1 Introduction

The new frontier of the “green” economy is the so called bioeconomy and biobased products. The latter are wholly or partly derived from biomass (such as plants, trees or animals) that have undergone physical, chemical or biological treatment. They are the “biobased versions” of traditional or novel products.

Bioeconomy refers to “various sectors of the economy [in a common context] that produce, process and reuse renewable biological resources” (EC, 2012, p. 18). Its foundations originate from ninety years of the European Commission’s (EC) strategic agendas, it was presented as “one of the key strategic challenges for the 21st century” by OECD (2002, 2009) and it has been officially discussed in Europe since 2005 in a market-oriented key that prepared the way for “Innovating for Sustainable Growth: A Bioeconomy for Europe”. This is a publication composed of an introduction, a communication from the EC to the European Parliament, the Council, the European Economic and Social Committee and the Regional Committees (the bioeconomy strategy and the action plan), and a Committee Staff working document (presenting facts and examples, as well as some possible scenarios). It was launched on 13th February 2012 and is based on operational proposals for the production of renewable biological resources and their conversion into products and energy, taking action through existing policies such as the Common Agricultural Policy and the Common Fisheries Policy and through new initiatives such as Horizon 2020.

The aim is “to pave the way to a more innovative, resource efficient and competitive society that reconciles food security with the sustainable use of renewable resources for industrial purposes, while ensuring environmental protection” (EC, 2012, p. 8). It is presented
as “a unique opportunity to comprehensively address interconnected societal challenges such as food security, natural resource scarcity, fossil resource dependence and climate change, while achieving sustainable economic growth” (p. 9). In relation to this last point, the growing bioeconomy sector has been viewed as a solution to the industry crisis, shifting public and private investments also toward research activities. According to available data, it is estimated that the European bioeconomy has an annual turnover of about € 2.1 trillion and employs more than 18 million people (Piotrowski et al., 2016).

Nevertheless, as McCormick and Kauto (2013, p. 2602) stress, while “there is great optimism about the benefits and opportunities associated with the growing bioeconomy and bioenergy in Europe [...] there are also significant risks and trade-offs embedded in a large-scale increase in biomass utilisation”. In regards to this, Sheppard et al. (2011) focussed their attention on biosecurity regarding agricultural, environmental, genetic and human health risks associated with new crop species and their potential invasiveness. In reality, the “bio” suffix is insufficient to grant a sustainable economic system and support “societal challenges such as climate change, natural resource scarcity and environmental pollution”, as has already been observed with bioenergy development. To evaluate the sustainability, we need to consider the kind of agriculture and energy used to produce biomass, the chain and scale of biomass production and biobased product processing, the main actors of this chain and their relations with the territory.

In this key, we propose a brief analysis of the “Innovating for Sustainable Growth: A Bioeconomy for Europe”, the official document presenting the strategy adopted by the EC. The objective is, on the one hand, to individualize potential social problems and contradictions in the environmental and economic field, while also reflecting the entirety of the challenges proposed and the connected power issues. These could be issues suitable for scientific community discussions and public debate, as well as for policy makers. Specifically, the paper aspires to assume and motivate a more systemic prospective in policy decisions on different levels of spatial scale, and in the evaluation and choice phases.

2 Methodology

We have used a multiscalar and inductive methodology, based on a critical, paradigmatic and deconstructionist approach in order to: 1) explicitly define the conceptual and ideological matrix at the base of the strategy; 2) analyse the population-resource relation connected to this type of bioeconomy, and to 3) evaluate the so-called participation process and, thus, the democratic level of the plan.

So, we have analysed the main words, concepts and interpretative categories present in the document and on the base of the supported thesis. The special attention to the language is because it is not neutral but, according to Raffestin (1981), it is a means of empowering that can be implemented with greater or lesser efficacy and also enables the interlocutor to manipulate public opinion. The language is always a representation of an issue (and also of power relations and structures) that can naturalize visions, concepts, perspectives and assumptions that, far from being “natural” (to state the obvious), are the result of cultural think (Dematteis, 1991; Staszak, 1997). It influences the individual’s perceptions and attitudes, and the collective imaginary that is the base of ideas, decisions and actions. So, finally, it is a performative “act”.

3 Results

The principal results of the analysis consider the conceptual and ideological matrix, the population-resource relation and the participation process (Table 1).

