HUMBOLDT-UNIVERSITÄT ZU BERLIN

Faculty of Life Sciences

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Critical Discourse Analysis of Social Sustainability in Agriculture:

The Political Discourses on Biofuels in Brazil and Germany

Master thesis in the study program: Integrated Natural Resource Management

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Berlin, 07.06.2018

Abstract

The social dimension of sustainability in agriculture is still the least understood dimension of sustainability. This could lead to practical consequences such as inadequacies and contradictions in policy-making. The main objective of this thesis was to improve the understanding of social sustainability in agriculture by analyzing discourses on biofuels in Brazil and Germany. In order to identify what different stakeholders have been communicating as 'socially sustainable' and if there are gaps in the political discourse on biofuels, a combined procedure of critical discourse analysis and content analysis was conducted. The analyzed materials includes official documents and websites from government, private and civil society stakeholders. The results demonstrate that there are gaps in the political discourses of the two countries. The two cases further show the difficulty in defining concrete policy goals regarding social sustainability. In Brazil, there is a strong focus on the role of family farms as a social aspect. However, there is a gap in the discourse around topics such as education and training, traditional peoples and communities, land tenure and social participation. In Germany, sustainability is commonly understood as environmentally friendly practices. Moreover, there is a strong tendency to reduce the social dimension of sustainability to work standards from the International Labour Organisation and according to certification schemes criteria. The identification of these gaps exposes shortcomings in policy that should be addressed in order to move towards sustainable agriculture through a more holistic approach in bioenergy policy-making.

Keywords:

Social Sustainability, Agriculture, Discourse Analysis, Biofuels, Sustainable Development Goals

Zusammenfassung

Die soziale Dimension der Nachhaltigkeit in der Landwirtschaft ist die am wenigsten verstandene Dimension der Nachhaltigkeit. Dies führt zu praktischen Konsequenzen wie Unzulänglichkeiten und Widersprüchen in der Politikgestaltung. Das Hauptziel dieser Arbeit war das Verständnis von sozialer Nachhaltigkeit in der Landwirtschaft durch die Analyse von Biokraftstoffdiskursen in Brasilien und Deutschland zu verbessern. Ein kombiniertes Verfahren der kritischen Diskursanalyse und Inhaltsanalyse wurde durchgeführt, um die Art der „sozial nachhaltigen“ Kommunikation verschiedener Stakeholder zu identifizieren und Lücken in den politischen Diskursen von Biokraftstoffen zu finden. Zu den analysierten Materialien gehören offizielle Dokumente und Websites von staatlichen, privaten und zivilgesellschaftlichen Akteuren. Die Ergebnisse zeigen, dass es Lücken in den politischen Diskursen beider Länder gibt. Die zwei Fälle zeigen auch, dass konkrete politische Ziele in Bezug auf soziale Nachhaltigkeit schwierig zu definieren sind. In Brasilien steht die Rolle landwirtschaftlicher Familienbetriebe als ein sozialer Aspekt im Vordergrund. Es gibt jedoch noch Lücken für Themen wie Bildung und Ausbildung, indigene Völker und lokale Gemeinschaften, Landbesitz und gesellschaftliche Teilhabe. Nachhaltigkeit wird in Deutschland häufig als die Anwendung umweltfreundlicher Methoden verstanden. Darüber hinaus besteht eine starke Tendenz, die soziale Dimension der Nachhaltigkeit auf Arbeitsstandards der internationalen Arbeitsorganisation und auf Zertifizierungssystemkriterien zu reduzieren. Die Identifizierung dieser Lücken stellt Schwachstelle in der Politik dar, die im Hinblick auf eine nachhaltige Landwirtschaft und einen ganzheitlicheren Ansatz bei der Politikgestaltung im Bereich der Bioenergie weiter verbessert werden sollten.

Schlagwörter:

Soziale Nachhaltigkeit, Landwirtschaft, Diskursanalyse, Biokraftstoffe, Ziele für nachhaltige Entwicklung

Resumo

A dimensão social da sustentabilidade na agricultura ainda é a dimensão menos compreendida da sustentabilidade. Isso pode resultar em consequências práticas como insuficiências e contradições na formulação de políticas. O principal objetivo desta tese foi melhorar a compreensão da sustentabilidade social na agricultura, analisando os discursos sobre biocombustíveis no Brasil e na Alemanha. Uma análise crítica de discurso combinada com uma análise de conteúdo foi realizada a fim de identificar como diferente *stakeholders* têm comunicado sua compreensão de "sustentabilidade social", assim como possíveis falhas nos discursos políticos de biocombustíveis. O material analisado inclui documentos oficiais e sites de entidades governamentais, organizações privadas e da sociedade civil. Os resultados demonstram que existem falhas nos discursos políticos dos dois países. Os dois casos mostram ainda a dificuldade em definir objetivos políticos concretos em relação à sustentabilidade social. No Brasil, há um forte foco no papel da agricultura familiar como um aspecto social. No entanto, existem falhas em relação a aspectos como educação e treinamento, povos e comunidades tradicionais, direitos fundiários e participação social. Na Alemanha, a sustentabilidade é comumente entendida como práticas ambientalmente corretas. Além disso, há uma forte tendência em reduzir a dimensão social da sustentabilidade aos padrões de trabalho da Organização Internacional do Trabalho e de acordo com os critérios de sistemas de certificação. A identificação destas falhas expõe deficiências políticas que deveriam ser abordadas, a fim de alcançar melhorias significativas na direção de uma agricultura sustentável através de uma abordagem mais holística na formulação de políticas de bioenergia.

Palavras-chave:

Sustentabilidade Social, Agricultura, Análise de Discurso, Biocombustíveis, Objetivos de Desenvolvimento Sustentável

Acknowledgement

I gratefully acknowledge Agroscope for providing the topic and the entire necessary infrastructure for writing this thesis. I express my sincere gratitude to M.Sc. Judith Janker for being the most kind and dedicated co-supervisor I could have. Her guidance helped me in all the time of research and writing, with insightful comments and discussions. My sincere thanks to Dr. Bettina König for the supervision with valuable dialogues and feedbacks. I would like to thank Dr. Dr. habil. Stefan Mann for welcoming me in the research group socioeconomics at Agroscope-Tänikon and Prof. Dr. Stephan Rist for accepting to be my second supervisor. I am thankful to the IRI Thesys for conceding my firsts reflections on social sustainability and to the PROMOS short-scholarships for the financial support. My gratitude also to Torsten Schwab that without even knowing, permitted my firsts reflections on the political discourses on biofuels. Finally, I kindly acknowledge John Anderson for his careful reading and insightful comments.

Dedication

To my father, that taught me to follow my dreams.

To my brother, for always inspiring me with his art.

To my nephew, the new light of my life.

To Konstantin, for always being by my side.

To my friends in Brazil, Germany and Switzerland: without you, I have had no fun at all.

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List of Abbreviations

ABA	Associação Brasileira de Agroecologia *Brazilian Association of Agroecology*
ABIOVE	Associação Brasileira das Indústrias de Óleos Vegetais *Brazilian Association of Vegetable Oils Industries*
BDBe	Bundesverband der Deutschen Bioethanolwirtschaft e. V. *Federal Association of the German Bioethanol Industry*
BImSchG	Bundes-Immissionsschutzgesetz *Federal Immission Control Act*
Biokraft-NachV	Biokraftstoff-Nachhaltigkeitsverordnung *Biofuel Sustainability Ordinance*
BioSt-NachV	Biomassestrom-Nachhaltigkeitsverordnung *Biomass Electricity Sustainability Ordinance*
BLE	Bundesanstalt für Landwirtschaft und Ernährung. *Federal Office for Agriculture and Food*
BMEL	Bundesministerium für Ernährung und Landwirtschaft *Ministry for Food and Agriculture*
BUND	Bund für Umwelt und Naturschutz Deutschland *Friends of the Earth Germany*
BtL	Biomass-to-Liquid
CAP	Common Agricultural Policy
CDA	Critical Discourse Analysis
COP	Conference of the Parties
EC	European Commission
EPE	Empresa de Pesquisa Energetica *Energy Research Company*
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FNR	Fachagentur Nachwachsende Rohstoffe e.V. *Agency for Renewable Resources*
GHG	Greenhouse Gas
GBEP	Global Bioenergy Partnership
HDI	Human Development Index

IEA	International Energy Agency
ILO	International Labour Organisation
ILUC	Indirect Land-Use Change
ISA	Instituto Socioambiental *Socio-Environmental Institute*
ISO	International Organization for Standardization
IRENA	International Renewable Energy Agency
MAPA	Ministério da Agricultura, Pecuária e Abastecimento. *Ministry of Agriculture, Livestock, and Supply*
MDG	Millennium Development Goals
NGO	Non-governmental organization
MST	Movimento dos Trabalhadores Rurais Sem Terra. *Landless Workers' Movement*
OECD	Organization for Economic Co-operation and Development
PNPB	Programa Nacional de Produção e Uso de Biodiesel. *National Program for the Production and Use of Biodiesel*
Pronaf	Programa Nacional de Fortalecimento da Agricultura Familiar *National Program to Strengthen Family Farming*
RED	Renewable Energy Directive
RenovaBio	Politica Nacional de Biocombustiveis *Brazilian Biofuel Policy*
RSB	Roundtable on Sustainable Biomaterials
Sead	Secretaria Especial de Agricultura Familiar e do Desenvolvimento Agrário. *Brazilian Special Secretariat for Family Farming and Agrarian Development*
SDG	Sustainable Development Goals
TBL	Tripple-Bottom-Line
T&E	European Federation for Transport and Environment
UDHR	United Nations Declaration of Human Rights
UFOP	Union zur Förderung von Oel- und Proteinpflanzen e.V. *German Union for the Promotion of Oil and Protein Plants*
UN	United Nations
UNCHE	United Nations Conference on the Human Environment

