forestry
- Food production
- Energy production

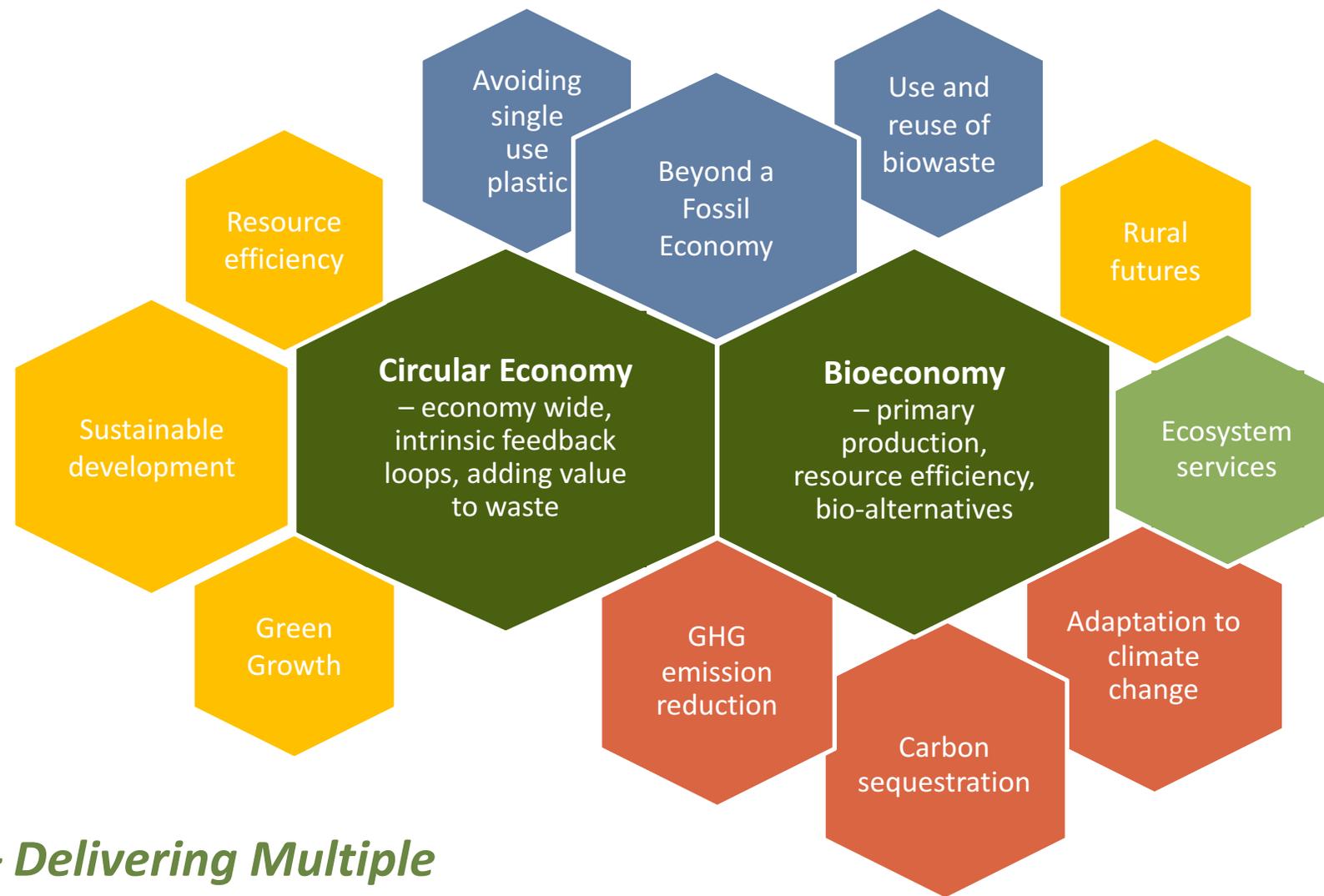
Material flow



Biomass flows in the bioeconomy (%)



Sources: EEA, 2017 – The circular economy and the bioeconomy; JRC Biomass project; 2016 Bioeconomy report (Ronzon, et al., 2017); Eurostat MFA



## *A Circular, Bioeconomy – Delivering Multiple Goals*

# Agriculture and forestry – the bio-economy

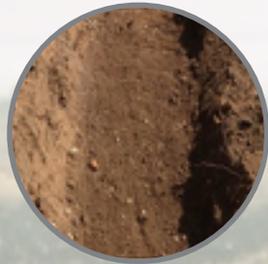
- The agriculture and forestry sectors are unique in that they rely on natural resources and cycles as their primary inputs.



Land



Water



Soils



Biodiversity

- Using these resources beyond sustainable limits undermines the future of these sectors and the benefits they generate for society.



