Bioenergy as an Empty Signifier

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Original publication:

Kuchler, M., & Hedrén, J. (2016). Bioenergy as an empty signifier. *Review of Radical Political Economics*, *48*(2), 235-251. DOI: https://doi.org/10.1177%2F0486613415591804.

ABSTRACT

The article provides insight into the contemporary international bioenergy debate and scrutinises how the idea of biofuel production as a win-win-win solution to energy insecurity, climate change and agricultural stagnation came into being, what discursive forces bind such a conceptualisation, and where dislocations arise. Based on critical assumptions of discourse theory developed by Laclau and Mouffe, the analysis explores assessments, reports, policy papers, and other central documents from three influential international organisations — the International Energy Agency, Intergovernmental Panel on Climate Change, and United Nations Food and Agriculture Organization — that provide an entry point to the global debate on biofuels. We show that the bioenergy concept occupies specific positions and conveys different meanings within the three overlapping discourses of energy, climate and agriculture. These three discursive areas are further "sutured" around the notion of biofuel production, where a hegemonic thread of the capitalist market economics, fixated on economic growth and presupposing the necessity of cost-effectiveness, results in internal contradictions and dislocations within the win-win-win conceptualisation, emptying bioenergy of any content.

KEYWORDS

bioenergy, biofuels, debate, discourse, international organisations, hegemony

1. Introduction

The concept of producing energy from biomass is not new, and debates about it have been resurfacing on the international agenda several times during the last century (Bernton et al., 2010). The two most prominent moments occurred at the beginning of the 20th century, when, in the early days of the automotive industry, biofuels were labelled as the fuel of the future and in the 1970s during the period of global energy scarcity resulting from the oil embargo declared by petroleum exporting countries. However, contrary to previous upsurges, the last two decades have witnessed a different debate that was not only driven by concerns on energy insecurity triggered by growing demand or resource scarcity. The recent global deliberations on biofuels have been marked by two more significant societal challenges: climate change impacts induced by greenhouse gas (GHG) emissions and the agricultural stagnation stemming from both excessive farming leading to overproduction in industrialised nations and depressed rural growth in developing countries.

The three challenges of energy insecurity, climate change and agricultural stagnation can be viewed in Gramscian terms of the so-called *organic crisis*, which indicates that “incurable structural conditions have revealed themselves (reached maturity), and that despite this, the political forces struggling to conserve and defend the existing structure itself are making every effort to cure them, within certain limits, and to overcome them” (Gramsci, 1971:178). As a result, various institutions, policy-makers, experts, and scholars have been conceptualising biomass energy as, simultaneously, a renewable alternative to fossil fuels that can help reduce energy insecurity, a low-carbon mitigation option necessary to abate climate change, and a new farm product opportunity able to trigger rural economic growth in both developed and developing countries.

The central aim of this paper is to critically analyse and unravel how the conceptualisation of bioenergy as a win-win-win solution is played out in the international debate. We unpack and expose the logic behind such reasoning by applying discourse theory of Ernesto Laclau and Chantal Mouffe (2001), which provides an important insight into how specific concepts are modified and transformed in line with or in opposition to different and often contradictory discourses. The perspective allows us to expose what conceptual and ideological factors lay behind the win-win-win framing, what forces bind such configuration, and where contestation arrives. It provides an insight into *what* has been said and *how* to present something that could potentially aggravate the crisis as a solution to the crisis. The entry point to the debate consists of assessments, reports, policy papers, and other documents issued by three major international organisations (IOs) involved in advocating for various bioenergy policies and options that result in different geopolitical, socio-economic, and environmental consequences for developed and developing countries. The selected IOs are: the International Energy Agency (IEA), Intergovernmental Panel on Climate Change (IPCC), and United Nations Food and Agriculture Organization (FAO). Despite their different agendas, structures, memberships, and functions in the global arena, our rationale for choosing them lies in the fact that each of them focuses, by mandate, on one of the three societal challenges.

Established in the 1970s by a group of industrialised nations in the wake of the oil crisis, the IEA functions as a policy adviser to its high-income member states in the field of global energy security challenges and has a capacity to significantly influence energy policies of major governments (Keohane, 1978; Podobnik, 2006). The IPCC is a consultative body that plays a highly prominent role in assessing global scientific and socio-economic information for the climate change negotiation process, so policy-makers rely greatly on its advice with regard to the mitigation of potential climatic change (Elliott, 2004; Axelrod et al., 2005). The FAO is a specialised agency of the United Nations that serves both developed and developing nations, leading international efforts to improve agricultural productivity, provide regular access to food, and improve nutrition worldwide (Phillips, 1960).