3.1 The conceptual and ideological matrix

The main concept at the base of the European Bioeconomy policy - “Sustainable Growth” - is an oxymoron. In fact, growth is a quantitative and a linear concept and, by definition, it is not sustainable because it demands an increasing consumption of natural and energy resources, while it generates a continuous and growing production of wastes (that, if recycled, will also need energy and water). Indeed, the oxymoron is a rhetorical figure very recurrent in the text. For example, the “sustainable” adjective recurs 72 times throughout the text and about 20% of the time it is used in an oxymoron form: sustainable growth (10), sustainable economic growth (1), sustainable increase (2) and sustainable exploitation (3).

On the other hand, the apparently more coherent concept of “sustainable development”, at the centre of a heated academic and political debate, has been questioned since the 1990s for its paradox. Furthermore, the concept of sustainability as referenced to in the text is the “weak interpretation” according to the so-called “frontier economic”. It is characterized by a technocentric and anthropocentric perspective that considers agriculture and forestry for commercial, ecological and societal
goods and services that can be offered and considers also innovation and industrial technologies (e.g. biotechnology, nanotechnology, synthetic biology, ICT) as drivers of economic growth. So, the aim is not to safeguard the ecosystem equilibrium, but “to support productive, resource-efficient and resilient systems that supply food, feed and other biobased raw-materials without compromising ecosystem services” (EC, 2012, p. 30).

The ideology of European Bioeconomy policy is the same as that of industry: a “competitive, innovative and sustainable Europe” (www.biconsortium.it), based on the substitution of very scarce fossil sources with biomass and wastes. The three concepts (as both a noun and an adjective) have a high frequency in the text, forming in some cases almost a “mantra”: “competitiveness/competitive/competition/competing” occurs forty-nine times, that is about one and half times per 4000 words; “sustainability/sustainable” occurs ninety-eight times, about one and half times per 2000 words; “innovation” occurs more than one and a half times per 1000 words. We considered the text in all instances, including full titles, but excluding short titles and notes.

The aim is to produce fuel, energy, chemicals, materials, food ingredients and feed while ensuring economic growth (fig. 1a). The modern concept of global order is based on a unified worldwide model of global efficiency and sustainable industry (fig. 1b). This correspondence could be explicated by the very strong lobbying activities made by big corporations in UE institutions. Their goal is “trying to influence the thinking of legislators or other public officials for or against a specific cause” (ISEA, 2005), namely to steer European policy according to their vision and interests. But these last two points can be very different from the interests of Member States (MSs) and citizens.

In regards to the bioeconomy field, in 2012 the Biobased Industries Consortium (BIC) was established. It covers agriculture, agrofood, technology providers, forestry/pulp and paper, chemicals and energy with close to 200 members (including large companies, SMEs, SME Clusters, RTOs, universities, technology platforms and associations spread across Europe) and its aim is to represent the private sector in the BBI, the Biobased Industries (http://biconsortium.eu). The BBI is a public-private partnership with €3.7 billion (€ 975 million of EU funds by Horizon 2020 and €2.7 billion in private investments, from 2014-2020) between the EU and the BIC, operating under the Horizon 2020. It is driven by the Vision and Strategic Innovation and Research Agenda (SIRA) developed by the industry (www.bbi-europe.eu/about/about-bbi; BIC, 2013). Additionally, BIC is part of the European Bioeconomy Alliance (EUBA), a “cross sector alliance dedicated to mainstreaming and realising the potential of the bioeconomy in Europe” with more “culture” and a defined political mission. This is “raising EU, national and regional leaders’ awareness on the benefits of the bioeconomy and biobased industries” and with the aim to “make bioeconomy a pan-European political priority, mobilise opinion leaders with a view to mainstreaming bioeconomy as a viable and accepted alternative” (fig. 2) (www.bioeconomyalliance.eu). The strategy focuses on three main areas: the investment in research, innovation and skills; the reinforcement of policy interaction and stakeholder engagement;
Fig. 1: The biobased industry: a) the activities’ frame from raw material to industrial products; b) the modern concept of global order according to bioeconomy vision. Source: http://biconsortium.eu

Fig. 2: The official relationships between the biobased industries and the European Union. Source: own figure on data by http://biconsortium.eu; www.bbi-europe.eu; www.bioeconomyalliance.eu; BIC, 2013
and the enhancement of markets and competitiveness in bioeconomy sectors. As we can see, the bioeconomy “matrix” is the same as the “fossil” economy: exploitation (the term “sustainable exploitation” is an additional oxymoron), productivism, commodification, global market and competitiveness (referring also to the society). Actually, among the full members of BIC there are the big fossil-based corporations such as Repsol, Total and ENI.