# Actors within the European food supply chain.



PRODUCING FOOD      PROCESSING AND MANUFACTURING      SUPPLY, RETAIL AND SERVICES      CONSUMING FOOD

Source: EEA (2017) *Food in a green light - A systems approach to sustainable food*. EEA Report - No 16/2017

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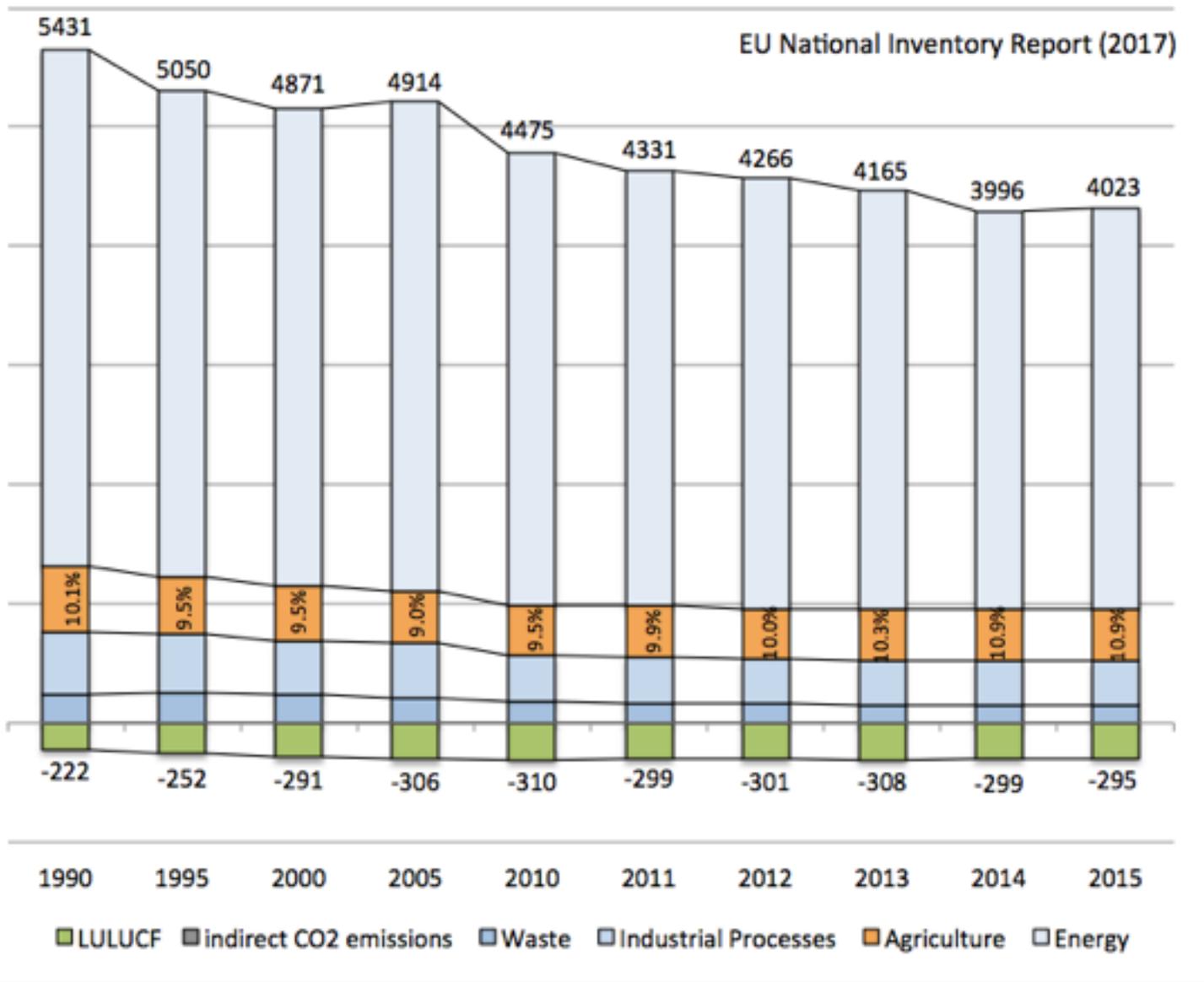


# EU Bioeconomy Strategy - Integrated Goals

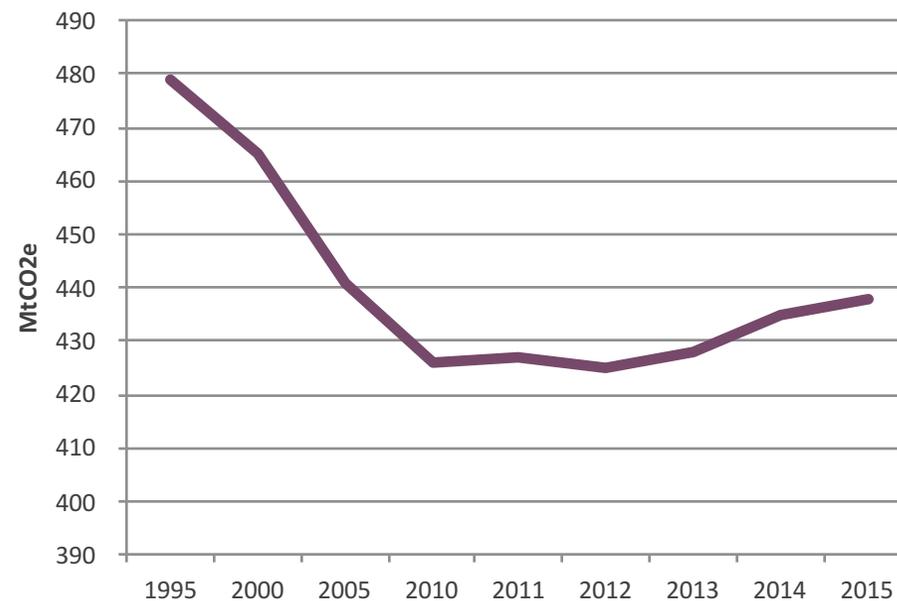
1. Ensuring food security;
2. Managing natural resources sustainably;
3. Reducing dependence on non-renewable sources;
4. Mitigating and adapting to climate change;
5. Creating jobs and maintaining competitiveness.