UNCED	United Nations Conference on Environment and Development
UNICA	União da Indústria de Cana de Açúcar. *Brazilian Sugarcane Industry Association*
UNDP	United Nations Development Program
UNWCED	United Nations World Commission on Environment and Development
WBGU	Wissenschaftliche Beirat der Bundesregierung Globale Umweltveränderungen *Scientific Advisory Council on Global Change*
USA	United States of America
VDB	Verband der Deutschen Biokraftstoffindustrie e.V. *German Biofuels Industry Association*
WSSD	World Summit on Sustainable Development
WCED	World Commission on Environment and Development
WTO	World Trade Organization

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Preface

"Ensuring effective actions towards sustainable agriculture involves also the searching for a *greater understanding of the social dimensions of sustainable agriculture—including the need to pay particular attention to the situations and roles of women, youth, smallholders and family farmers, fisher folks, pastoralists, forest users and indigenous peoples—is key in determining a successful transition to sustainable agriculture practices. Against this background, innovations that can contribute to a more sustainable economy have considerable potential for employment creation in rural areas, in particular for young women and men. This directly contributes to Goal 8 of the SDGs on productive employment and decent work for all"* (FAO 2016a, p. 5). Biofuels might represent a great technological innovation that can, in fact, contribute to SDG 8 and others SDGs towards a sustainable development. However, particular attention must be paid to this background that includes the role of women, youth, smallholders, family farmers and indigenous people in the development of policies. Facing the endless discussion about biofuel sustainability, we should consider that "*the discourse around bioenergy/biofuels is often overly simplistic* [and therefore we] *should accept and embrace their complexity. Biofuels or bioenergy per se are neither good nor bad. What matters is the way they are produced"* (FAO 2016b, p. 1). In this regard, we hope to contribute to the transition towards a sustainable agriculture through a more holistic approach in bioenergy policy-making.

1 Introduction

The United Nations Commission on Environment and Development's report, better known as 'Brundtland Report' gave rise to the approach of sustainability and sustainable development as is commonly understood today (WCED 1987). These concepts have become prevalent in policies all over the world with the aim of integrating environmental, economic and social objectives (Omann and Spangenberg 2002). However, their vagueness in meaning and the neglect of the social system are often objects of criticism and discussion (Missimer et al. 2017a). The social dimension of sustainability has often been overlooked and it is frequently used in the context of 'development' and 'economic growth' (Vallance et al. 2011). Particularly in agriculture, there are asymmetries between the three dimensions of sustainability usually favoring ecological aspects (Binder and Feola 2013). Besides this, the necessary changes towards environmental sustainability rely on the social dimension and on social involvement to act against the major environmental challenges we face in current times (Dillard et al. 2009).

In general terms, the importance of sustainable agriculture for the transition towards a global sustainable development is commonly agreed on (Binder and Feola 2013). Sustainability in agriculture is often related to resource conservation, productivity, and farm- and firm-level profitability (Allen at al. 1991). Likewise, sustainable agricultural movements have been focusing on an agenda related to environmentally friendly practices, failing to address a sustainable production related to human needs, social relations and inequality issues (Goodman 2000). Most of the literature on socially sustainable agriculture has been centred on local approaches (Gaviglio et al. 2016; Källström and Ljung 2005; Mancini *et al.*, 2008; Pilgeram, 2011; Bicalho et al., 2002; Gomes, 2005). In this sense, the poor understanding about socially sustainable agriculture might lead to practical consequences, for instance inadequacies in policy-making. This might be observed in the development of bioenergy policies around the world, that express promises to deliver social, economic and environmental improvements but that are rather too narrow in terms of sustainability due to them being possibly merely reduced to lowering emissins (Hunsberger et al. 2017; Millinger et al. 2018).

Renewable energy sources such as biofuels came to be seen as one answer to solve the environmental impacts recognized at the UN Conference on the Human Environment (UNCHE 1972), as well as for taking action to fight climate change as established by

Agenda 21 (UNCED 1992). Biofuels produced from biomass and used as transport fuels have been supported as a renewable energy source under the sustainable development agenda (Goldemberg 2007). In this context, the Sustainable Development Goals (SDGs) are the framework currentlyused to operationalize the concept of sustainable development and goals 2 and 7 directly support sustainable agriculture and renewable energy, respectively (UN 2015). The interlinkages between agriculture and energy represent a key part of biofuel production, since biomass availability is the central constraint for the further deployment of biofuels (Guo et al. 2015; Kline et al. 2017). The deployment of advanced biofuels is also within the aims of policies supporting the development of a 'bioeconomy' by promising a holistic approach in an economy based on the replacement of fossil fuels by renewable sources such as biomass (Aguilar et al. 2018). The production of 'advanced biofuels' has been called sustainable simply due to the fact that they reduce carbon emissions and are not based on food-crops (Joshi et al. 2017; Whalen et al. 2017). However, technological innovations are also related to environmental, economic and social settings that need to be considered for its sustainability and effectively coordinated by policies (Rodionova et al. 2017; Bauer 2018). Studies on biofuel sustainability rarely consider the social dimension in depth, being mostly focused on its environmental and economic aspects (Pashaei et al. 2018).

With social sustainability being the least understood dimension of sustainability, what have different stakeholders been communicating as 'socially sustainable'? Are there gaps in the political discourse on biofuels when comparing the discourses from government actors to those from other stakeholder groups such as the private sector and civil society in relation to the social dimension of sustainability?

Against this background, the main objective of this thesis is to improve the understanding of social sustainability in agriculture through the political discourse on biofuels. The hypothesis relies on the assumptions that i) there are gaps in the political discourse on biofuels related to social sustainability, and that ii) social sustainability might be perceived differently depending on the context. Because of this, two countries were chosen to be compared. Brazil was chosen for its leading role in biofuel production in the global South and Germany for having the highest level of bioenergy development in the European Union (Su et al. 2015; Hunsberger et al. 2017). Biofuels are approached by this study as biomass-derived fuels of agricultural origin (FAO 2018). It focuses on a broader definition of biofuels considering fuel production from any biomass supplied from

agricultural practices. Hence, the complex food crop feedstock and residues discussion is not within the scope of this thesis (IEA Bioenergy 2016).

A critical discourse analysis (CDA) following Jäger (2015) together with a content analysis was conducted in order to access what is perceived as being 'socially sustainable' according to different actors. The analyzed materials include official documents and websites from government, private and civil society stakeholders. The time analyzed focuses on 2015 onwards because it is the period since the introduction of SDGs. The gaps in the political discourses on biofuels were identified by comparing the topics covered in government discourses with the ones from the private sector and civil society in relation to the social dimension of sustainability.

This thesis is structured as follows. It starts with a literature review. First, it focuses on the concept of sustainability, the sustainable development goals, the social dimension of sustainability and the connections with a sustainable agriculture. Second, it is centred on the sustainability of biofuels and its social aspects. Further, the promises regarding the social sustainability of biofuels are presented, as well as the approach given by the UN sustainable development agenda and the European Union. Following this, the cases of Germany and Brazil are presented. The material and methods describe the specific methods, the analysis procedure and gaps identification. Subsequently, the results present the different elements of social sustainability according to stakeholder's discourses, the fulfilment of the SDGs by the social elements identified and the gaps in the political discourses on biofuels for Brazil and Germany, respectively. Next, the main international stakeholder discourses overlapping with national discourses are presented. In the discussion, the gaps in the political discourses on biofuels are discussed for Brazil and for Germany. Finally, the correlations between the two contexts are discussed as well as the relation with the SDGs as the normative framework.

2 Literature Review

2.1 Sustainability

Besides a general consensus regarding its importance, there is no common agreement about the meaning of sustainability and sustainable development (Dempsey et al. 2011). There are different approaches and interpretations that change according to different contexts, time, language and ways of living (Brown et al. 1987; Giddings et al. 2002; Crabbe 2006; Kajikawa 2008). Normally, 'sustainable development' is defined as the process towards a specific outcome that is 'sustainability' (Holmberg and Robert 2000; Loos et al. 2014; Wasiak 2017). Others would also argue that sustainability is not a fixed concept but a dynamic one, changing as society changes (Dale et al. 2013). Considering sustainability and sustainable development as normative statements, Brown et al. (1987) question: "*How would we know if global sustainability were achieved, and how would we know if we were following a sustainable path? It is important to recognize that the answers to these questions depend on how we construct our definitions of sustainability*" (Brown et al., 1987, p. 718).

Literally, sustainability "*means the ability to sustain, or a state that can be maintained at a certain level"* (Kajikawa 2008, p. 2018). It was originally used by the environmental conservationist movement and related to the capacity of ecosystems to remain self-sustaining, closely linked to the idea of carrying capacity (Brown et al. 1987; Kajikawa 2008). Later, it was approached at the WCED in 1987, giving rise to the definition of sustainability that is currently most used. The conference report 'Our common future', also known as Brundtland Report, defined sustainable development as the capacity "*to ensure that [*humanity*] meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED 1987, p.16). This definition represented a significant transformation in addressing sustainability as it was expressed as an attempt to connect environmental protection with economic development (Kajikawa 2008). The open meaning of the concept gave space for continued political discussion on its content and operationalization (Sharma and Ruud 2003). Nevertheless, the importance of integrating economic and social development with environmental protection is contemplated by several international conferences (UNCHE 1972; WCED 1987; UNCED 1992). Accordingly, the most used framework towards sustainability operationalization arose from the division and also interconnection of economic,

environmental and social dimensions, indicating that 'sustainability' would be reached by balancing the three pillars (Giddings et al. 2002). Originally an attempt by John Elkington to measure sustainability in corporations (Hall 2011), the so-called triple-bottom-line has become a common representation of sustainability (Kajikawa 2008).