Based on our empirical findings, we argue that due to the low-cost pressure enforced by the hegemonic system fixated on economic growth and the accumulation of capital, the concept of bioenergy becomes emptied of signification and constitutes a futile solution to the challenges of energy insecurity, climate change and agricultural crisis. At a closer look of the institutional discourse, our analysis reveals that, to discuss bioenergy as a potential win-win-win strategy to help solve these three societal challenges, a specific level of equivalence in the conceptualisation is required. What conflates the three discursive positions of bioenergy is the persuasive assumption that in each case it must be done cheaply, and whether biofuels are an efficient option to face the challenges is of secondary importance. It is because the desire to preserve economic growth and the accumulation of capital requires *cheap* solutions in the first place. Hence, as Peter Newell (2012) points out: "The ends of political interventions thus have to be justified in terms of their contributions to competitiveness and efficiency" (p. 52).

The paper is structured as follows. In section 2, we present our theoretical approach, which uses the theoretical assumptions of Laclau and Mouffe. In section 3, we discuss the data collection process and the analysis of empirical material. In section 4, we discuss our findings, grouped into three subsections. Finally, our conclusions are presented in section 5.

2. Theoretical perspective

Discourse theory developed by Ernesto Laclau and Chantal Mouffe (2001) emphasises the meaningful and dynamic character of all social configurations. The scholars argue that any process of conceptualisation rests on intersubjective relationships that are expressed in a multitude of different positions and, as a result, only partial and temporary objectivity can be reached. Differences, or *antagonisms* in terms of Laclau and Mouffe (2001), play a significant role in constituting a partial identity of any given concept. On the one hand, the occurrence of antagonisms is the main reason behind the impossibility of reaching a complete identity by social structures. On the other hand, it is precisely because of the failure to reach the closure of meaning that particular social structures require the presence of antagonism, the notion of otherness they can define against and constitute their partial objectivity in opposition to it.

According to Laclau and Mouffe (2001), this open and contingent character of the social constitutes a *field of discursivity* — a boundless and dynamic terrain of the surplus of meaning in which various discourses constantly overlap. Its elements have the status of *floating* *signifiers* — unstable concepts that are constantly open to interpretation and modification (Laclau and Mouffe, 2001:113). Hence, they acquire new contents as "different discourses struggle to invest with meaning in their own particular way" (Jørgensen and Phillips, 2002:28). In this sense, the concept of bioenergy has a floating character because it can mean different things to different people. For example, it can signify an "advanced" process of producing energy from algae or burning biomass in "traditional" cook stoves. It can represent a "sustainable" energy source for small-scale farmers in poor rural communities or a strategy for armed forces to go "green" by fuelling military vehicles with biofuels.

However, the theoretical approach also informs us that meanings are not only constructed through the presence of differences, but also because of the active presence of the *political*, understood as the exercise of power able to temporarily arrest the meaning. As Laclau (1990) explains, "the social is impossible without some fixation of meaning, without the discourse of closure" (p. 92). Thus, a given discourse becomes a dynamic force that penetrates the field of discursivity and strives to temporarily arrest the flow of floating signifiers around specific elements (Laclau and Mouffe, 2001; Andersen, 2003). The result of this partial fixating is expressed in privileged discursive signs called *nodal points* and is relative to other signs that are positioned and acquire their meaning (Laclau and Mouffe, 2001:112; Jørgensen and Phillips, 2002:26). In other words, at the occurrence of a powerful discourse penetrating the field of discursivity and striving to arrest the meaning, a particular floating signifier is transformed into a nodal point that occupies the centre of this discourse and around which conceptual formation is built (Smith, 1998; Jørgensen and Phillips, 2002). As we show in the analytical part of this paper, the concept of biofuel loses its floating character when powerful discourses of energy, climate and agriculture strive to partially and temporarily anchor it as a nodal point around specific conceptual formations.

However, no discourse can be completely closed and fully conceptualised because "it is in conflict with other discourses that define reality differently and set other guidelines for social action" (Jørgensen and Phillips, 2002:47). This incessant collision of discourses can be dissolved only through a *hegemonic* intervention. Resembling the character of a discursive force with its power to arrest the flow of signifiers, hegemony also strives to fix meaning but across different discourses that collide with each other (Jørgensen and Phillips, 2002:48). This action, however, is not possible "without equivalence and without frontiers" (Laclau and Mouffe, 2001:136). On the one hand, to bind distinctive discourses together, the hegemonic intervention needs to cancel difference between them, which is done through the logic of equivalence set up to simplify and weaken the relational system defining identities of specific discourses. Simultaneously, the process of *suturing* together different particularities, to establish compatibility between them in the chain of equivalence, is executed "vis-à-vis oppressive forces" that outline the limits of this equivalence. As Laclau and Mouffe (2001) argue, hegemonic interventions require the presence of *antagonism* — the notion of otherness they can define against and constitute their partial objectivity in opposition to it.

Finally, Laclau (1996) contends that the very condition of hegemony is the presence of an *empty signifier* (p. 43) and that simply "floating of the signifier does not make it an empty one" (p. 36). In other words, the concept of bioenergy having a floating character and thus meaning different things to different people does not make it an empty one. For Laclau (1996), an empty signifier can only emerge if the signification is structurally impossible due to various distortions and interruptions within the chain of equivalence (p. 37). The reason behind such "malfunctions" is that the identity of each particular element in the chain must be partially altered to fit other elements in the configuration (Laclau and Mouffe, 2001: 63). Consequently, a hegemonic empty signifier symbolises a long chain of equivalence while, simultaneously, being disengaged from its particular signification and thus assuming a function of universal interpretation (Laclau, 1993:342; 2000: 302-303).