## Integrated Goals for Sustainable Development and Climate Action

- The production of renewable (sustainable), biological products and resources – **scale is important**
- Primary production **relies on inputs** – can be both linear and circular
- Relies on a **common resource streams**
- Can deliver efficiency but **needs to be considered collectively** - best and most efficient use of resource



- Reductions in other sectors has been more rapid and sustained than in agriculture.



- Emission levels have seen sustained increases since 2012
- Relative share expected to reach 30% by 2050



## What makes agriculture & forestry special?

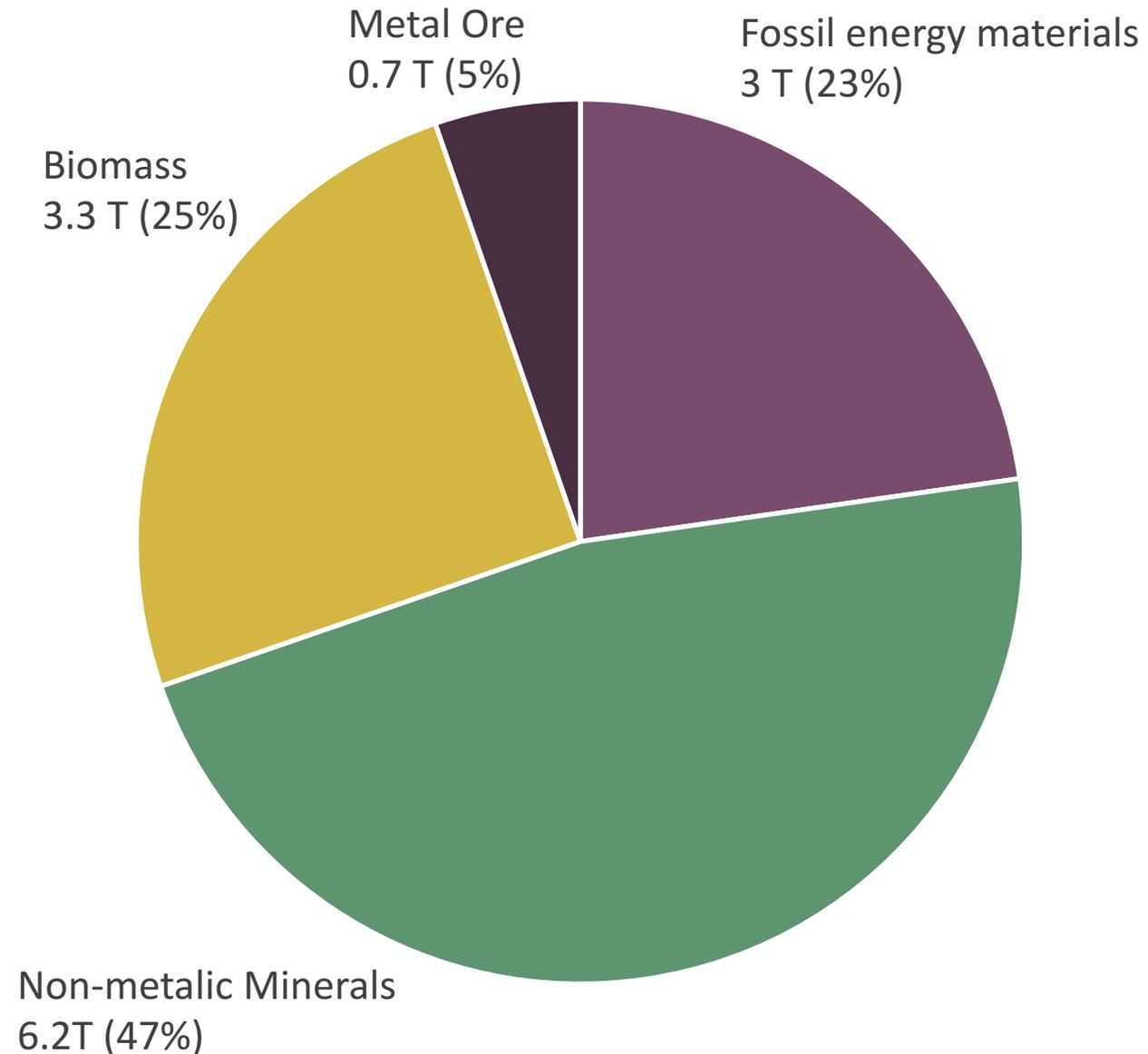
- Potential to compensate for emissions through carbon sequestration and storage
- Mitigation actions can deliver co-benefits: economic, environmental & social
- Agriculture also has a role in
  - Ensuring EU food and nutrition security,
  - Incomes and territorial development,
  - & the social & environmental benefits delivered by the sector

## Biomass production

- Biomass produced = 1,466 MT / year
  - 956 MT / year agriculture
  - 510 MT / year forestry
  - (avg figures)
- Harvested and used = 805 MT/year
  - 578 MT / year agriculture
  - 227 MT / year Forestry
  - (2013 figures)

Sources: Eurostat (env\_ac\_mfa) and (demo\_gind);  
JRC (2018) *Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment.* doi:10.2760/539520

## Material consumption per capita / year (2017)



## Biomass production

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## Consumption versus production