3.2 The population-resource relation

The strategy is based on the need for Europe “to radically change its approach to production, consumption, processing, storage, recycling and disposal of biological resources” with the aim to address some global challenges such as “an increasing global population, rapid depletion of many resources, increasing environmental pressures and climate change” (EC, 2012, p. 8). These problems seem to be accepted as inevitable, as a fact to manage in order to assure the market demand and the economic growth, opening “new and diversified markets in food and biobased products”. The strategy does not seem to take into account the connections between production models and scales, political and economic choices, social habits and practices that produce the above-mentioned problems. Biobased products and bioenergy are seen as the “‘biobased versions’ of traditional products or novel products with entirely new and innovative functionalities and potential for new and existing markets” (p. 13). Thus, the “solution” is simply to identify technological, organizational and financial tools to react in response to increasing demand, resource scarcity, and environmental and air pollution. Instead, the mechanisms and dynamics that produce “depletion of resources, environmental pressures and climate change” are not considered, as well as the possibility to reduce materials and energy consumption, and the market demand. The attention and the actions in order to deal with societal challenges are focused on the supply side (tab. 2). So, this approach involves the intensification of the production cycle, the increment of productive factors, the abatement of production costs and the increasing distance between places of production, transformation and distribution. The long chain entails a further ecological burden because of the increased transport distances and the associated energy consumption.

Table 2: “Innovating for Sustainable Growth: a Bioeconomy for Europe”: the societal challenges and the main strategic solutions.

<table>
<thead>
<tr>
<th>Societal challenges</th>
<th>Main strategic solutions</th>
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| Ensuring food security | - developing the knowledge-base for a sustainable increase in primary production  
- encouraging changes in production and consumption patterns  
- more resource-efficient food supply chains |
| Managing natural resources sustainably | - producing «more with less»  
- improving the knowledge base and foster innovation to achieve productivity increases while ensuring sustainable resource use and alleviating stress on the environment  
- implementing of an ecosystem based management  
- developing an internationally shared understanding of biomass sustainability and best practices to open new markets, diversify production, address long term food security issues |
| Reducing dependence on non-renewable resources | - becoming a low carbon society where resource efficient industries, biobased products and bioenergy all contribute to green growth and competitiveness  
- improving the knowledge-base and fostering innovation for producing quality biomass (e.g. industrial crops) at a competitive price without compromising food security, adding pressure to primary production and the environment, or distorting markets  
- making alternative sources of carbon and energy more accessible |
| Mitigating and adapting to climate change | - developing production systems with reduced greenhouse gases (GHG) emissions, adapted to and mitigating the adverse impacts of climate change  
- moving to a low-carbon economy  
- promoting the substitution of carbon, energy and water intensive production processes by more resource efficient and environmentally friendly ones wherever possible  
- pursuing partial replacement of non-renewable products by biobased ones |
| Creating jobs and maintaining European competitiveness | - leading to new bio-based industries  
- transforming existing ones  
- opening new markets for bio-based products  
- investing in all parts of bioeconomy by privates and public |

Source: own table on data by EC, 2012, pp. 9-11
The bioeconomy strategy “is not a new piece of legislation. Rather, it aims to focus Europe’s common efforts in the right direction in this diverse and fast-changing sector of the economy” (p. 4). In fact, it is pervasive from a geographical and sectorial point of view. It looks upon “rural, coastal and industrial areas”, involves all sectors (agriculture, livestock production, forestry, public goods, fisheries and aquaculture, industrial production, energy, waste, food chain, research, chemical and biotechnologies) and, thus, includes “land, sea space, fertile and functioning soils, water and healthy ecosystems, but also minerals and energy for the production of fertilisers”.