3. Data collecting and processing

The empirical data were collected and processed in three steps. Firstly, primary data spanning the 20 years from 1990 to 2010 were collected from the online databases of the FAO (www.fao.org), IEA (www.iea.org), and IPCC (http://ipcc.ch) using the following search terms: “agrofuel”, “agroenergy”, “biofuel”, “bioenergy”, “biomass energy”, “biomass fuel”, “biodiesel”, “biogas”, “energy crop”, and “ethanol”. As can be seen, the preliminary search was broadly delimited to include all types of bioenergy produced from biomass to expand the scope and encompass various types of biomass production and use. Secondly, the compiled data were analysed by breaking the texts into segments and then identifying and extracting related key fragments to scrutinise how the IOs discuss and advocate bioenergy in relation to and in the context of energy, climate change and agriculture. Comparing each organisation’s treatment of the concept in the three discursive fields allows us to extract recurring patterns and group them into themes that serve as the basis for examining the concept of bioenergy in its role and function relative to the three distinct nodal points. Thirdly, the compilation of texts was analysed again to trace and unravel how the institutions forward biofuels by embedding them in the market ideology.

4. Analysis

In the analytical section, we first present evidence of bioenergy’s loss of its floating character to privileged positions of signification as a nodal point in the three discourses of energy insecurity, climate change mitigation and agricultural crisis. We then elaborate on how the concept is reproduced and homogenised through the chain of equivalence by the hegemonic thread of capitalist market economics and its commensuration process, resulting in bioenergy becoming an empty signifier.

4.1. From a floating signifier to nodal points: partial fixating of the meaning

As a floating signifier in a given field of discursivity, the bioenergy concept has no intrinsic meaning outside a specific discourse; instead, it is open to change and redefinition when combined with or positioned against other meanings. However, on closer examination, the concept loses its floating character when powerful discourses of energy insecurity, climate change and agricultural stagnation arrest the signifier's flow and fix the conceptualisation around it. As a result, bioenergy acquires the privileged position of a nodal point that has a totalising effect on other elements by incorporating them into an assembled network of meaning.

4.1.1. The challenge of energy insecurity

The steady economic growth experienced by capitalist societies over the past 200 years is considered by many to be not only a natural state but also a trend that will continue indefinitely. The key enabler and indispensable driver of this generally desired developmental path is energy, specifically increasing quantities of fossil fuels (Ayers and Warr, 2009; Podobnik, 2006; Rogers Jr., 2000). Because the continuous availability of stable and reliable energy is a critical factor for the future global economy and the robustness of economic growth (Stern 2010), energy insecurity is the major challenge that can seriously disturb the fundamentals of the hegemonic order.

The concept of bioenergy enters the discursive field of energy to function as a nodal point in the form of a potential alternative to hydrocarbons and as a solution to the looming energy crisis. Its plausibility comes not so much from the fact that it is renewable and therefore inexhaustible, but mostly from the abundance of accessible biomass worldwide and because the implementation of such energy does not require significant changes in the existing infrastructure of capitalist societies. Hence, as the nodal point, bioenergy holds the promise of securing and diversifying energy supplies without altering the hegemonic order.

The IEA, FAO and IPCC all promote biomass as renewable based on the theoretical assumption that plant material stores solar energy that lasts indefinitely (FAO 1994, 2008a,e; FAO/GBEP 2007; IEA 1994, 1997a,b, 2003a, 2004a,d,e, 2006b, 2007a, 2008b, 2010; IEA Bioenergy 2006c,e, 2008b; IPCC 1995, 2001a,b,c,e; WEC/FAO 1999). Simultaneously, the IOs position biomass not only as renewable but also as an alternative source of energy, suggesting that it can play a pivotal role in displacing fossil fuels (FAO 2005, 2007b,c,d, 2008b,e,i; FAO/IIED 2008; IEA 1994, 1997a, 2002, 2003b, 2004a,e, 2005, 2006b,c, 2008b; IEA Bioenergy 2002, 2005a, 2007; IPCC 1990, 1995, 2001b,c, 2007b,d), alleviating dependence, particularly on oil in the transportation sector, without the need to change existing infrastructure (Cohen et al., 2008; FAO 2008b,e,i, 2009a; FAO/GBEP 2007; FAO/IIED 2008; IEA 1994, 1998, 2003b, 2004a, 2006c, 2007a, 2008a, 2010; IEA Bioenergy 1998, 2005b, 2007; IPCC 2007b; OECD/FAO 2007), and diversifying energy resources (FAO 2005, 2008i; FAO/GBEP 2007; IEA 1994, 2003a, 2006c; IEA Bioenergy 2006d,e, 2007). The notion of biomass as a renewable substitute for hydrocarbons extends to the conceptualisation of bioenergy as an energy source that can provide access to energy in general and help us meet global energy demand (FAO 2005, 2008d; Heinimö et al., 2007; IEA 1997a, 2001, 2003b, 2006b, 2007a, 2010; IEA Bioenergy 1998, 2008a; IPCC 1995, 2007b) and, therefore, ensure energy security (FAO 1994, 2005, 2007a,c, 2008a,b,e,i,j, 2009a; FAO/GBEP 2007; Heinimö et al., 2007; IEA 2000b, 2003a, 2004a, 2006c, 2007a, 2008a, 2010; IEA Bioenergy 2005b, 2006b,c,e, 2007, 2008a,b; IPCC 2007a,b; Junginger et al., 2010).