100 %

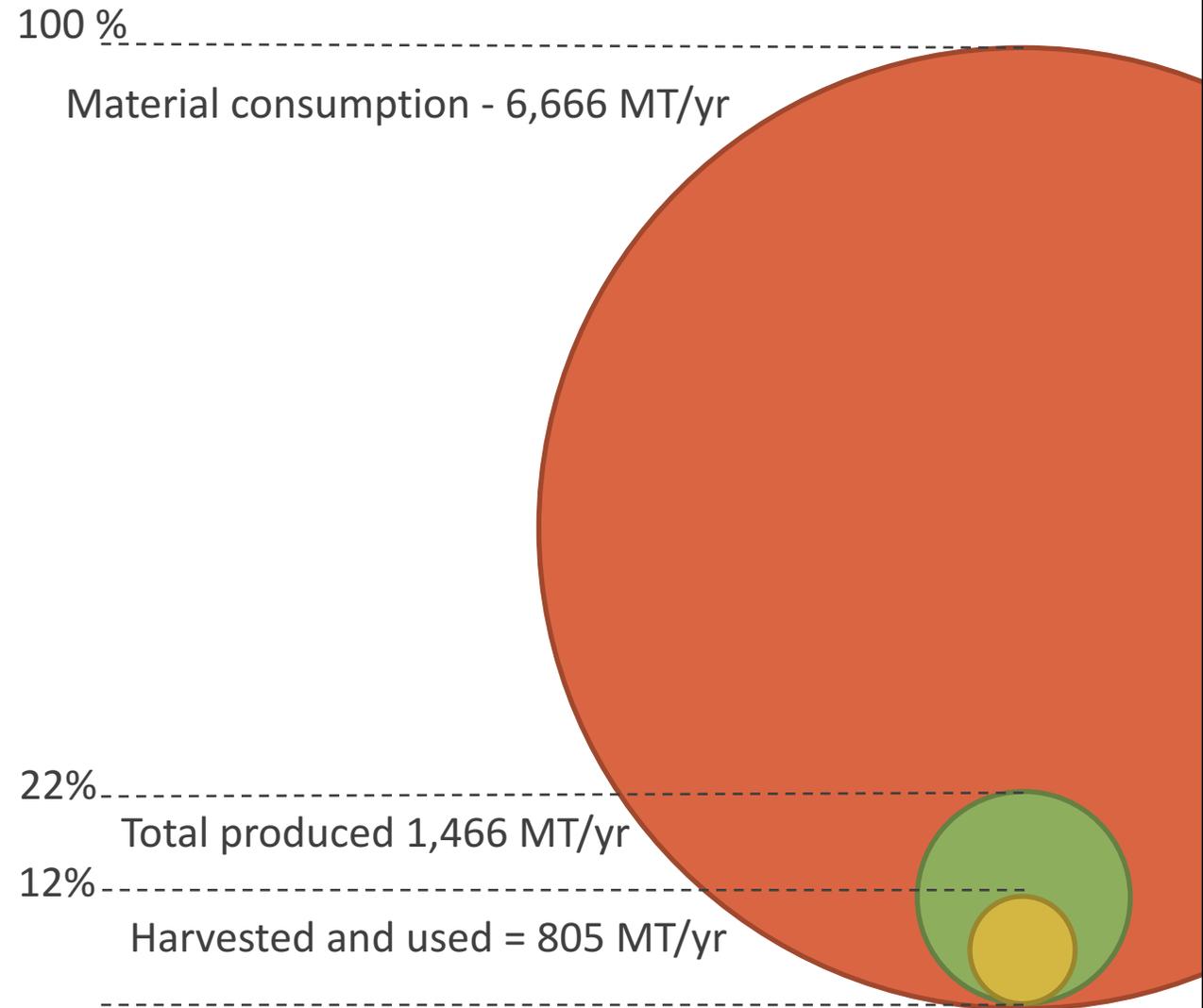
Material consumption - 6,666 MT/yr

22%

Total produced 1,466 MT/yr

12%

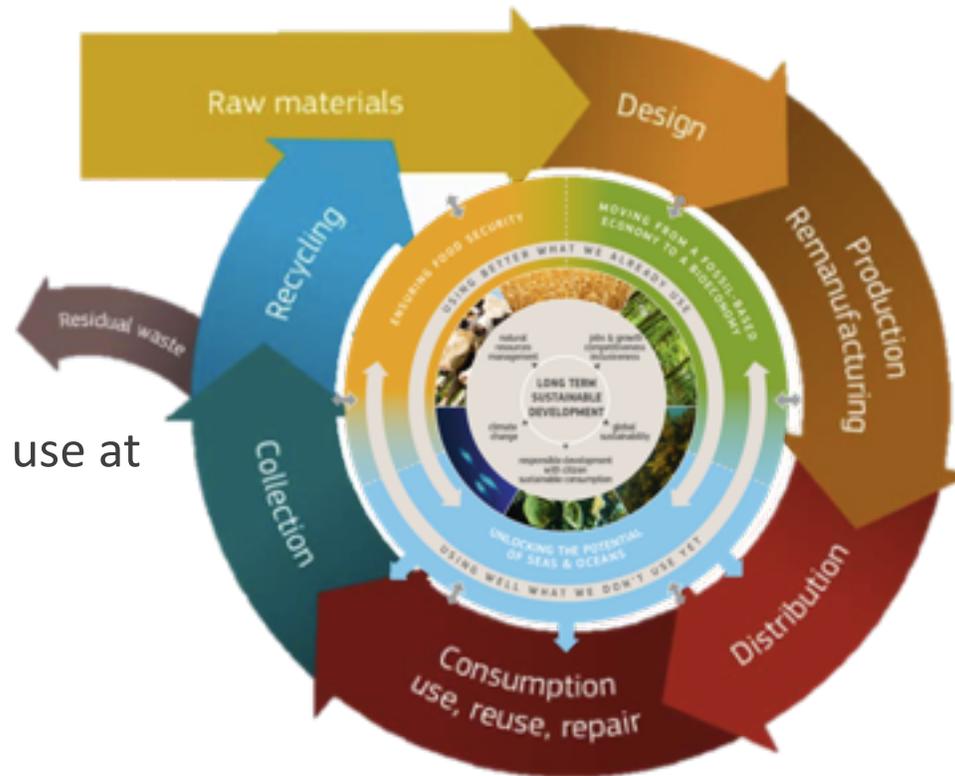
Harvested and used = 805 MT/yr



# Agriculture and forestry – A more circular bio-economy

## Opportunities

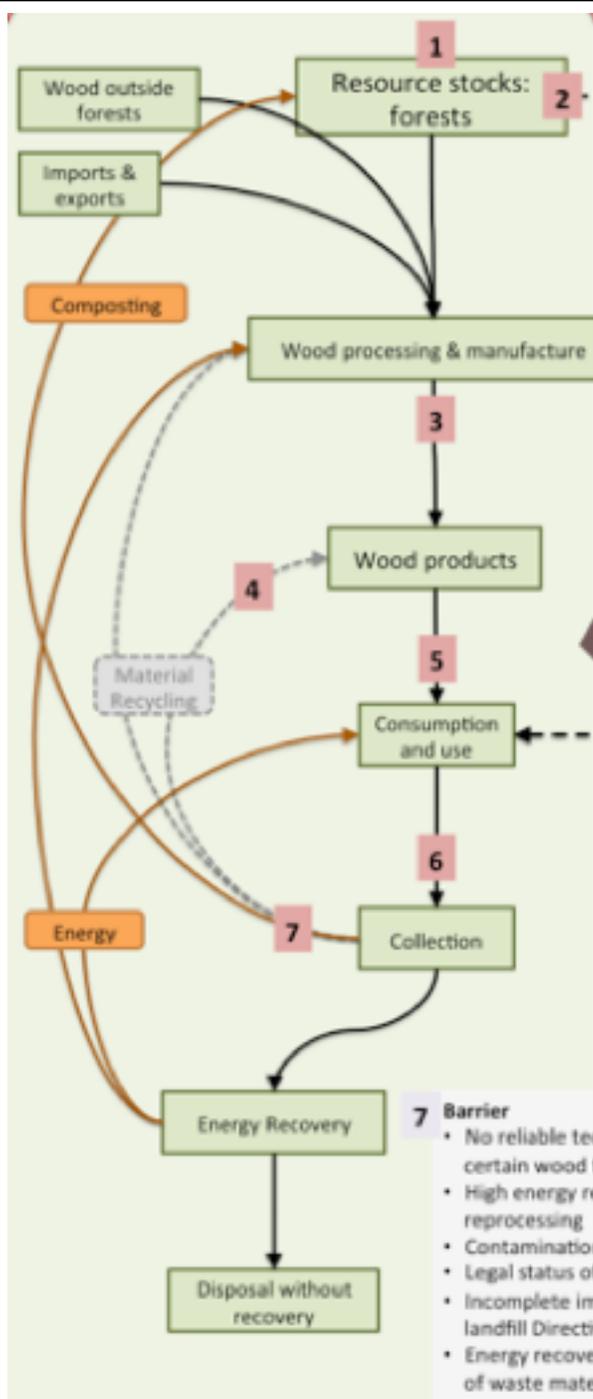
- New income streams
- Future proofing
- Job creation
- Links to new sectors
- More sustainable resource use at lower cost
- Reduced exposure to risk



## Circular-Bio-economy

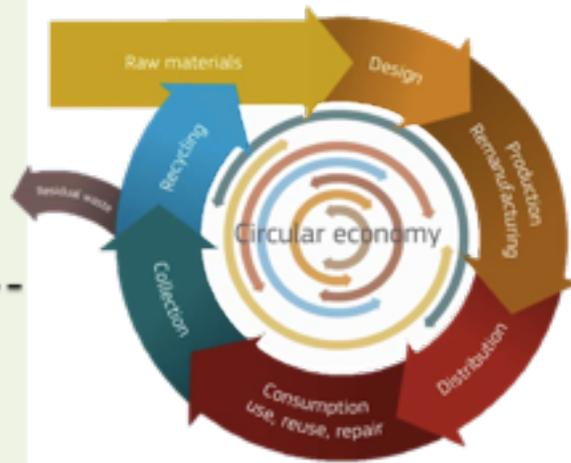
- Intrinsic recycling and feedback loops;
- Applies to the whole economy;
- Supports rural sectors;
- Emphasis on adding value to raw materials, wastes & residues;
- Strong knowledge and technical development;