The anthropocentric vision and mechanistic approach consider nature as a “product” to satisfy human (see industrial) needs and the territory as a “box” of resources. It does not encourage considering the relationship between elements of the system, neither within the environment-society-economy. For instance, when referring to breeding, molecular genetics are considered in assisted selection to achieve productivity, feed efficiency, disease resistance and climate change adaptation. “Indeed, the objective should be to rear the optimal animal for a defined production system with fine-tuned management support” (EC, 2012, p. 30). Or, when referring to “renewable biological resources”, the state of a natural matrix (soil, water, air) supporting their production is not really considered. For example, monoculture is the widely implemented approach to support a production on an industrial scale, yet it can produce desertification. Nevertheless, the connections between monoculture – characterized by a very high use of intensive chemical inputs and machinery, and a very strong reduction in biodiversity – and the ecological productivity of the soil is not taken into account. However, the biomass from agriculture is only potentially renewable; it cannot be produced without the “correct” natural conditions.

The technocentric perspective instils a deep belief in the general public in technology’s ability to find solutions to the environmental crisis until the adoption of a sort of “life engineering” takes place. This is foreseen as synthetic biology that designs and constructs artificial micro-organisms (as proteins) or reprograms existing organisms for engineering applications, as well as the nanobiotechnology that develops nanotechnology products with the basic components of biomolecules and living cells (EC, 2012, p. 37). The relationship between these synthetic organisms with the environment and the vital matrix, and the potential impact, have not been considered, neither from the monitored emission or accidental release aspects.

### 3.3 The “participation” process

The so-called participation process in reality refers only to stakeholders’ consultations, of which we have observed the process and the scope of participation.

In regards to the former, it is a purely online public consultation on the ‘Biobased economy for Europe: state of play and future potential’ open from 22nd February to 2nd May 2011 and developed by questionnaire and some open questions. The aim is to collect information on perceptions and “benefits, risks and concerns and potential of the bioeconomy” and “opinions on future directions for policy interactions, research and innovation actions, actions in relation to the promotion of biobased industries and the involvement of the public” (EC, 2011, p. 19). The citizens do not have any real capacity to affect the decision process.

On the other hand, this consultation does not even have any political value because of the very low involvement. In fact, the consultation received over 200 submissions from organisations (69%) and individuals (31%) across 22 Mss. Belgium (42 replies) was the most represented in this consultation, followed by Germany (23 replies), the Netherlands (17) and Italy (15). The private sector was the biggest contributor to this consultation (41.6%) followed by the academic sector (33.2%) (fig. 3).

![Fig. 3: The organisations’ sector in which the respondent worked (n=197). Source: EC, 2011, p. 14](image)

The number is insignificant when compared with more than 500,000,000 EU habitants. Additionally, the lack of tools for public dialogue also emerges as an important concern from consultation, especially in relation to benefits, costs and risks of the biobased economy (87.3%), and for addressing the ethical concerns of advanced technologies (81.2%).

The concerns and risk perception of the biobased economy expansion depends on the sectors responding. For instance, individuals appear to be more worried than...
those who took part in the consultation on behalf of an organisation, and among these there are big differences (tab. 3). As we see, the private sector appears less concerned than the others and within, the respondents from the industrial biotechnology, energy and biofuels and food and feed fields are more likely to perceive lower risks in comparison with other professional fields (EC, 2011, p. 28). This means that a “general” perception does not exist and the “prevailing” view depends on relations between each typology and associated number of respondents.

4 Discussion

4.1 The lesson from bioenergy

The technocentric and anthropocentric approaches as well as the neoliberal vision are all the same in regards to, both, old “fossil” economy and the most recent bioenergy sector’s development. So, if we assume that “bioenergy can be considered a test case for the bioeconomy, particularly in regards to meeting sustainability goals” (McCormick and Kautto, 2013, p. 2600), we could presume important lessons to avoid contradictions, paradoxes and problems. Fortunately, there is extensive literature (M. Ciervo and S. Schmitz, submitted for publication) and international agency reports (UNEP, 2009) that show the bioenergy trade and production models based on the large-scale production chain, long-distance transport of raw materials and export of biofuels (produced by ad hoc crops), generate ecological and agrarian impacts, as well as contradictions relating to environmental and socioeconomic goals at different levels of spatial scale (fig. 4).

For instance, the energy and environmental balance can be very low or negative because of the intensive use of land and productive factors (chemical inputs, energy and water included) and the pollution along the chain. This increase of CO₂ and other greenhouse gas emissions causes an alteration of regional climate and frustrates mitigations on climate change. Referring especially to the biomass production phase, monoculture systems cause nutrient leaching and soil erosion, soil and water pollution from pesticides and chemical fertilisers, loss of biodiversity, deforestation and desertification, degradation of natural resources and of the global ecosystem, and landscape changes until their simplification and uniformity.