For example, the IEA states that “one of the arguments for using biofuels is that they are potentially a renewable form of energy and most countries have some potential for producing them indigenously” (IEA 1994:14). The Agency argues that “biofuels for transport, including ethanol, biodiesel and several other liquid and gaseous fuels, have the potential to displace a substantial amount of petroleum around the world over the next few decades, and a clear trend in that direction has begun” (IEA 2004a:11). In another report, the Agency concludes that “biomass may diversify the total portfolio of fuels used and imported by countries, thereby reducing the risks of supply disruption in terms of both quantity and price, especially in the case of biofuels for transport since they replace oil imports” (IEA Bioenergy 2005b:9). The IPCC considers biomass a renewable energy technology and recognises its increased use as a way to replace fossil fuels (IPCC 2001c:131). The Panel envisages that “bioenergy options will be important for many sectors by 2030, with substantial growth potential beyond” (IPCC 2007b:621). In particular, “biofuels used as gasoline and diesel fuel additives/substitutes are projected to grow to 3% of total transport energy demand in the baseline in 2030” and “this could increase to about 5-10%” (IPCC 2007d:13). According to the FAO, “biomass is a locally available energy source that can produce electricity, heat and power, based on liquid, gas, or solid-derived fuels, which can contribute to the substitution of imported fossil fuels, thus enhancing national energy security as well as the diversification of energy sources” (FAO 2005:2). Moreover, the Agency states that “bioenergy is seen as one means of diversifying sources of energy supply and reducing dependency on a small number of exporters. Liquid biofuels represent the main alternative source that can supply the transport sector, which is overwhelmingly dependent on oil, without more radical changes to current transport technologies and policies” (FAO 2008i:26).

4.1.2. The challenge of climate change

Climate change and the threats it poses to the future prosperity and stability of civilisation present yet another challenge that contemporary capitalist societies and their ruling classes must face. In its Third Assessment Report, the IPCC states that climate change is likely to have “numerous negative effects on human development and well-being” (IPCC 2001a:84). Published in 2006, the Stern Report goes even further in its warning, linking risks associated with climate change directly to economic growth, based on the assumption that the capitalist accumulation necessary to continuously save and invest in the economy could be significantly reduced by the negative impacts of climate change (Stern et al., 2006).

Against the backdrop of climate change as a threat to the stability of capitalist societies and their capacity to accumulate wealth and continue along the developmental path, bioenergy enters this particular discursive formation to acquire the role of yet another privileged sign around which meaning coalesces. As the nodal point, energy produced from biomass is recognised by all three institutions as a key mitigation technology that can have a significant role in climate change abatement efforts and help meet targets defined by the Kyoto Protocol (FAO 1994, 2005, 2006, 2007a,b, 2008b,c,i; FAO/GBEP 2007; FAO/IIED 2008; IEA 2004a; IEA Bioenergy 2005b, 2007, 2008a; IPCC 2001b, 2007b,c,d). This realisation is possible because the IOs all assume that bioenergy has the potential to significantly reduce GHG emissions (FAO 2007a,c, 2008e,i,j, 2009a,b; FAO/GBEP 2007; Heinimö et al., 2007; IEA 1994, 1997b, 2000b, 2001, 2003b, 2004a, 2006c, 2007a, 2008b; IEA Bioenergy 1998, 2002, 2005a,b, 2006e, 2007; IPCC 2001c,e, 2007a,b,d,e; OECD/FAO 2007; Rapsomanikis and Hallam, 2006). The emphasis is placed on biofuels’ ability to diminish carbon dioxide (CO_2) emissions in the transportation sector (FAO 1994, 2007d, 2008e; IEA 1994, 1997a, 2003a, 2004a,e, 2009, 2010; IEA Bioenergy 1998, 2002, 2005a,b, 2006a; IPCC 1990, 1995, 2001b, d,f, 2007a,b; Rapsomanikis and Hallam, 2006). Consequently, the IOs portray biomass as a carbon-neutral energy source that, unlike conventional fossil fuels, ensures low- or zerocarbon energy (FAO 2005, 2006, 2007c, 2008i; FAO/GBEP 2007; IEA 1994, 1997b, 1999, 2001, 2002, 2003a, 2004a,b,c, 2006a,c, 2007a, 2010; IEA Bioenergy 2002, 2005b, 2006b; IPCC 1990, 2001b,c, 2007b).