The operationalization of sustainability usually involves the identification of criteria and indicators in the three dimensions. This is because it is easier to divide impacts into three categories and as such, it is mostly committed to a *problem driven agenda* (Kajikawa 2008, p. 233). Multidisciplinary, interdisciplinary, and transdisciplinary aspects have recently become more prominent in sustainability studies (Kajikawa 2008). Furthermore, multiple goals and consideration of local contexts are also endorsed when approaching sustainability issues (Davidson 2009; Dempsey et al. 2011). This reinforces the dynamic aspect of sustainability as "*different people have different aspirations in different time periods, over different time scales, and in different contexts"* (Kajikawa 2008, p. 5).

2.1.1 Sustainable Development Goals

A first attempt to implement sustainable development came in 2000 with the Millennium Development Goals (MDGs) consisting of eight time-bound targets - with a deadline of 2015 (UNDP 2018). The MDGs were designed as a global partnership with an action plan to eradicate extreme poverty and hunger in the world (UN 2000).This meant that it had a limited approach only addressed atdeveloping countries (Fehling et al 2013). Later on, in 2016, the SDGs replaced the MDGs representing the first time that universal goals applied to all UN countries (Costanza et al. 2016). The United Nations "2030 Agenda: our Common Future" set 17 SDGs with 169 targets to be implemented according to countries national strategies (UN 2015). It is used as a global reference for the period 2015-2030 and represents a common framework for sustainable development (Le Blanc 2015; Fritsche et al. 2018). The SDGs highlight the importance of the three dimensions of sustainability and their inter-linkages. "*They* [the SDGs] *are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental*" (UN 2015, p. 1). Nevertheless, there is no guidance on how countries should achieve the goals. Or how the goals and targets are interconnected, including their synergies and trade-offs (Costanza et al. 2016).

2.1.2 Social Sustainability

There is a common agreement in the literature that the disregard for the social dimension of sustainability is the result of the difficulty in its definition and operationalization (Omann and Spangenberg 2002; Dillard et al. 2009; Boström 2012; Myllyviita et al. 2013). The social pillar of sustainability has been constructed in a combination of 'development' and 'economic growth' (Vallance et al. 2011). In most debates and scientific research, either the environment or the economy is prioritized (Giddings et al. 2002; Lehtonen 2011; German and Schoneveld 2011). Frameworks and methods usually adopted for measuring economic and ecological conditions are inappropriate for social considerations (Lehtonen 2011).

From a neoclassical economic perspective, development would be defined as an "*increase of social welfare*" that would require measuring "*social welfare*" in terms of economic outputs (Lele 1991, p. 609). Accordingly, the apparent indifference towards the social pillar of sustainability might be also explained as a result of the difficulty in approaching the social pillar separately from the environmental and economic ones (Parkin et al. 2003). This complexity can be summarized by asserting that *"the social world is much too complex and far too interwoven with value statements, morals, and other intangible, non-measurable aspects to be studied as one would study an ecological system with traditional scientific methodologies"* (Missimer et al. 2010, p. 6). In this respect, the difficulty in approaching social sustainability is also a result of the high variability in social considerations according to different contexts (Gaviglio et al. 2016). After all, social development issues vary greatly among countries (Omann and Spangenberg 2002). For instance, indicators such as child labour that in some cases may provide crucial information on social sustainability would be an irrelevant indicator in areas where child labour is not practised (Myllyviita et al. 2013).

Sachs affirms that social sustainability comes as the very purpose of development (Sachs 2000). According to Lele (1991), the definition of environmental sustainability principles, how they are accepted and their magnitude, all take place in the social dimension". Vallance et al. (2011) identifies three trends in research focusing on social sustainability: (i) basic needs and 'underdevelopment' issues (ii) behaviour and ethics towards ecological concerns, and (iii) protection of ways of living or particular socio-cultural traditions (Vallance et al. 2011). Brown (1987) discusses that the social dimension might be perceived as fulfilling Maslow's hierarchy of needs. Moreover, concepts such as

equity, social justice and local participation are further approaches to the social dimension of sustainability (Lele 1991). Giddings et al. (2002) considers a fairly shared benefits and losses between stakeholders on policy-making and action for sustainable development. Equality in distribution and opportunities; provision of social services like health and education; gender equity and political voice and participation are fundamental elements of social sustainability according to Assefa and Frostell (2007). Foladori (2002) concludes that social participation is probably the way towards which the concept of social sustainability has been evolving.

Dillard et al. (2009) investigates several relevant perspectives on the social dimension of sustainability. In their work, universal principles are listed as being well-being, equity, democratic government, and democratic civil society. Murphy (2012) develops a framework with four main social concepts for social sustainability: equity, awareness, participation, and social cohesion. Boström (2012) exemplifies a set of substantive (goals) and procedural (elements) to foster socially sustainable development. Eizenberg and Jabareen (2017) defend an ontological foundation of social sustainability in the concepts of safety and equity**,** developing a conceptual framework of social sustainability focusing on resilient societies. Missimer et al. (2017a; 2017b) investigate the current operational definition of social sustainability. They identify essential aspects of trust, common meaning, diversity, capacity for learning and capacity for self-organization. Social sustainability is also delineated through social changes, where social engagement and "*more network-based governance models"* are pointed out as being needed (Sharma and Ruud 2003, p. 211). In Opielka (2016), the relevance of reflection on sustainability by social sciences and sociology, in particular, is stressed. The greatest challenge to deal with environmental impacts such as climate change, for example, demands at first changes in the social dimension (WBGU 2011 apud Opielka 2016).

Due to the complexity involved in social sustainability, different definitions are often dependent on the sociopolitical goals of policy-makers (Littig and Griessler 2005). In this sense, global frameworks such as the UN Declaration of Human Rights (UNDHR) or the International Labour Organization (ILO) are commonly used to legitimize social aspects of sustainability (Boström 2012).

2.1.3 Socially Sustainable Agriculture

The social dimension of agriculture has been even less investigated than social science sustainability research. The origin of 'sustainable agriculture' is intrinsically related to the criticism raised against industrial agriculture in the 1960s (Pretty 2008; Slätmo et al. 2017). It is regularly used to define 'alternative' agricultural systems as 'agroecology', 'organic', 'low-input', 'permaculture', 'biodynamic', 'ecological' etc. (Lele 1991; Pretty 2008). According to Lele (1991), this is an example of the propagation of confusing concepts surrounding 'sustainable development' policies that are influenced by personal, organizational and political preferences. This is because improving production practices as an individual fact will not automatically meet environmental, economic, and social goals (Allen et al. 1991). The social dimension involves complex social conditions such as the fair distribution of benefits between farmers and workers while also meeting the needs of society with environmentally sound practices (Lele 1991). In this sense, the social dimension is of crucial importance and highly interactive with the other dimensions in agricultural systems, implying the concepts of justice and equity (Allen 1991).

The majority of methods developed to assess sustainability in agriculture have been focusing on ecological aspects (Kajikawa 2008; Binder et al. 2010). Besides, they often carry a reductionist approach without covering the critical literature on sustainability (Slätmo et al. 2017, p. 380). The very few sources found on social sustainability in agriculture are summarized in Table 1. However, there is a broad divergence on the social topics included by each one and their focus often rely on local a level approach.

Table 1 - Social Sustainable Agriculture in Scientific Literature

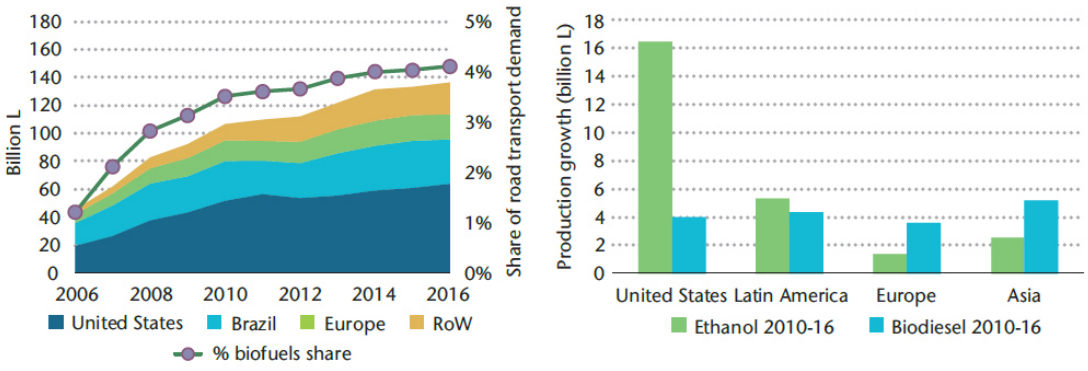
Social Sustainability in Agriculture	**Author**
Vulnerability and resilience of rural sustainable livelihoods: education and practical skills, health and physical competence, rural-urban migration, empowerment of small-farmers	Chambers and Conway (1991)
Sanitation, transport, education, health, relationship and interactions in the community: quality of life of family farms in a region of Southeast Brazil	Bicalho et al. (2002)
Employment, health, education and longevity of family farms in a municipality of the central-west region of Brazil	Gomes (2005)
Labour and working conditions to increase social and environmental sustainability in organic agriculture	Shreck et al. (2006)
Collaboration: bringing farmers to decision-making arenas and to a closer relation to consumers	Mancini et al. (2008)

Labour practices and class privileges among farms in the northwest Pacific coast	Pilgeram (2011)
Education of farmers in Andhra Pradesh, India	Dale et al. (2013)
Product quality and region of origin, short supply chain and related activities, work, ethical and human development and society, culture and ecology	Gaviglio et al. (2016)
Equity, gender inequalities, farmers' health and safety, as well as participation in decision-making processes	Slätmo et al. (2017)
Knowledge generation, farm scale and farmers livelihood	Mockshell and Kamanda (2018)

Altogether, there is a pressing need to better understand the social dimension of sustainable agriculture. This is also endorsed by FAO (2016), highlighting the necessity to "*pay particular attention to the situations and roles of women, youth, smallholders and family farmers, fisher folks, pastoralists, forest users and indigenous peoples"* (FAO 2016, p. 5).