A crucial question is the land. According to a “conservative” assumption on the absence of additional policies supporting bioenergy demand, the cropland requirements could be between 35 million hectares and 166 in 2020, between 53 Mha in 2030 and 1668 in 2050.

Table 3: The potential risk perception of the biobased economy’s expansion, by sectors.

<table>
<thead>
<tr>
<th>Risk</th>
<th>Private (%)</th>
<th>Public (%)</th>
<th>Academic (%)</th>
<th>NGOs (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>23.3</td>
<td>14.3</td>
<td>6.2</td>
<td>4.5</td>
<td>14.2</td>
</tr>
<tr>
<td>Medium</td>
<td>39.0</td>
<td>39.3</td>
<td>40.0</td>
<td>22.7</td>
<td>37.6</td>
</tr>
<tr>
<td>High</td>
<td>37.8</td>
<td>46.4</td>
<td>53.8</td>
<td>72.7</td>
<td>48.2</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: EC, 2011, p. 28

Fig. 4: A general biofuel frame with inputs, environmental impacts and connected socioeconomic implications. Source: UNEP, 2009, p. 51, with update on data M. Ciervo and S. Schmitz (submitted for publication)
Another simulation shows that biofuel crops at the global level have been linked to the deforestation and conversion of natural lands, and the intensification of land use (increasing inputs of capital, labor and materials such as fertilizers). In both cases, the forecast is that, by the mid 21st century, many regions will substantially increase the fraction of land they convert in order to satisfy both the demands for food and biofuels with the consequent loss of important natural ecosystems (fig. 5) including a number of biodiversity “hotspots” in the sub-tropics and tropics. So, in both scenarios land-use conversion produces different impacts involving greenhouse gas emissions (the total carbon debt is predicted to be around 103 billion tonnes by 2050 in the first case and 34 billion tonnes in the second), however both scenarios produce very important natural habitat loss with serious impacts on biodiversity and ecosystems (Melillo et al., 2009).

On the socioeconomic side, the biofuel global industrial model produces a change in land use and a process of deterritorialisation, that is to say an alteration or destruction of pre-existent relations among the local actors, and a new territorialisation and spatial organization by exogenous actors, as seen through modification of the landscape. Generally, this means changes in agricultural products, a greater dependence of farmers on corporations for the upstream and downstream production phases, peasants’ economic weakness, food insecurity, and rural poverty; all of these effects with a compounding increase in land and food prices. Furthermore, the people on the receiving end of these environmental costs (i.e., peasants and inhabitants in rural areas) are often not the people who receive the economic benefits (*in primis* the actors who participate in the localisation and development of renewable energy on the global scale). Thus, the externalisation of environmental costs can become a social justice problem and a question of social acceptance.

It is clear that growth in biomass demand from a biobased economy could accelerate and intensify the impacts mentioned above. These are also the potential risks arising from an expansion of the European bioeconomy resulting from the online consultation (EC, 2011, p. 23). Finally, if the ideological premises (neoliberal logic), the economic requirements (global market development), the aims (economic growth), the tools to achieve them (stakeholder engagement and enhancement of markets and competitiveness), and the production scale that characterise bioeconomy resemble that of bioenergy, then we cannot expect different effects. So, we can foresee that results, also in this case, will be in contradiction with the preset goals.

### 4.2 The geopolitical issue

A biobased economy needs two factors: an increasing quantity of natural resources and biomass, namely additional land, and a very advanced level of technology and knowledge. The former are not equally distributed, but they are concentrated where natural conditions favour high yields: on the global scale, in tropical and subtropical regions (UNEP, 2009; WB, 2011), such as southern countries in Sub-Saharan Africa, Latin America, Asia; and, on the European scale, in the Mediterranean basin. In contrast, advanced technology is predominantly in the global cities and, thus, on the world scale, in the northern countries; and on the European scale, in the northern and western continental countries. To these we can add other countries (i.e. BRICS) that are in the process of developing a bioeconomy strategy, even if they currently possess less advanced technology (fig. 6).