To illustrate this, the IEA suggests that "biofuels can play a significant role in climate change policy and in measures to reduce GHG emissions. Biofuels have become particularly intriguing because of their potential to greatly reduce CO_2 emissions throughout their fuel cycle. Virtually all of the CO_2 emitted by vehicles during combustion of biofuels does not contribute to new emissions because the CO_2 is already part of the fixed carbon cycle" (IEA 2004a:20). In another document, the Agency states that biomass is "a carbon-neutral energy source on that basis, as it releases only the CO_2 that was captured during its growth and an equivalent amount of CO_2 is recaptured in the regrowth. In that sense, biomass can greatly contribute to CO_2 emissions reductions, relative to fossil fuel use" (IEA 2010:284). In its scientific assessment, the IPCC considers biomass low-carbon energy and argues that "a high potential supply of biomass energy would ameliorate the burden of carbon emissions reduction" (IPCC 2001b:160). Moreover, the Panel suggests that "such fuels release CO_2 when burned, but this CO_2 is of recent atmospheric origin (via photosynthetic carbon uptake) and displaces CO_2 which otherwise would have come from fossil carbon" (IPCC 2007b:511). Like the other IOs, the FAO suggests that energy produced from biomass is a "potentially important source of carbon emissions reduction" (FAO 2007d:43) and that the capacity for bioenergy to reduce GHG emissions is well recognised (FAO 2008e:44). In one report, the organisation states that "when sustainably produced, biofuels can provide a carbon-neutral or even carbon-reducing source of energy. Biofuels can contribute to climate change mitigation through substituting for fossil fuels and through carbon sequestration in forest and soils" (FAO 2007a:10). Furthermore, the UN agency reasons that such potential is attainable because "biofuels are produced from biomass; in theory, therefore, they should be carbon neutral, as their combustion only returns to the atmosphere the carbon that was sequestrated from the atmosphere by the plant during its growth – unlike fossil fuels, which release carbon that has been stored for millions of years under the surface of the earth" (FAO 2008i:17).

4.1.3. The challenge of the agricultural crisis

The potential agricultural crisis presents a more complex challenge to capitalist societies, because the fate and shape of global food production is strictly interwoven with the two previously discussed challenges. In developed nations, where only a small fraction of the population works on farms and food production is highly industrialised, excessive farming has led to chronic surplus production that in turn depresses prices on basic commodities and causes stagnation in the sector (Gardner, 1996). In contrast, developing countries — where most poor populations live in rural areas and depend on agriculture — experience depressed rural growth and are particularly vulnerable to famines (Cuffaro, 2001; Weis, 2007). Agricultural production is not just essential to human survival, livelihoods and quality of life. It is also vital to the hegemonic order of capitalist societies fixated on capital accumulation and economic growth. The underlying reason for this, as Johnston and Mellor (1961) explain, is that "economic development is characterized by a substantial increase in the demand for agricultural products, and failure to expand food supplies in pace with the growth of demand can seriously impede economic growth" (p. 571). Any potential crisis in the global rural sector threatens the stability of capitalist societies and their continuous ability to accumulate capital and continue along the developmental path.

Therefore, when bioenergy enters the discursive field of agriculture, the concept is transformed into a key enabler of an indispensable factor promoting rural economic development in both developed and developing countries. The IOs suggest that, by creating employment and providing new jobs (Cohen et al., 2008; FAO 1994, 2006, 2007b, 2008a,b,f,i,j, 2009a,b; FAO/GBEP 2007; FAO/IIED 2008; IEA 1994, 2007a, 2010; IEA Bioenergy 1998, 2002, 2004, 2005a, 2006a,b,c,e, 2007; IPCC 1995, 2007b; Schmidhuber 2006), bioenergy will enable farmers to earn greater income (Cohen et al., 2008; FAO 1994, 2006, 2007a,b,c, 2008a,b,e,f,i, 2009a,b; FAO/GBEP 2007; FAO/IIED 2008; IEA 2004a; IEA Bioenergy 2004, 2005a,b, 2006a,e; IPCC 1995, 2007b; Schmidhuber, 2006). These organisations argue that production of energy from biomass can help revitalise the agricultural sector and promote rural development (FAO 1994, 2006, 2008b,c,d,e,f,g,i, 2009a,b,c,d; FAO/GBEP 2007; FAO/IIED 2008; IEA 2004a, 2006b,c, 2007a,b, 2008a; IEA Bioenergy 2004, 2005a,b, 2006a,b,d, 2007; Junginger et al., 2010; Schmidhuber, 2006). Moreover, in particular, the FAO and IEA argue that bioenergy constitutes a new product able to increase demand for feedstocks (FAO 2006, 2008c,g,i, 2009a; IEA 1994, 2004a; IEA Bioenergy 2005b, 2006b,e; Schmidhuber, 2006) and, as a result, improve yields and food security (Cohen et al., 2008; FAO 1994, 2008b,d,g,i; FAO/IIED 2008).