2.2 Sustainability of Biofuels

The scientific and political approach to biofuel sustainability strongly relies on the energy sector as its primary objective is achieving energy security (Hunsberger et al. 2017; Oliveira et al. 2017). Biofuel deployment is also largely validated by its role in mitigating climate change (Jaiswal et al. 2017; Kline et al. 2017). Liquid biofuels are, for example, bioethanol, biodiesel, pyrolysis bio-oil, and drop-in transportation fuels. Biomass is currently the most used biofuel feedstock (Guo et al. 2015). Agriculture plays a crucial role in providing biofuel feedstock (Kline et al. 2017). In this sense, the "*efforts towards a more sustainable supply of biofuels should therefore be closely linked to policy instruments aiming towards a more sustainable agriculture*" (Roman et al. 2010, p. 72). According to the International Energy Agency (IEA), 90% of the biofuel market is concentrated in the United States, Brazil, the European Union and China (Figure 1) (OECD/IEA 2017).



Notes: Share of world road transport fuel demand calculated based on energy adjusted data; biodiesel production numbers include hydrotreated vegetable oil (HVO) production.

Figure 1 - Global biofuels production and share of world road transport fuel demand, 2006-16 (left), and ethanol and biodiesel production growth for key regions, 2010-16 (right). Source: OECD/IEA, 2017

The IEA produces forecasts regarding the share of transport fuel demand in the future under several scenarios. According to the 2°C Scenario (2DS), biofuels will provide 40% of air transport fuel in 2060, and 30% of bunker fuel for shipping – mostly based on advanced biofuels (according to IEA, those produced from non-food crop feedstocks). The scenario also indicates the continued use of conventional ethanol, favoured by the presumed advantage of sugarcane in reducing GHG emissions (Figure 2) (OECD/IEA 2017).

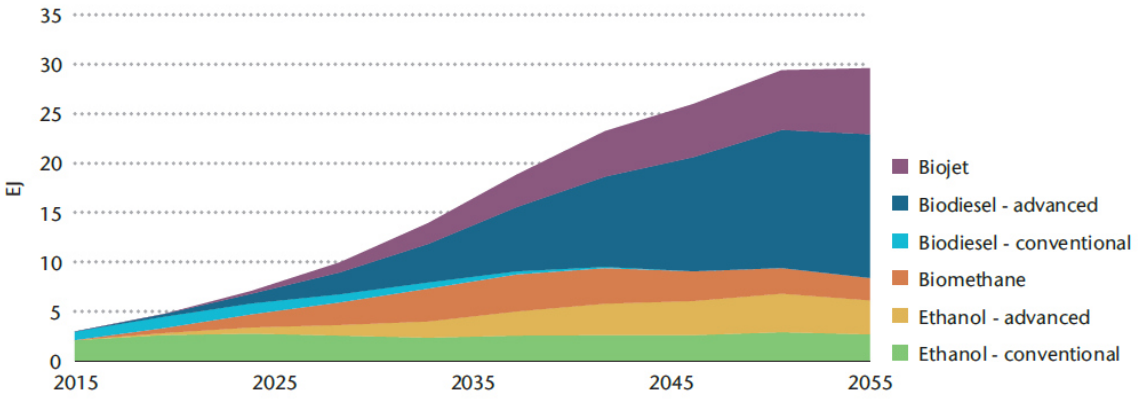


Figure 2 - Biofuels final transport energy demand by fuel type in the 2DS, 2060. Source: OECD/IEA, 2017

Policies are often guided by such models and scenarios. However, these are usually built on assumptions and simplifications, and considering different scales and contexts, the

sustainability this bioenergy system remains highly doubtful (Goetz et al. 2017). Besides that, the definition of sustainability for bioenergy varies greatly according to the stakeholder considered (Fritsche and Iriarte 2014). Moreover, the availability of biomass is a central constraint for further deployment of biofuels (Gül et al. 2009). Its future availability also depends on agricultural settings that involve the "*competition for land and water including land use and biodiversity issues, food demand as well as agricultural productivity"* (Ahlgren et al. 2017, p. 1177).

Concern has been rising regarding the sustainability and availability of biomass to cover additional energy demands using bio-based energy (Thra et al. 2017). Nevertheless, it is expected that biomass feedstock for biofuels will continue being central in the pursuit of the SDGs (Müller et al. 2015; Acheampong et al. 2017; Fritsche et al. 2018). In this sense, several expectations surrounding biofuels have been reproduced in the form of policies that represent an opportunity to achieve social, economic and environmental goals (Hunsberger et al. 2017b). Studies analyzing biofuel policies indicate that sustainability considerations are often restricted to GHG emissions or to environmental aspects (Kluts et al. 2017; Gaurav et al. 2017). This tendency in bioenergy policies is described by Fritsche and Iriarte (2014), as being made up of basic and basic and advanced sustainability criteria: "*the first establish only minimum requirements mainly for biodiversity protection and GHG emission reduction while the latter more demanding standards also consider more holistic issues such as soil, water, or social aspects, respectively"* (Fritsche and Iriarte 2014, p. 5).

2.2.1 Socially Sustainable Biofuels

Mainly induced by government policies, biofuel production has increased worldwide in recent years worldwide (Oliveira et al. 2017). With increased production, negative environmental and social impacts started being reported, mostly from developing countries. This has raised concerns about food security, human and labour rights (Kaphengst et al. 2012). Consequently, an additional need to validate the sustainability of biofuels has been demanded (Kaphengst et al. 2012; Ponte 2014; Selfa et al. 2015). Scientists, policymakers, non-governmental organizations (NGOs), and the biofuel industry have begun a controversial debate about biofuel sustainability (Fritsche 2012; Labruto 2014; Stattman and Mol 2014). Nevertheless, the focus on climate change mitigation and decarbonisation of economies has raised the discussion about biofuel

deployment again (Fritsche and Iriarte 2014; Turetta et al. 2017; Pelkmans et al. 2018). This discussions are strongly related to innovation systems that includes new pathways for biofuels production involving (bio)technology innovations and policies regarding the production of bioenergy (Bauer 2018).

The trade-offs involved in the production of biofuel and the social impacts related to it have shaped the scientific discussion related to the social sustainability of biofuels (Lehtonen 2011). This is because the social dimension of sustainable biofuels was constructed according to the social impacts reported by biofuel production in developing countries (Diaz-Chavez et al. 2015). There are several common elements highlighted in the social dimension by the literature. These include: food security; human and labour rights; working conditions; land rights; healthy livelihoods; access to water; equitable wages; gender equality; capacity building and traditional cultural practice (Ajanovic 2011; Kaphengst et al. 2012; Fritsche 2012; Labruto 2014; Müller et al. 2015; Acheampong et al. 2017; Oliveira et al. 2017). In addition, health benefits from better air quality with less GHG emissions are indicated as positive externalities of the use of biofuels (Roman et al. 2010). Other positive social aspects of biofuels are the generation of income and employment as well as increased rural and local development (Fritsche et al. 2005; Roman et al. 2010; Boeing et al. 2013; Romijn et al. 2014). Participation of local communities in decision-making and income distribution, along with improvements in living conditions and decrease rural-urban migration are further social aspects considered important, particularly for developing countries (Fritsche et al. 2005; Roman et al. 2010; Dale et al. 2015). In Europe, the impacts of biofuel production are mostly related to the problems associated with the intensification of land use (pesticides and fertilizer use, water consumption, monocultures). Social impacts are approached as positive, such as job creation and diversification of income opportunities (Kaphengst et al. 2012).

To secure the sustainability of biofuels, new ways of governance were necessary (Selbmann and Ide 2015). Sustainability criteria have been establishedby policies in order to avoid unwanted impacts from biofuel consumer countries in biofuel producer countries (Ponte and Daugbjerg 2015). Moreover, voluntary certification schemes have been adopted as controlling mechanisms for biofuel sustainability (De Man and German 2017). This non-hierarchical governance of biofuels sustainability as adopted by the EU has indirectly forced Brazilian companies to comply with sustainability criteria, preventing markets that are less focused on exports from attaining social gains (Bellantuono 2017).

However, the limited emphasis on social sustainability by the EU-RED make it possible that even certification schemes with poor social standards are in compliance with the EU-RED sustainability criteria (German and Schoneveld 2011; German and Schoneveld 2012). Among certifications for biofuel sustainability is the international Roundtable on Sustainable Biomaterials (RSB). The RSB has been recognised as having the most rigorous standard in social criteria (German and Schoneveld 2011; Dale et al. 2015). To assess biofuel sustainability, the Global Bioenergy Partnership (GBEP) is constantly mentioned as a reference for biofuel sustainability criteria (Fritsche 2012, Hayashi et al. 2014; Dale et al. 2015; Nogueira et al. 2017). Coordinated by the FAO and international organisations, with members of several nations, the 'GBEP Task Force on Sustainability' developed a set of indicators to promote and assist bioenergy deployment for sustainable development (GBEP 2011). By having considered several stakeholders in its development, Hayashi et al. (2014) affirm that the GBEP indicators reflect a very similar range of elements to those proposed by the scientific literature.

There is a broad range of literature assessing biofuel sustainability, besides there are few that focuses only on the social dimension of sustainability. The social aspects identified by the several studies are summarized in Table 2. The main social components identified for biofuels or bioenergy systems vary according to the study and source. However, the common aspects identified are food security, human and labour rights, employment, health, and land rights.

Table 2 - Social Sustainable Biofuels and Bioenergy in Scientific Literature

Social Sustainability for Biofuels and/or Bioenergy	**Author**
Human rights (e.g. sufficient food and water, health rights, labour rights, and land entitlements), fair trade principles and equitable distribution of costs and benefits	Buyx and Tait (2011)
Commitment, jobs, benefits generated, networks, institutional structures, stability and flexibility as social indicators of a sustainability assessment for a wood-based bioenergy production chain	Myllyviita et al. (2013)
Social well-being, energy security, external trade, profitability, resource conservation, and social acceptability	Dale et al. (2013)
Compliance with relevant national laws and international conventions, land rights, employment, wages and labour conditions, human health and safety of workers, social and rural development, stakeholders participation, and food security	Cortez et al. (2014).