Maximising circularity

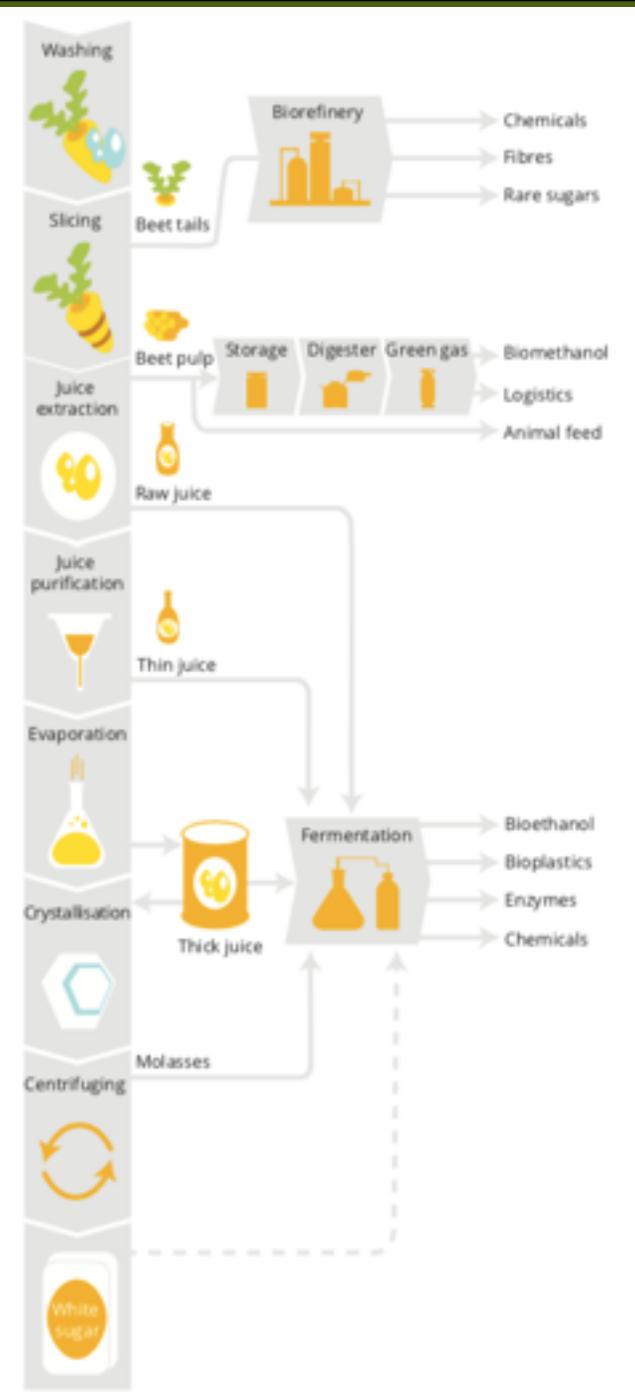


Source: Vis et al, 2016  
Cascading use of woody biomass

## Circular Bioeconomy



Source: EEA, 2017 – The circular economy and the bioeconomy;



Maximising valorisation

## Rural challenges of the bio-economy

1. Increasing demand for natural resources
2. GHG emissions are uncertain and depend on production practices, life of product and end-of-life.
3. High utilisation of existing biomass – and dependence on imports
4. New products and uses counter efforts to reduce waste
5. Loss of value from rural areas

## Limits of a Circular Economy

- Respect established environmental limits and thresholds
- Real resource savings must be measured as absolute, rather than just relative
- Europe is a leader for environmental policy but per capita consumption and waste production remains very high
- Does not automatically integrate concepts of social and environmental justice - future development models

## Solutions from the Circular Economy

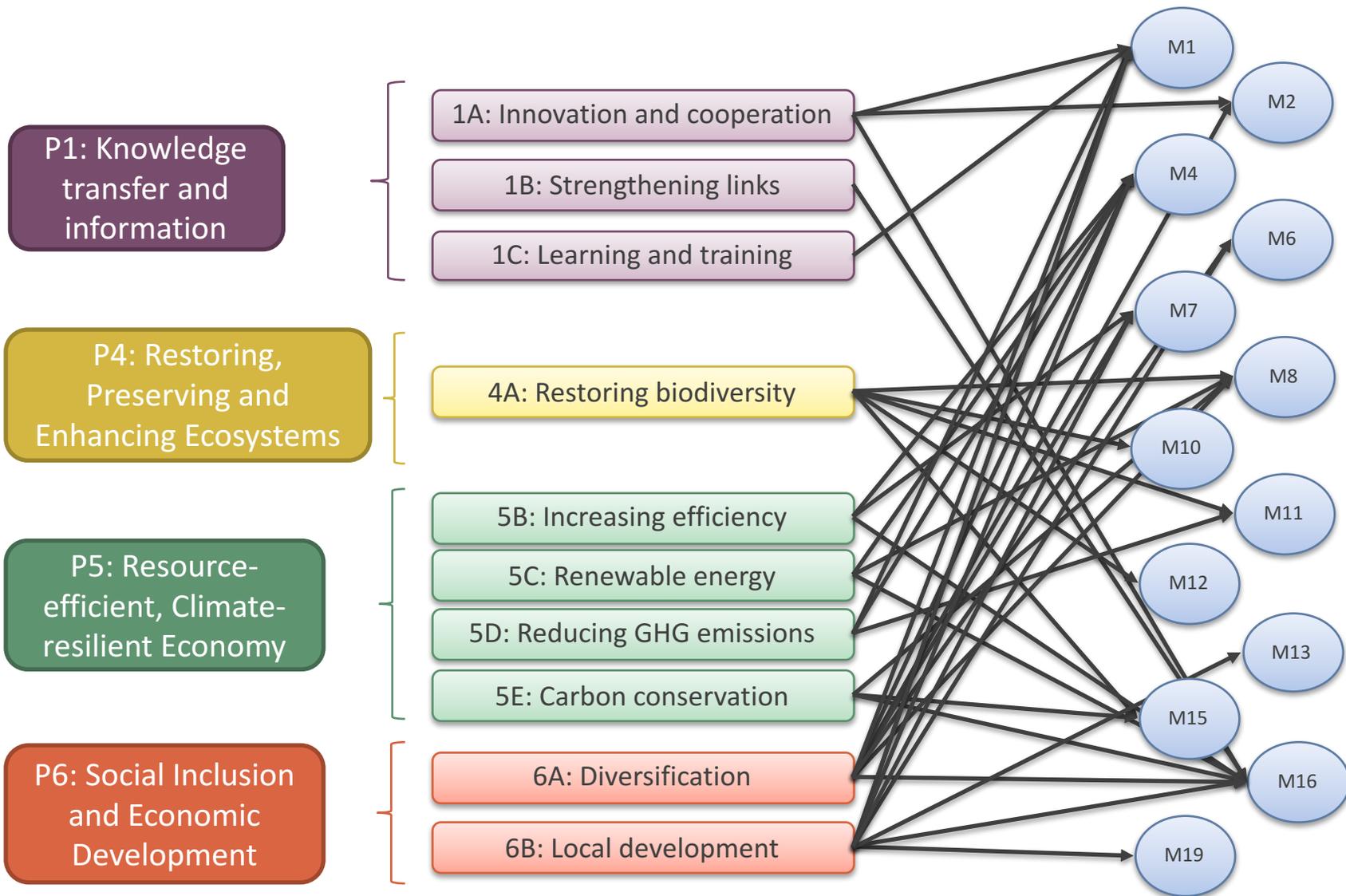
- Circularity can help to reduce competition as can a change in the resource base.
- Recovery at end of life - change in production practices and closing nutrient loops.
- Greater cascading use of woody biomass, developing new side-streams from existing wastes & residues
- Systemic change and focus on consumption
- Develop rural bio-economy value chains, with greater feedback.
- Emphasis on added value – economic, social and environmental not consumption or production of products