To exemplify this, the IEA argues that "from the social perspective there can be little doubt that bioenergy projects protect existing employment, provide new jobs, give learning opportunities, transfer skills, introduce new skills, and provide training and educational opportunities" (IEA Bioenergy 2002:4). According to the Agency, "unlike other renewable energy sources, the production and use of bioenergy is relatively labour intensive and can potentially play a positive role in maintaining and developing the rural economy" (IEA Bioenergy 2008a:2). In another report, the Agency also suggests that spatial expansion of bioenergy production would offer many opportunities for farmers internationally, as "the possibilities for exporting biomass-derived commodities to the world's energy markets can provide a stable and reliable demand for rural communities in many (developing) countries, thus creating an important incentive and market access that is much needed in many areas of the world" (IEA Bioenergy 2005b:7). The IPCC assumes that "the increased production of biofuels for transportation, or energy production in rural areas, is expected to protect existing employment and to create new jobs in rural areas" (IPCC 2007b:730-731). Furthermore, the IPCC assesses that "large-scale production of modern bioenergy crops, partly for export, could generate income and employment for rural regions of world" (IPCC 2007b:522). According to the FAO, "potential benefits associated with bioenergy production include increased employment opportunities and related improvement in livelihoods. Bioenergy may contribute to job creation and higher wages in agricultural communities by diversifying rural economies. Developing countries in particular have much to gain from increased global demand for biofuels if they can diversify their agricultural output with energy crops, especially if they can grow feedstocks that may be used for both food and fuel markets" (FAO 2007b:22). In another document, the UN agency also suggests that "the expanding market for biofuel feedstock offers a new opportunity for agricultural producers, and could contribute significantly to higher incomes for farmers and farm workers who are well-placed to take advantage of the opportunity" (FAO 2007a:12). Therefore, as the FAO argues, "the demand for biofuels could reverse the declining trend in real commodity prices that has depressed agricultural growth in much of the developing world over recent decades. As such, biofuels may offer an opportunity for developing countries — where 75% of the world's poor depend on agriculture for their livelihoods — to harness agricultural growth for broader rural development and poverty reduction" (FAO 2008i:5-6).

4.2. Reproducing the concept in the chain of equivalence: an empty signifier

The struggle to provide discursive closure to bioenergy as a win-win-win solution to the three syndromes of the organic crisis depends on a level of equivalence between the specific nodal positions it occupies in three distinct discourses. The hegemonic intervention is driven by the necessity of assembling the three particularities of the concept into an equivalent relationship with each other — and most importantly — in opposition to antagonistic forces that could threaten the dominant order fixated on economic growth and capital accumulation. As a result, the capitalist logics of price pressure and cost-effectiveness become measurement characteristics that, depending on the values they express, place bioenergy in a position that can be either commercially beneficial or disadvantageous, regardless of the concept's occupation of privileged centres in the three discursive formations.

Therefore, by suturing its meaning with the hegemonic thread by the logic of the capitalist market economy, the three nodal positions of bioenergy become homogenised through a process of commensuration. Furthermore, they are placed in the chain of a valuing system that partially reproduces the concept's quality as a feasible solution to specific problems into that of a commodity that, by acquiring *economic feasibility*, can be regarded as useful and functional. In other words, whether bioenergy is potentially an effective way to deal with the challenges of energy insecurity, climate change and agricultural crisis is of secondary importance now. In the equivalent network sutured through the hegemonic thread, what primarily matters is bioenergy's *cost*-effectiveness, and that is what explicitly determines its competitiveness on the market and its significance as an alternative option. Consequently, the totality of cost and price pressures transforms a bioenergy option that is too expensive to go into commercial production into an antagonistic force that can impose oppression on the hegemonic system. It is the *cheap* solution preserving the economic growth and capital accumulation that is desired and accepted.

The hegemonic thread that sutures the concept of bioenergy into the chain of equivalence is obvious in documents and reports issued by the IOs, since the process of commensuration is ubiquitous. All international organisations depict the bioenergy option as a potentially cost-effective strategy that could cheaply replace fossil fuels, mitigate climate change, and revitalise agriculture (FAO 1994, 2005, 2007b, 2008i, 2009d; FAO/GBEP 2007; IEA 1994, 1997a, 2004a, 2004c, 2007a; IEA Bioenergy 2006e; IPCC 2007b,e). On closer inspection, however, one crucial problem arises when forming the equivalent chain and repositioning its links to fit each other. When the economic feasibility of producing energy from biomass is compared with that of fossil fuels, in particular oil, the institutions realise that the actual costs of bioenergy remain unfavourable and must be subsidised to make this energy more competitive on the market (FAO 1994, 2005, 2007a,d, 2008e,h,i; FAO/GBEP 2007; IEA 1994, 1995, 1997b, 1999, 2000a, 2001, 2002, 2003b, 2004a, 2006b, 2008a,b, 2010; IEA Bioenergy 2004, 2006d, 2007; IPCC 1990, 2001b, 2007b,e; Rapsomanikis and Hallam, 2006). The IEA notes that "high cost is the primary barrier to all biofuels" (IEA 2000a:59). According to the FAO, "decreasing the price differences between fossil fuels and biofuels remains a major general constraint when these prices are based on direct cost analysis, even when the recent volatility in international oil prices is making bioenergy (and raw materials produced from biomass) more attractive" (FAO 2005:3). For the IPCC, especially "transport biofuel production costs remain high compared with oil products" (IPCC 2001b:173).