Quality of life-related to illiteracy rate, human development index (HDI), Theil index, percentage of poor people, connection to the grid, child mortality and life expectancy	Machado et al. (2015)
Food security, direct job creation and fuel poverty	Baudry et al. (2017)
Stakeholder participation, transparency, public opinion, social acceptance**,** and social well-being (e.g. household income, food security and employment)	Dale et al. (2017)
Governance, participation of civil society, and development of institutional capacity	Kline et al. (2017)
Human rights, labour conditions, land rights, infrastructure, quality of life, human health and recreation	Turetta et al. (2017)
Health and safety, gender equality, employment and cooperation	Mattila et al. (2018)
Labour and human rights, health issues, food safety and water supply, rural development and social welfare through the creation of jobs	Rafiaani et al. (2018)
Employment, health and safety of workers, fair salary, equal opportunities, bargaining power, education, consumers health and safety, societal contribution, fair value chain and social responsibility	Souza et al. (2018)
Working conditions, labour rights, employment, training and education, equity, human health and safety, cultural diversity, food security, energy security, social cohesion, standard of living, property rights, social development (local prosperity; fair trade), corporate ethics, accountability, participation, rule of law, holistic management	(Pashaei et al. 2018)

Diaz-Chavez et al. (2015) affirm that besides limited data about the social aspects of bioenergy, International Conventions and NGOs have been playing a crucial role in taking social concerns into consideration. However, the social aspects of social sustainability of biofuels are mostly dependent "*on the scope of the study, data availability, and the priorities of the stakeholders involved"* (Rafiaani et al. 2018, p. 1861). Moreover, the context for biofuel sustainability is considered of particular importance. Each country has a unique mix of characteristicsin terms of soil, climate, land availability, infrastructure, economic feasibility, available workforce, institutional framework and sometimes scenarios of uncertainty and asymmetric information (Nogueira et al. 2017).

2.2.2 International Sustainable Development Agenda

The role of energy for poverty alleviation was emphasized at the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002. The WSSD encouraged the promotion of the sustainable use of biomass and the need to develop "*national energy policies and regulatory frameworks to improve access to reliable, affordable,*

economically viable, socially acceptable and environmentally sound energy services for sustainable development and poverty eradication" (WSSD 2002, p. 11-12). At the 'High-level event on the Millennium Development Goals' in 2008, biofuels were indicated as a possibility to reduce GHG emission, "*increasing rural income and employment opportunities"* (UN, 2008, p.15). This event also brought the concerns about food security and biofuel production to the fore, emphasizing the need for further research to guarantee an effective *sustainable* production of biofuels (UN 2008). In 2009, at the United Nations World Summit on Food Security in 2009, the concerns about food vs. fuel were discussed again. "[P]*olicies promoting the use of food-based liquid biofuels need to be reconsidered with the aim of reducing competition between food and fuel for scarce resources, and the use of biomass energy for improving rural people's access to sustainable energy should be promoted"* (FAO 2009, p.2). Nevertheless, "*liquid biofuels based on agricultural commodities increased more than threefold from 2000 to 2008"* (FAO 2009, p.15). This continued worldwide expansion mainly driven by policy incentives (Sorda et al. 2010). The current 2030 Agenda for Sustainable Development does not have a specific target for biofuels or bioenergy directly, although it might be related to the majority of the goals (Müller et al. 2015; Fritsche et al. 2018).

2.2.3 European Union Sustainability Criteria for Biofuels

At the European Union (EU) level, the policy-driven production of biofuels is largely justified by the Renewable Energy Directive (RED 2009/28/EC) (Allen et al. 2013). The Common Agricultural Policy (CAP) also brought extra incentives for agriculture to produce biofuel feedstock in Europe. Agricultural surplus production, set-aside payments and an energy crop premium payment for biomass from 2003 to 2009 triggered biofuel expansion through CAP (Baudry et al. 2017; Oliveira et al. 2017). The RED "*sets out biofuels sustainability criteria for all biofuels produced or consumed in the EU to ensure that they are produced in a sustainable and environmentally friendly manner"* (EC 2018). The *sustainability* criteria of RED were intensively criticized for lacking social considerations (German and Schoneveld 2011; Kaphengst et al. 2012; Baudry et al. 2017; de Man and German 2017; Oliveira 2017).

To address the heated discussion involving biofuel sustainability, Directive 2015/1513/EU introduced additional requirements to reduce the risk of Indirect Land Use Change (ILUC) (Bellantuono 2017). ILUC does not include a direct social impact, (it

refers to the displacement of agricultural production into previously non-agricultural land. Indirect impacts on local communities, smallholders' displacement and a reduced water supply may be alleviated if the ILUC factor is accounted for.(see Kaphengst et al. 2012). The social criteria of the EU RED rely on a biennial reporting mechanism related to the ratification of ILO treatiesand on the scope of voluntary certification schemes approved by the EU (EC 2009).

The RED is currently being revised and under its specific objectives relies on the development of advanced biofuels, as well as the clarification of the role of food-based biofuels post-2020 (EC 2016). The public consultation for the recast of the RED highlighted the long debate about biofuel sustainability as one of the main barriers to increase the share of renewable energy in the transport sector, as well as a divided perception of bioenergy sustainability. Moreover, there is "*a divided perception of the benefits and risks of bioenergy and on the need for a new EU policy. Nevertheless, an overwhelming majority of respondents underlined climate mitigation as the main objective of a bioenergy sustainability policy"* (EC 2016, p. 11).

2.2.4 Biofuels in Germany

The production of biofuels in Germany began during times of crisis when fossil fuels were in shortage and ethanol was produced from potatoes and cereals, for example. Production incentives from the 1980s increased a small share in ethanol production. This was primarily with agrarian and socio-political goals in mind and with the support of potato, cereal, and beet farmers, as well as the spirits and sugar industry. Biodiesel production came later in the 1990s under the incentives from the EC Agrarian Reform in 1992. It was also highly dependent on oil prices (Beneking 2011).

In the context of climate change and the sustainable development debate, political incentives for biofuels in Germany came with the 2003 EU Biofuels Directive (2003/30/EC) and the 2003 EU Energy Tax Directive (2003/96/EC). These established market targets and mandates, and later also sustainability criteria for biofuels in accordance with the EU-RED (Gardebroek et al. 2017). The policy incentives proved to be effective and resulted in a growing share of bioenergy in Germany. They also resulted in a significant increase of agricultural land being used for feedstock production (Thrän et al. 2015). The biofuel sustainability criteria from the RED 2009/28/EC was transposed into national policy by the 'Biofuel Sustainability Ordinance' (*Biokraftstoff-*

Nachhaltigkeitsverordnung Biokraft-NachV), under the authority of the Federal Office for Agriculture and Food (*Bundesanstalt für Landwirtschaft und Ernährung* - BLE). The BLE provides licenses and supervises certification systems in accordance with the Biokraft-NachV (BLE 2018).

About 57 million tons of fuel was consumed in the transport sector in 2016. Biofuels represented a share of 4.7% (FNR 2017). Biodiesel, mostly produced from rapeseed oit with about 2 million tons per year, (FNR 2016), has the largest market share among biofuels. About 62% of renewable energy used in the transport sector is biodiesel, followed by bioethanol with about 26%. Although if compared with the overall fuel consumption in the transport sector for 2016, this makes up only 3% and 1.5% respectively (FNR 2017). Approximately 65% of the rapeseed oil used to produce biofuels comes from German cultivation. In 2016 the amount of biodiesel from waste oils exceeded the amount of biodiesel from rapeseed oil for the first time due to low-priced imports (UFOP 2018). Other sources such as palm oil (19%) are mainly from Indonesia and Malaysia. Soybean oil comes from South America and sunflower oil from other European countries (UFOP 2018).

Besides liquid biofuel, biomethane is a gaseous alternative for transport fuel and represents about 0.1% of the renewable energy share in the transport sector (FNR 2017). The biogas produced from energy crops and agricultural residues are blended with natural gas and are considered a promising future prospect to further reduce GHG emissions (Uusitalo et al. 2014). However, gaseous fuels are not well established in the transportation sector yet (Daniel-Gromke et al. 2018). Future expectations rely especially on more efficient uses of biomass and on residual materials like biofuel feedstock. A notable example are synthetic biofuels, , as a substitute for diesel and gasoline engines, such as BtL fuels (biomass-to-liquid) that can use a broad range of raw materials (FNR 2016). Such advanced biofuel technologies are still highly uncertain and dependent on further research and development, biomass availability, high investments and a commitment to a long-term policy planning (Beneking 2011; Millinger et al. 2017).

Policy support for food-energy crops for biofuels has declined over the years and biofuel tax incentives were replaced by a GHG reduction quota from 2015 onwards. The quota requires a net GHG reduction of 4% of GHG emissions from 2017 onwards and 6% from 2020 onwards, being GHG reduction calculated with the basic value of 83.8kg CO2eq/GJ

according to the Federal Immission Control Act (*Bundes-Immissionsschutzgesetz - BImSchG*) (Naumann et al. 2016).

An analysis of long-term energy scenarios in Germany predicts an increase in biofuels over the current rates by 4–14% (Szarka et al. 2017). However, future scenarios for advanced biofuels often only rely on economic measurements such as feedstock costs (Millinger et al. 2017; Millinger and Thrän 2018). Nevertheless, some approaches endorse the necessity for accounting arable land as directly related to social, economic and environmental factors instead of merely considering energy or GHG reduction (Millinger et al. 2018).

2.2.5 Biofuels in Brazil

Sugarcane represents the central biofuel feedstock in Brazil (Gilio and de Moraes 2016). The country is the largest bioethanol producer in the global South and the second largest in the world, just after the USA (IRENA 2016). No other country has such a high share of biofuels in its national fuel mix as Brazil (Hunsberger et al. 2017). Biofuels represented a share of about 20% in the transport sector in 2016 (MME 2016).