## Delivering a Sustainable Circular Bioeconomy

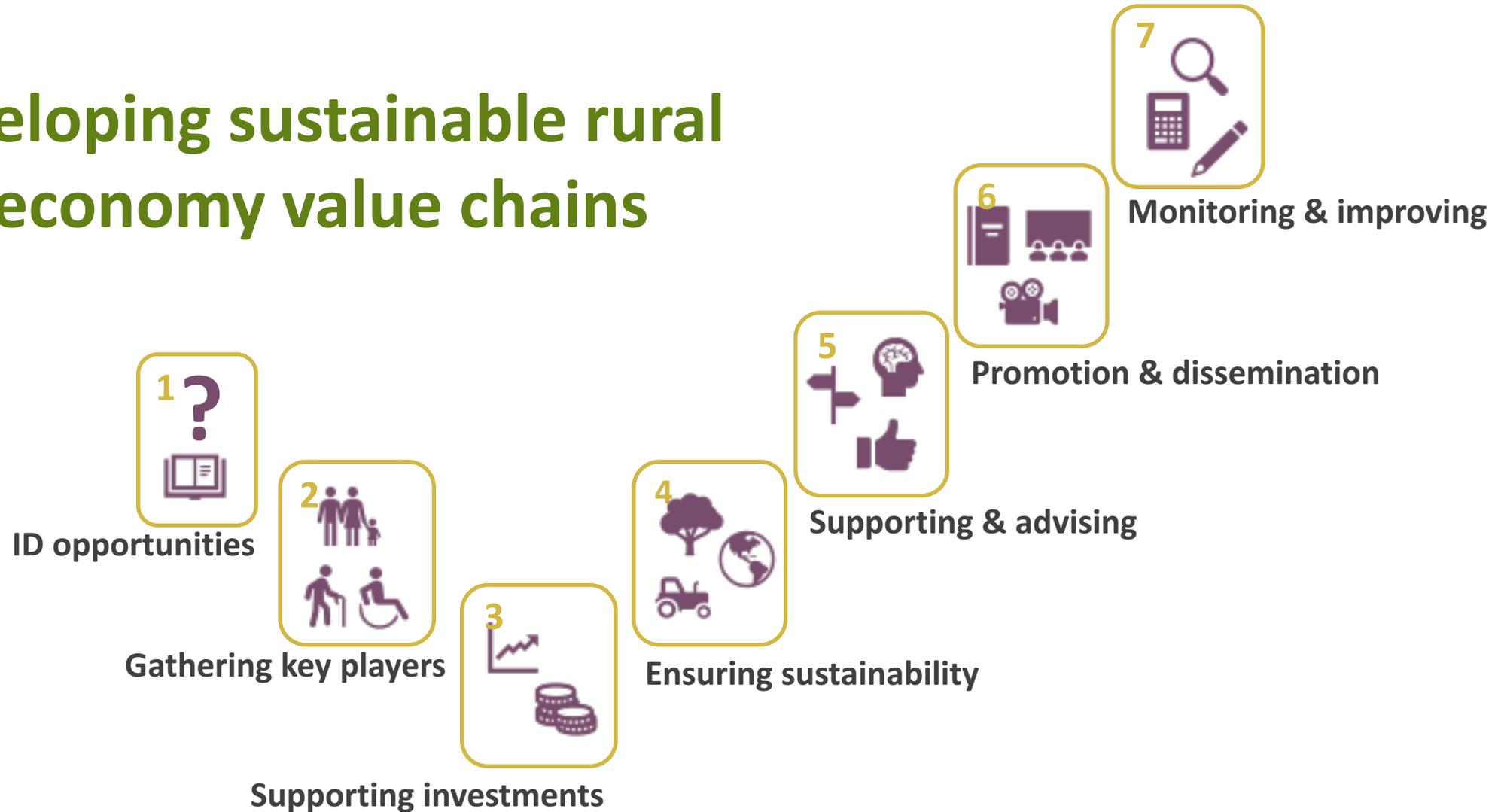
- Policy coherence - sustainable trajectory for the circular bio-economy
- Policy interventions to deliver reduction of environmental pressures along the entire value chain
- Necessity socio-economic and institutional innovations - reconceptualising what value means in the bio-economy, not just production
- Changes in consumption and behaviour
- Sustainability criteria - to ensure the bio-economy stays within natural limits and to promote circularity
- A new way of considering bio-resources and their role in society

