Bio-based economy: are we going to enhance the market power of forest owners?

Davide Pettenella
TESAF Dept. – University of Padova

Outline

1. Bio-economy: a fuzzy word
2. Two approaches to bio-economy
3. Some final considerations

Presentation available on the web: search "pettenella"
1. Introduction: bio-economy a fuzzy word

Bioeconomy: a fuzzy word...

A definition:

Bioeconomy “encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. It includes agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries” (EC, 2012)

Bioeconomy: the 3 “F” (food, feed, fiber) + bioenergy

• Bioeconomy (BE) → a sub-part of the nation’s total economy (often in relation to white biotech and life science)

• Biobased economy (BBE) → an economy where renewable resources instead of fossil ones constitute feedstocks for both energy, food, feed and materials

A difference that is not outspoken nor defined (Staffas et al., 2013)
2. Two approaches to bioeconomy

Approaches to bioeconomy

2 different (complementary?) approaches that may help to understand the territorial differences in bioeconomy policies:

• the traditional, *technological* approach
• the emerging, *social* approach
Technological approach: an example from Finland

- Largest investment in the history of Finnish forest industry
- 100% of wood raw material used
- 1.3 million tonnes of pulp/year + bioproducts (e.g. textile fibres, biocomposites, lignin products, fertilisers…) and bioenergy
- +150 jobs created (2,500 including value chain and consumption)

Social Innovation in Mediterranean forests
Example: Borgotaro network (territorial marketing)

Enterprises: 62
15 Agro-tourisms/ Farm businesses
12 Hotels/Guest quarters
8 B&B/Inns/Hostels
9 Cheese, sausage and wine growing and producing factories
2 Didactic farms
3 Museums/Private collections
30 Restaurants/Porterhouses
26 Typical products sellers

Imago product: Boletus mushroom
The traditional (dominant) approach (modified from Toman, 2012; Pettenella, 2015; Secco et al., 2015)

<table>
<thead>
<tr>
<th>Technological approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on</td>
</tr>
<tr>
<td>• Technological innovations</td>
</tr>
<tr>
<td>• Large scale investments</td>
</tr>
<tr>
<td>• Value chain perspective</td>
</tr>
<tr>
<td>• Sectoral development</td>
</tr>
<tr>
<td>• Vertical integration</td>
</tr>
<tr>
<td>Input/output diversification</td>
</tr>
<tr>
<td>1 or more inputs</td>
</tr>
<tr>
<td>Diversification in outputs</td>
</tr>
<tr>
<td>Market power</td>
</tr>
<tr>
<td>Increasing role of business owning/controlling the (new) technologies</td>
</tr>
<tr>
<td>Model regions</td>
</tr>
<tr>
<td>Northern EU (UK, Scandinavian countries)</td>
</tr>
</tbody>
</table>

A strong emphasis on biorefinery within the bioeconomy framework

• A key factor in the transition to a bio-based economy will be the development of biorefinery systems (Scarlat et al., 2015)

• Biotechnology and the biorefinery concept are essential components of the bioeconomy (McCormick and Kautto, 2013)

• The bioeconomy is integrating traditional agricultural, forest and marine biomass feedstock production systems with a range of biorefinery options and applications (SCAR, 2014)

• Biorefineries are increasingly at the core of the bioeconomy vision at the EU level and worldwide (World Bioeconomy Summit, 2015)
2 large biorefinery models
(Europabio, 2011, European Commission, 2012, Ceapraz et al., 2016)

A. Port-biorefinery → strongly connected to global flows of raw materials, key-logistic location (inside/nearby harbors, along channels…), high specialization, threshold effects, and economies of scale

B. Territorial biorefinery → strongly connected to local/surrounding territory and (in general terms) dependent on a more diverse and more thorough valuation of various biomasses

75% of the biorefinery sites and 70% of the largest sea harbors are located within a circle consisting of France, Germany, Denmark, Belgium, the Netherlands, and the UK

Source: Reith and Steinmetz (2009); Fava (2015)
### The social approach
(modified from Toman, 2012; Pettenella, 2015; Secco et al., 2015)

<table>
<thead>
<tr>
<th>Focus on</th>
<th>Technological approach</th>
<th>Social approach</th>
</tr>
</thead>
</table>
|  | • Technological innovations  
|  | • Large scale investments  
|  | • Value chain perspective  
|  | • Sectoral development  
|  | • Vertical integration  
|  | • Social innovations  
|  | • Small scale  
|  | • Networks  
|  | • Cross-sectoral development  
|  | • Horizontal integration (= forests and agriculture as the green infrastructures for rural development)  
| Input/output diversification | 1 or more inputs  
|  | Diversification in outputs  
|  | Diversification in the use of inputs  
|  | High added value products & services  
| Market power | Increasing role of business owning/controlling the (new) technologies  
|  | Role of networks, groups, associations, public-private partnerships…  
| Model regions | Northern EU (UK, Scandinavian countries)  
|  | Southern EU (Mediterranean region)  

### Different (complementary?) strategies
(modified from Toman, 2012; Pettenella, 2015; Secco et al., 2015)

<table>
<thead>
<tr>
<th>Focus on</th>
<th>Technological approach</th>
<th>Social innovation approach</th>
</tr>
</thead>
</table>
|  | **Adaptive strategy**  
|  | (“Old wine in new bottles”) →  
|  | conventional wisdom of innovation generation  
|  | Focus on forests, agriculture, fishery as raw materials providers with biotechnology being the engine of the growth  
| Input/output diversification |  | Bioeconomy: an opportunity to re-think to our consumers’ patterns  
|  | It not only considers the protection of natural capital, “but it stresses as well the importance of addressing equity and social inclusion challenges in moving toward a green economy”  
| Market power |  |  
| Model regions |  |  

---

Adaptive strategy (“Old wine in new bottles”) → conventional wisdom of innovation generation  
Focus on forests, agriculture, fishery as raw materials providers with biotechnology being the engine of the growth  
Bioeconomy: an opportunity to re-think to our consumers’ patterns  
It not only considers the protection of natural capital, “but it stresses as well the importance of addressing equity and social inclusion challenges in moving toward a green economy”
3. Some final considerations

Conclusions

Bio-refineries: prevailing large-scale investments, capital-intensive $\rightarrow$ increased market power of the industrial complex and lower one of forest owners, asked to produce low-value raw material (biomass) and much exposed to international competition

Comparing a family sawmill with a bio-refinery, the first is producing much more added value and employment for the local residents (and the forest owners)
Conclusions

We should catch the real innovative aspects of bioeconomy that are related to equity, social inclusiveness, promotion of local knowledge and employment creation, i.e. to social innovation, more than to problems connected to technology innovation (that can be market driven, without much public support).

Conclusions

… rural (forest) areas needs more social innovations than technological innovations