The leading role of Brazil in biofuel production has been acknowledged several times in the literature (Selfa et al. 2015; Hunsberger et al. 2017; Selbmann and Ide 2015), and praised as a model of a successful case (Goldemberg et al. 2008; Kaphengst et al. 2012; Diaz-chavez et al. 2015; Solomon et al. 2014; Jaiswal et al. 2017; Kline et al. 2017). In this sense, international organizations such as the "*World Bank, Organization for Economic Cooperation and Development (OECD), and Food and Agriculture Organization (FAO) studies have exempted Brazil's ethanol program from the central critiques on biofuels in terms of economic efficiency, contribution to greenhouse gases, and impact on food prices"* (Wilkinson and Herrera 2010, p. 753). Due to this leading representation, South-South partnerships have been made to reproduce the Brazilian "success" in African countries, with the promise to reduce poverty and contribute to social development (IRENA 2016; Labruto 2014). However, the sustainability of biofuels in Brazil is mostly validated by ecological considerations such as Sugarcane Agroecology Zoning (Turetta et al. 2017). The creation of jobs, improvement of livelihoods and the development of rural infrastructure are usually cited as positive social benefits of biofuel deployment in Brazil (de Moraes and Zilberman 2014). Stattman and Mol (2014) mentions Brazil as one of the first countries to explicitly include social sustainability into

national biofuel policy by providing incentives for the inclusion of smallholders and family farms in the biodiesel supply chain.

In reality, Brazil focuses national biofuel policy initiatives on both ethanol and biodiesel deployment (Selfa et al. 2015). To foster biofuel production and reduce GHG emissions by meeting the country's commitments under the Paris Agreement, Brazil started to develop a new Bill for Biofuels in 2016 (BrazilGovNews 2017a). The policy was developed based on emissions reduction policies such as the EU-RED, the Renewable Fuel Standard Program (RFS) from the USA, and the Low Carbon Fuel Standard (LCFS) from the State of California (USA) (Novato and Lacerda 2017). The Bill promised to provide *sustainability principles*, including social benefits like social development to the country (Nastari 2017; BrazilGovNews 2017b). Approximately one year after its submission, the Bill was sanctioned into a law (No. 13.576/2017). It established a National Biofuel Policy (*Política Nacional de Biocombustíveis*), RenovaBio, for the first time" (BRAZIL 2017; FGV 2018). The law itself does not provide any sustainability criteria but foresees decarbonisation certificates and further support to smallholders and family farms within the scope of the National Program for the Production and Use of Biodiesel (PNPB) (BRAZIL 2017).

The political context of biofuel in Brazil was shaped by the strong influence of key actors and institutions of both the agricultural and the energy sectors (Bellantuono 2017). Soybean and sugarcane are the main cultivated crops used as biofuel feedstock. (Cortez et al. 2014). Much of the agricultural land is controlled by export-oriented large-scale farms and sugarcane and soybean are included in this frame (Martinelli et al. 2010). This production system is further encouraged by a strong rural parliament group that favours political deliberations in support of corporations investments and large-scale projects (Sparovek et al. 2016). In 1990, the area occupied by large-scale farming of commodity crops represented 53% of all cultivated area, and by 2011 70% (Lapola et al. 2013).

2.2.5.1 Ethanol

The production of biofuels in Brazil started with the mandatory blending of 5% of ethanol into gasoline in 1931 (Cortez et al. 2014). After the oil crises of 1973, the production of biofuels promote energy security and reduce dependence on foreign supply gave origin to the National Ethanol Program (Proálcool), heavily funded by public investments (Oliveira 2017). The programme aimed to replace gasoline with ethanol fuel by a

progressive blend mandate of up to 25%, as well as the production of only ethanol running engines cars (Cortez et al. 2014). After a stagnation in the production of ethanol due to decreasing oil prices, the introduction of flex-fuel vehicles in 2003 increased ethanol production again (Oliveira 2017). In 2017, flex-fuel cars (able to run on both ethanol and gasoline or a combination of both) represented about 75% of the Brazilian cars(UNICA 2018a). The government support on production and consumption of ethanol also resulted in an increased share of sugarcane derived fuels in the national energy matrix, not only with ethanol for transport fuel but also using sugarcane bagasse to produce electric energy (Oliveira 2017, p. 768). Furthermore, the debate about climate change gave further support to the sector. Sugarcane ethanol in Brazil has been suggested as the most sustainable of the current renewable transport fuels available in the market for providing the highest reductions in GHG emissions (Jaiswal et al. 2017).

During the 2016/2017 harvest season, Brazil produced 652 million tons of sugarcane for sugar and ethanol (compared with 428 ten years before), representing about 9.7 million hectares of harvested fields and the production of 27.2 million cubic meters of ethanol (UNICA 2018b). Research indicates that the presence of a sugarcane processing plant brings considerable direct and indirect socio-economic benefits to the region (Gilio and de Moraes 2016). Nevertheless, poverty in Brazil is concentrated in rural areas (Sparovek et al. 2016). Social impacts related to labour rights and working conditions are strongly referred to the ethanol-sugarcane sector in the literature. However, (Goldemberg et al. 2008; Nassar et al. 2012) highlight that the ethanol-sugarcane sector commonly offers better working conditions than other agricultural sectors in Brazil. In fact, the National Commitment for the Improvement of Labour Conditions in Sugarcane Production as a voluntary code of conduct indicates advances and commitment from the sector over labour conditions (Hunsberger et al. 2017). Additionally, there is also a positive correlation between per capita income and income distribution related to the expansion of the sugarcane sector in the State of São Paulo (Satolo and Bacchi 2013).

The livelihood of communities surrounding plantations is also impacted as a result of this large-scale monoculture system (Cremonez et al. 2015). The production of sugarcane is dominated by large farms. However, some sources indicate that 40% of the sugarcane production originates from independent suppliers with less than 50 hectares (Diaz-Chavez et al. 2015). Depending on the municipality, 50 hectares would be classified as small to average property sizes (EMBRAPA 2018).

2.2.5.2 Biodiesel

Following the consolidation of the concept of sustainable development as defined by the WCED, Brazil started to investigate the feasibility of using biodiesel as a renewable source of transport fuel (MDA 2010). The PNPB was launched in 2004 with the aim of decreasing diesel imports and incentivizing renewable energy fuels in the country (Oliveira and Schneider 2016). The production of biodiesel has increased exponentially since then and blending targets have risen from2% in 2008 to reaching a quota of 10% in 2018 (ANP 2018; UBRABIO 2017).

The production of biodiesel is mainly based on soybean (70%) and tallow (17%) (ANP 2018). Soybean cultivation represents predominantly large-scale monoculture systems concentrated in the Midwest and South regions of Brazil (Selfa et al. 2015; ANP 2018). In 2017, biodiesel production achieved 4.3 million cubic meters (ANP 2018). The social impacts of soy production are related to increasing income inequalities, exposure to health risks, and marginalization of smallholders. At the same time, employment, higher local incomes, and improvements in local infrastructure are identified as positive social aspects of soy production (Garrett and Rausch 2016).

The PNPB has the clear social objective that is to include smallholders and family farms that are framed in the requirements of the National Program to Strengthen Family Farming (Pronaf) (Stattman and Mol 2014). A 'Social Fuel Seal' and a special tax are offered to companies that purchase biofuel feedstock from family farms. In turn, family farms receive pre-contracts to sell the production to the companies. In addition, free technical assistance and training should be provided in order to ensure the production of oilseeds by those farmers (MDA 2010).

The lack of logistic integration and low production capacity of small farmers, as well as low-income rates are some of the pronounced reasons of the failure of the social objective of the PNPB, and particularly in poorer regions (Padula et al. 2012; Wilkinson and Herrera 2010; Hunsberger et al. 2017; de Andrade and Miccolis 2011; Oliveira and Schneider 2016). At the same time, the stability of soybean supply from organized family cooperatives in the South of the country is an indication of success with high participation rates (Silva et al. 2017). By organizing into cooperatives, family farms benefit from greater bargaining power and in this sense Stattman and Mol (2014) conclude: "s*ocial sustainability of biodiesel in Brazil has little to do with biodiesel production and products, nor with food versus fuel, but more with the choices these farmers and cooperatives make*

to secure (future) income and to benefit from governmental policies" (Stattman and Mol 2014, p. 293). Briefly, there is a great difficulty in addressing this trade-off that is to conciliate increasing markets of a large-scale export-oriented agriculture and reach social gains by including smallholders and family farms (Diaz-Chavez et al. 2015).

3 Material and Methods

Critical discourse analysis (CDA) has a very diverse theoretical background from both social and linguistic theories. Being problem-oriented and interdisciplinarity is what differentiates CDA from ordinary discourse studies (Wodak and Meier 2015). Originally derived from a Foucauldian approach, discourse is defined as the use of language as '*a flow of knowledge through time and space*' (Jäger 2015 p. 29, own translation). At the ontological level, language operates as a social practice, perceived as the result of a jointly constructed meaning of the world, "T*hat is, discourse is socially constitutive as well as socially conditioned – it constitutes situations, objects of knowledge, and the social identities and relationships between people and groups of people. It is constitutive both in the sense that it helps to sustain and reproduce the social status quo, and in the sense that it contributes to transforming it"* (Fairclough and Wodak 1997, p. 258). Accordingly, by conducting a CDA we reproduce and analyse discourses critically, being able to change a particular trend or status quo (Fairclough and Wodak 1997). The deconstruction of ideologies and power *"through a systematic and retroductable investigation of semiotic data"* (i.e. the use of language) is therefore a common interest between CDA Schools (Wodak and Meier 2015, p. 3), through which not only the language content, but also its meaning within a context, fundamentally considered (Wodak and Meier 2015).