In regards to biomass production and according to
WB (2011, pp. 34-35), “more than half of land that could potentially be used for expansion or cultivated area is in ten countries, of which five are in Africa”. Additionally, “the currently non-cultivated area suitable for cropping that is non-forested, non-protected and populated with less than 25 persons/km² (or 20 ha/household)”, which amounts to 446 million hectares (201 in Sub-Saharan Africa, 123 in Latin America and the Caribbean, 52 in Eastern Europe and Central Asia, 3 in the Middle East and North Africa, 50 in the rest of the world). Actually, we have already observed very high interest in African land associated with a worrying rush to obtain it. It was only in 2008 when investors expressed interest in around 29 million hectares of agricultural land in Sub-Saharan Africa, especially in countries with weak land governance. Between 2004 and 2008, total land transfers to investors amounted to 4 million in Sudan, 2.7 million in Mozambique, 1.6 million in Liberia and 1.2 million in Ethiopia (p. 32). On the European scale, the differential costs in the land and labour (higher in western Europe, cheaper in the eastern and southern countries) and the high competition for different land use (especially in western countries among agriculture, industry, alternative energy, tourism, transport, housing, natural zones, etc.) could produce an additional labor division. So, the eastern and southern countries could become the first suppliers of biomass and in some cases producers of biobased products; while in western countries, research and advanced technological industrial phases will be localised and consumers with higher purchasing power will be further concentrated. Similarly, on the global scale, we could observe a “new” and more intense international division of labor between countries with arable lands that become producers and exporters of biomass or by-products and countries with limited arable lands but with very advanced technology, which become the driver of the bioeconomy. This could cause a severe imbalance in power relations in favour of countries that possess “advanced technology”, and an increasing gap between rich and poor people, farmers and consumers. The risk is the transformation of the old form of ecological exploitation and economic domination in a new “bio-version” and its expansion on different levels of spatial scale.

However, biomass production from microalgae does not really change the situation, especially on the global level. In fact, most production is localised in tropical

![Fig. 6: The distribution of higher potential biomass and advanced-technological countries. Source: own figure on data by UNEP, 2009; WB, 2011; bio-step.eu/background/bioeconomy-strategies.html](attachment:image.png)
and subtropical areas, where the light insensitivity and temperature are higher (fig. 7).

This resource distribution, associated with an increasing demand in biobased products and biomass, induces an exponential increase in strain on land, forestry, natural resources, and, generally, on territories, due to the incoming competition. The latter occurs over, both, land and other scarce resources needed for production (primarily water) and among alternative land uses of biomass for food, fibre and fuel. It can lead to very important impacts on different levels of spatial scale. On the local and regional level, further loss of control over territories and ecosystems by local people could be at risk and, consequently, a potential increase in tensions and conflicts in rural areas between indigenous, who defend their territory, and industries interested in exploitation, generally supported by national governments. On the national level, we could assist new forms of dependence from imports based on different grounds: physical (absence in own territory of abundant lands or climatic conditions to produce the necessary biomass), economical (differential production costs) and political (a choice of government to rely on foreign biomass supplies in order to keep own lands). On the global scale, we can observe an increase in land and water appropriation that could force delocalization of the local people in the authoritarian state or cause new emigration streams, thus perpetuating a “new” form of migration. This would be a sort of “bio-migration” where, in contrast to environmental migration triggered by the loss of natural conditions for life (because of climate change, desertification, water pollution, etc.), locals could be forced (legally or illegally) to leave their lands designated for bioeconomy.

In regards to the advanced technology, the World Economic Forum, WEF (2010, p. 5), hypothesizes a “division of RD&D” as consequences of the increasing complexity and cost of technology. It imagines two blocks: on one side, the government as “a client of industry” and the industry (and not individual companies) as the supplier of products and technologies. This means establishing a “new customer-supplier dynamic”. As the WEF emphasises, “This has the potential to create an opportunity for the industry to act as a whole in a collaborative manner and to meet these innovation demands in a non-competitive way as truly corporate global citizens”. But this plan is not neutral. It means a super integrated value chain and a potential “technological monopoly” where technologies are more and more subjected to patents and thus to royalties or licensing fees for their use. This will exponentially increase the power of big corporations, i.e. “industry”, and the countries where their headquarters are localised, and thus establish a tremendous power. In the modern history, we have known the public monopoly and, in the last decades, the private monopoly circumscribed by policy in the space and time (e.g., the water services management grant to private companies), but this case is
different. It could be a private technological monopoly on a global scale potentially without a time and space limit. And if “advanced technology” essential to transform biomass becomes the crucial resource to satisfy basic needs (i.e. water, food, health, heat and energy), it could also be used as a very efficient economic and political pressure tool or even as a weapon. History bears a lot of many cases of resource manipulation.