As a result, it is not only that bioenergy as a final product *per se* must be cost-effective, but that the hegemonic chain of equivalence must extend to encompass the other aspects of bioenergy, including the economic cost of production (IPCC 1990, 2001b, 2007b,e), relating directly to the cost of the feedstock from which the energy is produced (FAO 1994, 2007a, 2008i; IEA 1994, 1999, 2001, 2004a, 2006b,c; IEA Bioenergy 2006e; IPCC 2001b, 2007b; Rapsomanikis and Hallam, 2006; Schmidhuber, 2006), which further corresponds to the cost of labour necessary to harvest and process biomass (FAO 1994; IEA 1999, 2004a, 2006c; IEA Bioenergy 2005b, 2006b,e, 2007; Schmidhuber, 2006). For example, the IEA observes that "the main cost element in biofuel production is the feedstock, so research currently concentrates on the identification of cheaper feedstocks to reduce the costs of fuel production and help make it more competitive with fossil fuels" (IEA 2001:326). Similarly, the FAO states that “biofuel production costs depend fundamentally on the underlying production costs for the feedstock, so low-cost agricultural producers are also more likely to be low-cost producers of bioenergy” (FAO 2007a:10–11). Since the price of bioenergy must be reduced to make it competitive with fossil fuels on the capitalist market, these institutions assume that lowering the cost could be achieved and propose three different ways to do so.

Firstly, the IOs suggest that to make the bioenergy option cost-effective, it must be supported by government in the form of various subventions (FAO 2008i, 2009b; FAO/GBEP 2007; Heinimö et al., 2007; IEA 1994, 2001, 2002; IEA Bioenergy 2005a, 2006d; IPCC 2001b; OECD/FAO 2007; Rapsomanikis and Hallam, 2006). Accordingly, the IEA reasons that biofuels are only competitive if they enjoy subsidies (IEA 2001:310). The FAO justifies this position by arguing that biofuels “without subsidies are currently not competitive with their (also subsidized) fossil fuel counterparts, with the exception of Brazilian sugarcane ethanol” (FAO/GBEP 2007:40). In its assessment report, the IPCC argues similarly that biofuels can only become competitive with cheap oil if “significant government support is provided” in the form of, for example, “subsidies (such as for use of set-aside surplus land)” (IPCC 2001b:245).

Secondly, the institutions advocate for intensification of global agricultural production — by achieving higher yields, establishing large-scale cultivation schemes, and introducing technological innovations — as yet another way to meet the price pressure and make the bioenergy option cost-effective (Cohen et al., 2008; FAO 1994, 2007a,b, 2008a,e,f,g,i, 2009a; FAO/GBEP 2007; Heinimö et al., 2007; IEA 1994, 1997a,b, 2000a,b, 2001, 2003a,b, 2004a,c,d,e, 2005, 2006b,c, 2007a, 2008a, 2010; IEA Bioenergy 1998, 2006b; IPCC 2007b). The IEA suggests that “with increased productivity, energy crops could also provide a low-cost fuel for producing” (IEA 2001:402). Moreover, in the Agency’s view, “one way to increase the benefits and lower the costs of producing biofuels is to raise crop yields” because "high crop yields per acre and per energy input (like fertiliser) reduce cost, increase potential biofuels supply" (IEA 2004a:47). The FAO argues that "given the significant economies of scale associated with biofuel feedstock production, in most cases large-scale plantations represent the most efficient and economically competitive option for producing such feedstock" (FAO 2008f:3). According to the FAO, "improved crop yields, area expansion and intensification could expand feedstock production significantly and reduce costs" (FAO 2008i:6). The IPCC suggests that "in the years to come, some biofuels may become economically competitive, as the result of increased biomass yields" (IPCC 2007b:344).

Thirdly, all three organisations recommend that to alleviate price pressure and make the bioenergy strategy more cost-effective, it is necessary to expand the production of biomass for energy to developing countries characterised not only by suitable climatic conditions but, most importantly, cheap labour and land (FAO 1994, 2007a, 2008b,e,f,i, 2009a,b,d; FAO/IIED 2008; IEA 2003a, 2004a,c,d, 2006c; IEA Bioenergy 2005b, 2006b,e, 2007; IPCC 2007b; Rapsomanikis and Hallam, 2006). The IEA argues that "if developing countries can make use of their substantial biomass supplies by cost-effectively converting them to biofuels, they can benefit from trade with OECD countries" (IEA 2003a:37). Moreover, "given the availability of land and relatively low costs of labour in many developing countries, biomass production costs can be low, and thus offer an opportunity to export biomass-based energy carriers to developed countries" (IEA Bioenergy 2006b:3). The FAO concurs with this idea, stating that "in the longer-term, tropical countries will likely play an increasingly important role in feedstock production, due to favourable biophysical conditions and generally lower costs of land and labour" (FAO 2008b:15). In another report, the FAO similarly implies that "tropical and subtropical countries not only have land and climatic conditions suitable for the efficient crop production of many important feedstocks, but their labour costs are usually lower than in OECD countries" (FAO 2009b:2). The IPCC promotes much the same assertion by suggesting that “major transitions are required to exploit the large potential of bioenergy” and therefore “improving agriculture efficiency in developing countries is a key factor” (IPCC 2007b:511).