Against this background, the method used for this study relies on Jäger's CDA (Jäger 2015) and a combined procedure of content analysis. According to Jäger (2015), the fundamental purpose of a CDA is the analysis and critical appraisal of a controversial object in a certain time and space. Different from most of CDA approaches that does not explicitly explain or recommend data sampling procedures (Wodak and Meier 2015), Jäger uses a decidedly practical approach describing the CDA in ten methodological procedures (see Jäger 2015 p. 90-111). However, in order to properly answer the research questions, the combination of methods was used. The objectives of this study was to access what have different stakeholders been communicating as 'socially sustainable' and the searching for gaps in the political discourses of biofuels, rather than only critically analysing discourses through its reproduction. Hence, the content analysis together with CDA permitted the identification of important elements for the social dimension of sustainability as being communicated by each stakeholder group and a later comparison with the political discourses for gaps identification. The main emphasis in the analysis process relied on the content analysis while working on the materials (official websites

and/or documents), whereas the CDA was used to contextualize the discourses and the findings from the content analysis.

The analysis process was made up of three major phases that were followed for this study and are described in detail below:

a) Pre-analysis: establishes the purpose of the investigation, and the definition of the scope of materials within a time and space. In this study, it also established a starting point for stakeholder's identification.
b) Structural analysis: observation of common statements within the context according to a systemic procedure with the materials. The stakeholders' discourse position arises and well as the frequent topics in the social dimension of sustainability being communicated by each stakeholder from the content analysis.
c) Detailed analysis: careful investigation of typical materials. The identification of typical discourses for each stakeholders' group was possible, and a clearer understanding about discourse positions and contextualization of discourses on the main elements of social sustainability according to each stakeholder group.

3.1 Pre-Analysis

The research object of this work is the political discourse of biofuels related to social sustainability in agriculture. Consequently, the *phenomenon of interest* is social sustainability in agriculture. The *discourse strand*[1] is the political discourse of biofuels. The discourse materials are official websites and/or public documents such as policies, reports and information sheets from the stakeholders analysed. The materials are a represent how these actors officially communicate subjects related to sustainability and social issues. The *discourse space* is composed of Brazil and Germany. Brazil was chosen for its leading role in biofuel production in the global South (IRENA 2016) and Germany for having the highest level of bioenergy development in the European Union (Su et al. 2015). The *time* comprehends the year 2015 onwards as the arising period of the SDGs, used as the normative framework for sustainable development in this work. Nevertheless, this time frame had to be enlarged as there was not enough information available about the civil society from 2015 onwards and this group would have had to be disregarded.

[1]Discourse strand delineates the scope of materials for the discourse analysis (see Jäger 2015 p. 76-111; Wodak and Meier 2015 p. 109-135).

In order to identify stakeholders in both countries, a snowball sampling for stakeholder mapping was applied based on the typology for stakeholder analysis proposed by Reed et al. (2009). As a starting point for the snowball sampling, biofuel policies, new or in review, were considered to identify the central actors of the political discourse on biofuels in both countries. Understanding that these policies would lead to central actors of biofuel discourses. The use of snowball sampling permitted a direct identification of the relations between stakeholders and subsequent antagonisms or similarities in discourses positions.

In Brazil, there was the case of the development of the Bill and later sanctioned Law RenovaBio (No. 13.576/2017). It was the point of origin for the interested actors in biofuels in the country. Government representatives involved in the biofuel discussion were considered first, followed by those related to the agricultural sector and others involved with the sustainable development agenda. Government representatives related to the sustainable development agenda as well as biofuel private sector led to international arenas. Government actors that focused more on socio-environmental issues directed to agricultural social movements. Private sector actors led to national NGOs.

For Germany, the EU RED case was used as the point of origin for identifying the interested actors in biofuels in the country. This directive led to German national policies such as the 'Biofuel Sustainability Ordinance' (*Biokraftstoff-Nachhaltigkeitsverordnung* Biokraft-NachV) and government representatives related to (i) bioenergy and renewable energy, (ii) the agricultural sector, and (iii) national sustainability strategy. In turn, government discourses led to private sector biofuel producers and private sector actors led to national and international NGOs.

In order to limit the scope of the analysis, particular criteria were developed to consider stakeholders from the private sector and civil society. For the private sector, only actors meeting the following criteria were considered:

(i) Biomass feedstock producers
(ii) Biofuel sector related to agriculture.

For the civil society, only actors meeting the following criteria were considered:

(i) Involved with biofuels discussion
(ii) Mentioned by government discourses
(iii) Related to the agricultural sector

Many stakeholders from the transport sector were eliminated by this criteria, as well as actors from the civil society that were not directly related with the discussions of biofuels or agriculture.

3.2 Structural Analysis

At this phase of the analysis, official websites and/or public documents such as policies, reports and information sheets from each stakeholder involved were analysed. Common subtopics regarding the social dimension of sustainability were systematically identified. When these topics started to repeat themselves, the completeness of the discourse, i.e. theoretical saturation was reached (cf. Jäger and Maier 2016). In order to identify the main discourse position from each stakeholder, the following were considered in order to analyse each material (i.e. website and documents):

- Name of Stakeholder
- Reason for considering this stakeholder
- Material: website or public document
- Title and date of the material
- The approach towards sustainability
- The approach towards the social dimension
- The approach towards the social dimension in agriculture
- The approach towards the social dimension of biofuels
- Link to the website/document
- Observation and citations
- To which another stakeholder it led

This categorization permitted a systematic analysis of the discourses content by fist searching for sustainability topics and then on the social dimension (if existing). Next, sustainability in agriculture and biofuels were considered, and finally how actors not related to biofuel deployment as civil society representatives perceive social sustainability. In the case of Brazil, there was generally very restricted availability of documents and official reports that could be analysed compared to Germany. Hence, the analysis of websites was more common for the case of Brazil whereas official documents and reports were more prevalent in the case of Germany. At this phase, the common subtopics identified from the content analysis comprised the main elements of the social dimension of sustainability as perceived by each stakeholder.

The main elements of social sustainability identified by the content analysis were not represented by exact numbers because the aspects mentioned were organized in the certain categories ordered by similarity. Therefore the topics mentioned in the websites/documents and identified in the content analysis represent the tendency in discourses position towards topics considered important for each stakeholder.

In the case of Brazil, were identified 32 stakeholders and the analysis was conducted from a total of 35 materials i.e. websites and/or documents. From the government group were analysed 15 materials, 13 from the private sector and 17 from the civil society group. In the case of Germany, were identified 29 stakeholders and the analysis was conducted in a total of 29 materials i.e. websites and/or documents. From the government group were analysed 24 materials, 20 from the private sector and 23 from the civil society group.

3.3 Detailed Analysis

Common statements were identified using the structural analysis. This permitted a detailed analysis of discourse fragments, giving rise to a characterization of discourse positions within stakeholder groups. Moreover, it was given a clearer understanding about discourse positions contextualized by the CDA procedure, also towards the main elements of social sustainability identified by the content analysis according to each stakeholder group.

3.4 The Gaps in the Political Discourse on Biofuels

In order to identify the gaps in the political discourses on biofuels, two steps were followed. First, the subtopics identified in the structural analysis and representing the social elements of sustainability were systematically arranged to SDGs targets. The equivalence of social elements identified in the stakeholder discourses by the content analysis and CDA, means that there would be reasonable advancements towards social sustainability if these aspects were implemented in practice. Second, the subtopics identified in the discourses from the civil society and private sector actors, and not covered by the political discourses on biofuels were considered as a gap in the political discourses.

The gaps in the political discourses are related to the lack of an important topic related to the social dimension of sustainability in the political discourses (Figure 3). In order to

discuss policy measures in relation to the gaps, national strategies for sustainable development in line with Agenda 2030 were analysed. For Germany, 'Germany`s Sustainability Strategy' (*Deutsche Nachhaltigkeitsstrategie*) (Bundesregierung 2016) and the 'Indicator Report 2016' from the Federal Statistical Office of Germany (Statistisches Bundesamt 2016) was analysed. For Brazil, it was the 'Voluntary National Review on the Sustainable Development Goals' (Brazil 2017a), the 'Monitoring the Agenda 2030 for Sustainable Development' (PNUD 2015), the Brazilian SDGs strategy (Estrategia ODS 2018) and the accompanying indicators by the Brazilian Institute of Geography and Statistics (IBGE 2018).

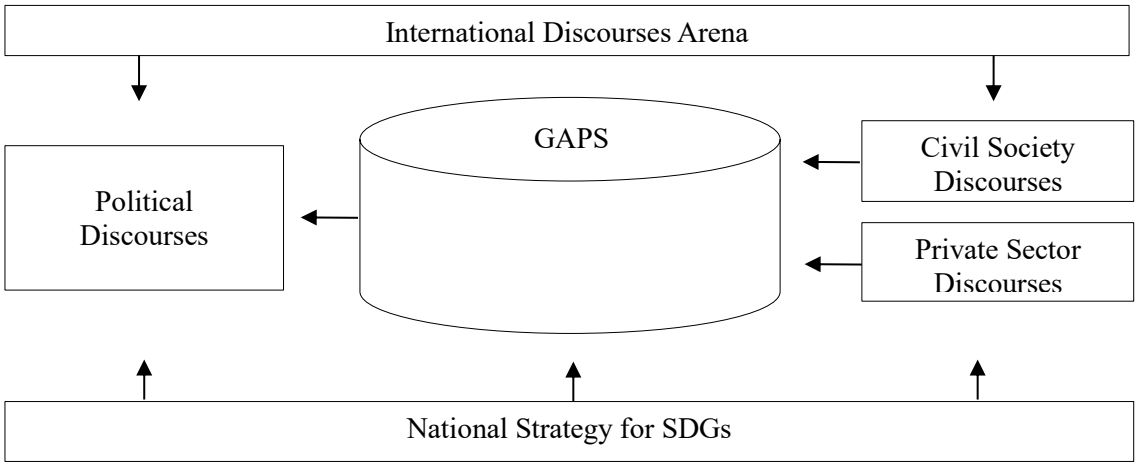


Figure 3 - Discourses system for gaps identification in the political discourses and verification with the SDG national strategy.