A red tractor is shown from a rear perspective, plowing a field. The tractor is moving from left to right, turning over dark soil. The field is mostly dry and brown, with some green plants visible in the foreground. In the background, there are power lines and a clear sky with many birds flying. The overall scene is set during the day, likely in a rural or agricultural area.

**The role of the CAP & RDPs in  
mainstreaming a sustainable bio-  
economy**



# Developing sustainable rural bio-economy value chains



# Identifying opportunities



- What are the opportunities at the territorial level?



- *Pays des Condruces* - LAG supported studies related to biogas production, including mapping the distribution of farms, capacity to produce biogas, cooperation potential, compensation, implementation, etc.
- *Seminars for farmers and citizens, with online outreach, study trips and guidelines.*
- *LAG supported analysis estimated biogas production could cover electricity in the 7 towns*

- Potential RDP measures:
  - M7 Basic services
  - M16 Cooperation
  - M19 Leader

## Gaps:

- Identifying resource surpluses & potential for value added
- Business models beyond primary production
- Non land-based production



## Gathering the key players

- Actors working together, farmers, SMEs, researchers, etc.



- *Finish Lapland - Arctic Smart Rural Communities cluster is helping this remote area of Europe to recognise the potential of its local natural resources to supply bio-based energy, food and materials.*
- *Mission to avoid capital outflow from the area and add value.*
- *Create new innovative enterprises based on circular economy principles adding value to local natural resources for local communities*

- Potential RDP measures:
  - M9 Producer groups
  - M16 Cooperation

### Gaps:

- Support to bio-economy innovation (beyond primary production) in a scale that is accessible for small- and medium-size rural enterprises.

## Supporting investments



- Up-front investments for infrastructure, facilitation, machinery, knowledge as a catalyst for other funding source
  - *Sastamala, Finland used M6 & LEADER support In a feasibility study to upscale a biocomposite production line, the farm and business development measures*
  - *20 new jobs created.*
  - *The support enabled funding visits to potential suppliers abroad to develop the bioeconomy value chains.*
- Potential RDP measures:
  - M3 Quality schemes
  - M4 Investments in physical assets
  - M6 Farm & business development
  - M7 Basic services
  - M8 Investments in forests



### Gaps:

- Support for existing enterprises and scale-up
- Cross sectoral support combining instruments (e.g. EAFRD, other ESIF).

# Ensuring environmental sustainability



- Bio-economy based on natural resources to support sustainable management



- *Thuringia and Brandenburg used M323 to support pilot initiatives identifying locally appropriate ways to recover wood fuel through landscape maintenance.*
- *Focus on ecological and economical ways.*
- *Habitat management used to prevent natural succession and scrub development whilst also providing wood fuel.*

- Potential RDP measures:
  - M4 Investments in physical assets
  - M10 Agri-environment-climate
  - M11 Organic Farming
  - M15 Forest-environment-climate

## Gaps:

- Perception and understanding of sustainability in different contexts

## Supporting and advising

- New/novel bio-economy value chains can require better understanding



- *The 'Academy on Tour' initiative in Belgium used Leader to support all -day tour to a foreign country on a VIP- bus with appropriate facilities for work.*
- *This helped (potential) agri-food entrepreneurs to develop their business ideas into concrete plans and then implement them.*
- *In Scotland, the GrowBiz initiative implement a community-led method of support, establishing a volunteer board of up to 10 people from the community and appointing a locally based Enterprise Coordinator. This prevent the need to travel to the city to get advice.*

- Potential RDP measures:
  - M1 Knowledge transfer
  - M2 Advisory services
  - M19 Leader

### Gaps:

- Bio-economy not compulsory advice;
- Ongoing business advice is limited



# Maximising opportunities for a sustainable, circular bioeconomy that delivers value to producers and rural development

## Adding value and defining projects that deliver added value

Project criteria – what defines a bioeconomy intervention?  
Delivering more than BAU re innovation, sustainability resource efficiency  
Connecting the dots between different current interventions to deliver new value chains  
Building on current best practises eg cooperation for ecosystem service delivery PEGASUS H2020

## Mapping available local and regional resource base as a basis for environmental/socially responsible decision making and prioritisation

Understanding local and regional opportunities  
Pinpointing support priorities  
Utilising the bioeconomy as an opportunity for transition to support wider sustainable practices eg crop rotation, more innovative cover crops, agro forestry

## Integrated Governance

## Monitoring and impact/change

Support is generating sustainable transition that prioritises and considers scale of biomass use and the sustainability of production and use

## Matching local and regional resource to broader societal needs/environmental goals

Bioeconomy as a basis for supporting and integrating transition to climate smart agriculture, delivery of ecosystem services and value to for the rural economy



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