However, the signification of the bioenergy concept as reproduced by the hegemonic thread symbolises a long chain of equivalence that, due to internal distortions, can no longer hold its structure. Unavoidable alternations applied to particular identities of the discursive moments to establish a sequence of compatibilities in relation to antagonistic forces contradict the privileged position that bioenergy occupies as the nodal point in the three discourses. Hence, various intrinsic dislocations mark the impossibility of conceiving what is within the given limits of signification.

Firstly, the problem with subsidies is that they are often too costly (Steenblik, 2007), which positions them antagonistically in the chain of equivalence, outside the systemic limits set up by the hegemonic intervention. Additionally, financial support provided by governments for bioenergy production distorts agricultural markets domestically and internationally, making it a highly contested issue in the debate. Secondly, and most importantly, it is the implications of the intensification and expansion of biomass production to reduce the cost that mark the limitations of the conceptualisation of bioenergy as a win-win-win solution to the three symptoms of the organic crisis. Basing production on economies of scale and the further spatial enlargement of cultivation entails such problematic issues as: increased fossilisation through expanded mechanisation and extensive fertilizer and pesticide use; massive direct and indirect land use changes; concentration of land and production ownership; and reduction in rural manual labour (Kuchler and Linnér, 2012). These factors, in turn, call into question: the extent to which biofuels can serve as a renewable energy source able to reduce dependence on oil and contribute to energy security; how the concept can be claimed to be carbon dioxide neutral to help reduce GHG in climate change mitigation efforts; and how the bioenergy strategy can provide rural jobs, improve farmers' incomes, and promote agricultural development.

Marked by internal contradictions and dislocations in the chain of equivalence, the win-win-win construction is disengaged from particular significations and results in emptying the concept of bioenergy of any precise content. Consequently, the bioenergy option constitutes emptiness that serves both as a brilliant solution to the three challenges of the organic crisis and pretty much nothing at all or, more precisely, preservation of the status quo. Worse, it presents something that could potentially aggravate the crisis rather than help overcome it. However, this emptiness of the concept is a necessary condition for the hegemonic discourse to succeed. Hence, it is an expression of powerful discursive means that make it possible for the logic of a capitalist market economy to secure its continuation through hegemonic sedimentation that establishes and grounds a particular norm expressed through economic growth and capital accumulation.

5. Conclusions

As demonstrated in the analytical section, the bioenergy concept is not empty *per se*, but becomes emptied because of the hegemonic project's attempt to suture its signification through the logic of a capitalist market economy fixated on economic growth and capital accumulation. We argue that, as shaped and forwarded in the current international debate, the bioenergy option constitutes a futile way to deal with the three symptoms of the organic crisis, due to the pressure of the same market ideology that initially caused these problems. Simultaneously, the international debate illustrates that dominant voices serve to sediment the capitalist economy rather than respond to the urgent need for serious structural reforms demanded by the three challenges of energy insecurity, climate change and agricultural stagnation. Prominent international organisations (i.e., the IEA, IPPC and FAO) appear to play a significant role in providing the ideological grounds for such hegemonic interventions.

From an environmental justice perspective, it is apparent that this hegemonic project maintains the production of uneven geographical differences (Harvey, 1996:5). The necessity of low production costs and low-priced bioenergy commodities excludes any concerns about improving welfare or prohibiting environmental degradation in poor areas. Rather than presenting solutions to the organic crisis, the project confirms and presupposes the continuance of current environmental deprivation in the global south and uneven economic relationships globally. While we could have expected the discourses to contain seeds of utopian thought, expanding on specific bioenergy potentials (e.g., flexibility, small scale and local adaptability), we find instead the emptiness of ideological mystification, taking the current control and distribution of wealth and resources for granted.

The potential utopian energies are still to be released here (Hedrén and Linnér, 2009), particularly regarding any radically alternative structural settings. Experimental activities triggered by social unrest and the triple crisis (i.e., the economy, environment and food supply) are developing in a great number of settings and directions today. One example is the engagement in strategies for de-growth, which means downscaling of production and consumption in combination with increased well-being and enhanced equity and environmental conditions (Sekulova et al., 2013). Other examples can be found in different manifestations of the so-called peer economies: peer-to-peer hardware production and peer-to-peer consumption of goods (Bradley, forthcoming). Any endeavour to include bioenergy in such experiments should of course relate to the unsustainability of an oil-driven economy to alternatives in which justice and ecological considerations are as important as material wealth and social welfare.

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