Indeed, all resources are tools of power and can be the object of power relations (Raffestin, 1981). So, if the “industry” (and not individual companies) attempts to have power over biomass and advanced technology, it could potentially control all aspects of life, producing a new form of domination, a sort of “bio-colonialism”. On the other hand, if the government becomes a client of the “industry” (and not of individual companies) that supplies the product, as well as the technology, what is in store for us? If relations between the “industry” and the governments are developed according to the market logic, then what about human rights? What could be the “contractual power” of a government towards the “industry” that has the (direct or indirect) control on the biomass and advanced technology essential to the production of food, energy, fuel, materials, etc.? Could the government really maintain its decision power? As well as the citizens? What about popular sovereignty?

### 4.3 The crucial question of sovereignty

Sovereignty, i.e. the power to decide, is being actualised less and less by the people. We have seen that the vision and perspective of the EU Bioeconomy are the same as industry and, in fact, the strategy represents a very good opportunity for companies to substitute their inputs and open new markets.

The online stakeholder consultation (with the 200 replies) cannot be considered a tool to put sovereignty into practice, primarily because citizens have no power to affect policy. The consultation is finalised to collect (by a series of multiple-choice and semi-open questions) information, views and opinions from stakeholders and civil society, not to open a public debate. This is a critical point. This means that information is used in order to promote bioeconomy and the “involvement” of people has the aim to reassure them, to facilitate consensus reaching, to ensure acceptance and, therefore, avoid oppositions and social tensions (EC, 2012, pp. 27, 28). In this way, we also interpret the emphasis on the development and increase of jobs, research, and economy almost as a promise. Furthermore, the Bioeconomy Panel cannot be considered a place of sovereignty. Its goal is supporting interactions among different policy areas and sectors for the bioeconomy strategy implementation, and it is composed by the EC, the MSs and representatives of “relevant stakeholder groups”. The latter include industrial sector associations; universities, research organisations and the scientific community; farmers, foresters, fishermen and non-governmental environmental organisations (EC, 2012, p. 26). This choice confirms the passing of a law to business forma mentis and the change regarding the way Europe is governed, characterised by an increase in the non-elected groups’ influence (private enterprises and their representative associations, ONG, lobbying groups, etc.), as has already been observed with water policy (Page and Kaika, 2003; Petrella, 2013; Ciervo, 2015). This produces a problem of democracy and sovereignty. On the one hand, there is no space for parliament, however decisions and policies are taken-on by EC after stakeholder consultations.

Stakeholders stand in order to achieve and safeguard the sector’s goals, while deputies represent citizens and, in theory, the general public’s interests. Stakeholders are carriers of their own interests and support it without a holistic vision, but the collective/general/ecological interest is not simply the sum of different interests. On the other hand, the contractual power of industrial sectors’ associations is not the same as universities’ and researcher organizations’, or farmers’, foresters’ and fishermen’s, or non-governmental environmental organisations’ contractual power. Needless to say, those with greater power also have more (legitimate and illegitimate) tools to impose their own vision and interests.

So, the two outcomes are: that the results of consultation cannot be considered reliable, and citizens’ participation appears simply a way to gain social acceptance. On the other hand, various studies have shown how the participation processes can be used in a rhetorical way to support propaganda and/or manipulation and/ or placation, to augment the “weight” of inside actors, to develop initiatives according to the visions and interests of dominant actors (Hamel, 1995; White, 2000; Cinq-mars et Fortin, 2007). However, participation without equal power distribution, citizens’ control and a real capacity of the inhabitants to affect the decision process, is an empty ritual that, as stated by Arnstein (1969, p. 216) almost 50 years ago, “allows the power-holders to claim that all sides were considered, but makes it possible for only some of those sides to benefit. It maintains the status quo”.

Another, specific observation regards territorial sovereignty in rural areas, especially in southern countries. This model of bioeconomy involves a “new”
form of control of knowledge and power. Referring to the traditional elements of control and domination in political geography (population, territory and resource), we can see that technology and technical knowledge, to exploit natural resources and transform them, became more and more central and essential in the production process. Nevertheless, the substitution of traditional knowledge with advanced technical knowledge, and the replacement of traditional territorial organization finalised to satisfy community needs with the market-oriented industrial organization, are not “neutral”. It can affect the local economy, degenerate people’s competence and push towards a deterritorialisation/reterritorialisation process. The former of these destructs the traditional territorial relationships and causes the transformation of the population-resource relations (Raffestin, 1981; Turco, 1988). This could influence features of the “bases of living” (Turco, 2003): the knowledge, the control and the cultural legitimacy. The tacit and understood knowledge that permits satisfying one’s own vital needs is more and more diminished with advances in specialist technical knowledge. A loss of popular decisional power, and thus control, on the use of locals’ territorial resources could occur. The legitimacy could be put in question if the “new” policy is not coherent with territorial culture and values. The deterritorialization could affect the attitude of local communities to endure, the capacity to autonomously preserve their own identity after the change, and to maintain the conditions for change. The reterritorialisation process refers to new exogenously driven relations. This can lead to deep changes in rural economies that are viewed more and more as a simple link in the bioeconomy chain. This could also produce some problems in access to natural resources.

5 Final observations

The EU bioeconomy model cannot be considered an economic revolution. As seen, it focuses on the supply side in support of market demand and economic growth, based on the change in raw material and energy sources without taking into account the production model and scale, and characterised by the territory’s perception as a box containing biological resources to exploit, allowing “the production of more from less”. In reality, it simply appears as one of many steps of “industrial revolution”: from fossil sources to biobased ones. Perhaps, it would be more correct to call it “bio-industry” because the central issue does not regard a “new” way to construct the economy, namely “the house-management” (oikos-nomia), but rather it concerns a “new” manner to drive industry, that is to say, an efficient way to produce standardized goods on a large scale by mechanized processes, artificial inputs and “renewable” resources, according to the logic of labour division and the capital’s central role. The real change is in the use of raw-material and energy for industrial processes, i.e. biological instead of fossil resources. The nature of the population-resources relation has not been called into question, thus the reductionist and utilitarian paradigm remains the same.

However, McCormick and Kautto (2013) have shown that the bioeconomy concept has been labelled by some science and technology scholars as a technical fix where economic considerations are the priority, while ethical, social and sustainability issues are secondary. Furthermore, the competitiveness concept has also been extended to the society and has become a metaphor by which issues are interpreted and decisions are based on. The problem is when the metaphor becomes dogma and is accepted by policy makers without further critique. As Krugman (1994, p. 30) argued “the obsession with competitiveness is not only wrong but dangerous, skewing domestic policies and threatening the international economic system” and risking “thinking in terms of competitiveness [that] leads, directly and indirectly, to bad economic policies on a wide range of issues, domestic and foreign, whether it be in health care or trade”.

This analysis has shown a very strong rhetoric about sustainability, efficiency and competitiveness, yet the incoherence between goals and actions to reach them is apparent. So, some crucial questions have arisen: 1) the modalities and scales of production are not neutral, also from an environmental point of view; 2) the model of bioeconomy based on the supply-side is very interesting for the industry, less for public needs and ecologic equilibrium; 3) the control of the biomass and technological innovations to exploit it could have very important consequences on the democracy; 4) the moral implications of the utilitarian management of natural resources that can mean the further exploitation of people and territories; 5) the possibility and need to investigate a new population-resource relation and a new way to face environmental, socioeconomic and geographical challenges, such as the reduction in consumption and demand for energy and goods, and the short chain and production scale of bio-products.

For this reason, it is very important to make the choice process a democratic one, bringing in the Member State Parliaments on the discussion on the analysed document and more generally on the UE biobased policy, as well as opening a real and broad public debate about the
prospects and effects of this choice. It is urgent and radical reflection is necessary about the population-resources relation in regards to, both, the vertical relations between environment and community (according to the culture and technology), and horizontal relations among areas directed by the demands (considering the quantitative and qualitative aspects) and offers (according to availability). It is very important to take into account the different models and the scale of the production-distribution-consumption processes. We think that a holistic vision and a systemic approach are fundamental to understand and consider the relations regarding the vital matrix (soil, water, air and biodiversity), the flora and fauna, the human communities, their territorial organisation and local economy. We think a change in paradigm is fundamental in order to assure ecologic equilibrium, social equity and popular sovereignty.

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