4 Results

4.1 Biofuels and Social Sustainability Discourses in Brazil

The common topics identifying the social dimension of sustainability in Brazil according to stakeholder's discourses were organized by frequency (Table 3). The arrow is pointing towards the most frequent topics on the social dimension from a total of 35 official websites and documents analysed from 32 stakeholders. The inclusion of smallholders and family farm is by far the most important social aspect of social sustainability in Brazil and mentioned by all stakeholder groups.

Table 3 - Frequent tendencies in stakeholder discourses on the social dimension of sustainability in Brazil

Frequent topics about social sustainability in the context of biofuels
↑ The inclusion of smallholders and family farms
Regional/rural/social development
Human rights and labour rights
Health
Income opportunities
Job opportunities/employment
Education/technical assistance/workers qualification
Rights of indigenous peoples, *quilombolas*[2] and *traditional communities*[3]
Working conditions
Food security
Social inclusion
Social responsibility
Land tenure/reform
Quality of life
Social equality
Gender equality
Social participation
Socially fair agricultural methods (e.g. agroecology, organic)
Cooperatives
Social Standards

[2] *The quilombos were villages in which black slaves gathered and tried to live a free life. The quilombolas are descendants of slaves who recognize themselves as such and still inhabit those places* (Labruto 2014) (Decree nº 4887, November 20, 2003).

[3] Traditional peoples and communities are culturally differentiated and recognized groups that have their own forms of social organization and occupy and use territories and natural resources as a condition for their cultural, social, religious, ancestral and economic conditions, using knowledge, innovations and practices generated and transmitted by tradition (Decree nº 6040, February 7, 2007).

Each stakeholder group approached these topics differently (Figure 4). The topics were organized in categories ordered by similarity, representing the tendency in discourses position towards topics considered important for each stakeholder group. These elements occurred with different frequencies in the materials analysed and also mentioned with different frequencies according to each stakeholder group. This is represented in the Figure 4 with different colours. In the centre of the circle are the less frequent elements from the social dimension identified in the materials analysed and towards the external circles the most frequent ones. Each aspect was counted only one time for document/website. That means that the topic touching the most external circle represent also the most mentioned topic for the social dimension of sustainability and considered particularly important for the respective stakeholder group. For example, the inclusion of smallholders and family farms were mentioned eleven times in 15 websites and documents analysed from the government group, whereas human and labour rights only in four. Human and labour rights were also mentioned in four websites and/or documents from the private sector group whereas the civil society group mentioned it in 14 websites and/or documents.

Furthermore, each topic was also approached with different perceptions sometimes. For example, health was considered by the private sector a positive aspect of biofuels as reducing GHG emissions and improving air quality. For the civil society group health was related to negative aspects from an agriculture production based on large-scale monocultures with high inputs of pesticides causing harms to the human health. The common social elements identified in the discourses reflect tendencies in discourse positions by each stakeholders group. This implies differences in how each group perceives social sustainability but also the importance of these topics for social sustainability according to the stakeholders analysed.

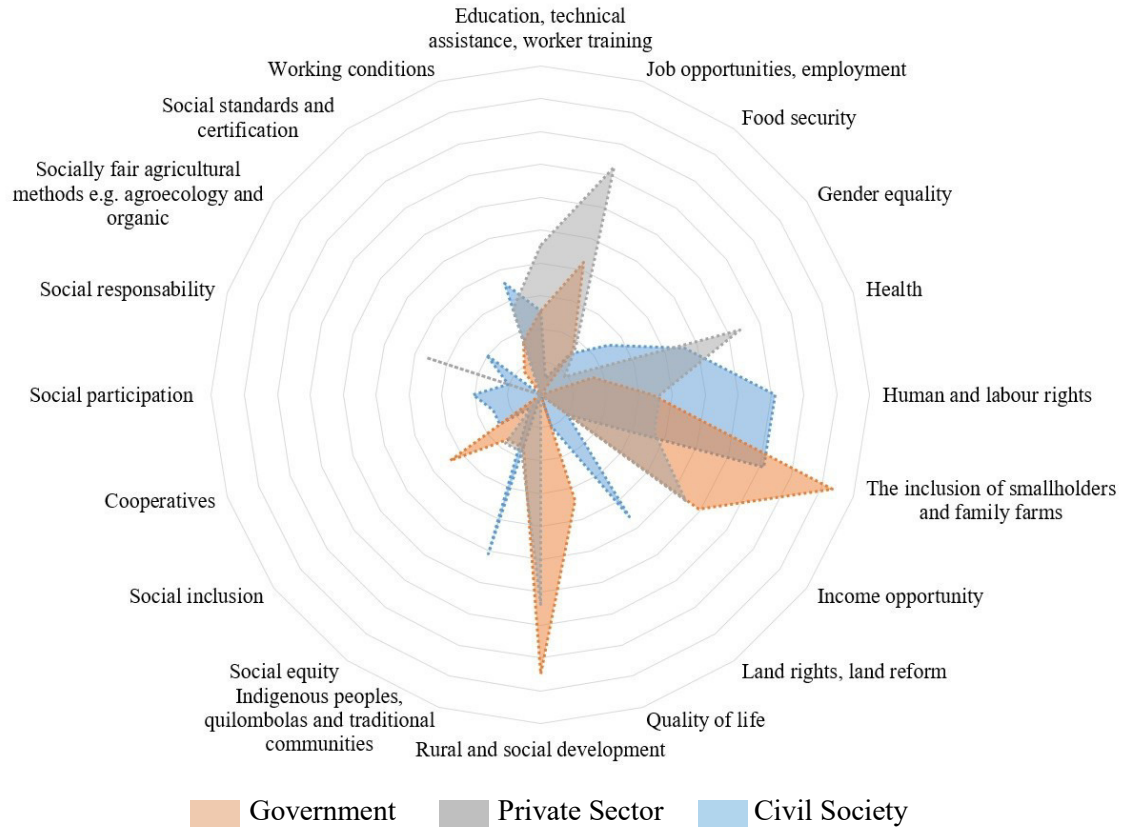


Figure 4 - Social sustainability of biofuels from agricultural-derived biomass according to stakeholders discourses in Brazil

The political discourse of biofuels in Brazil has a focus on employment, income generation, rural and social development, as well as social inclusion through the integration of family farm in the biodiesel production chain. Further analysis of government bodies provides additional elements to the social dimension such as cooperatives, technical assistance in the rural sector, agroecology and social inclusion through rural women empowerment and promotion and support to small-scale family farm.

The social inclusion is corroborated generally in relation to the National Program Production and Use of Biodiesel (PNPB), by the participation of smallholders and family farms in the biodiesel supply chain. This is also highlighted by the newly sanctioned Law RenovaBio: "*the contribution of biofuels to the security of the national supply of fuels, environmental preservation and the promotion of development and economic and social inclusion*" (Brazil 2017, 2nd Article, own translation). In the development of the Bill, the social pillar of sustainability is described by the Energy Research Company as an opportunity to "*improve the living conditions of the population and decreased social*

differences" (EPE 2017, p. 7 own translation). It is worth to mention that during the development of the Bill a fourth pillar was added to the to the common threefold pillars of sustainability and defined by the Energy Research Company: "*financial sustainability refers to the fact that an enterprise considers all* these concepts [the environmental, economic and social] *and yet is able to produce returns for its continuity and growth*" (EPE 2017, p. 7 own translation).

Other government bodies related to the agricultural sector also focus on the social inclusion of smallholders and family farms. Although this is approached in different ways. The Brazilian Ministry of Agriculture, Livestock, and Supply (MAPA) locates sustainability in its environmental dimension (e.g. low carbon agriculture). However, the MAPA also indicates support to family farms, rural extension and cooperatives as important elements of sustainability. The Brazilian Special Secretariat for Family Farming and Agrarian Development (Sead) is directly linked to family farm and smallholder issues. The Sead relates sustainability to alternative agricultural methods such as agroecology or organic agriculture, by means of promoting socioenvironmental benefits like healthier food. Land regularization issues are also related to the social inclusion of family farm by the Special Secretariat for Family Farming and Agrarian Development: "*Land regularization is considered the gateway for family farmers in situations of legal uncertainty to be able to access public policies aimed at the growth of the sector*" (Sead 2017a, own translation). Gender equality is also mentioned through rural women empowerment programs and particularly related to SDGs strategy "*Brazil began its participation in the 15 days of activism for the empowerment of rural women. The idea is to spread the main objectives of the United Nations (UN) Sustainable Development (SDGs) by 2030 and the strong linkage of rural women's work to the fulfilment of the women's work to their fulfillment*" (Sead 2017b, own translation).

The stakeholders from the private sector centre the social dimension on employment and on the promotion of jobs and income. Labour rights, working conditions, health and safety of workers are further highlighted. Positive benefits from the sector are accentuated by the improvement of social indicators. Typical statements from the private sector include the one from the Brazilian Sugarcane Industry Association: "[The sugar-energy sector] *has an important role in the social area with jobs, above average wages and the HDI. Not to mention the positive impact on the growth of these in 30% of municipalities*. *It is an important instrument of resumption of growth and economic, social and environmental development*" (UNICA 2017, p. 14). Likewise, better living conditions and derived

infrastructure and workers qualification are underlined as positive outcomes of the sector. This is observed in the statement from the Brazilian Association of Vegetable Oils Industries: "*The comparison between the last two surveys of the Human Development Index - HDI (...) conducted by the United Nations Development Program (UNDP), a UN agency, shows a strong increase in the quality of life in municipalities in which soy plays an important economic and social role. The positive effects promoted by soy and industry translate into more jobs, income sources and improvement in the quality of services through the expansion of investments in education, professional training and citizenship*" (ABIOVE 2017, own translation). There is also an overall agreement about the benefits of GHG emissions reduction to mitigate climate change and a benefit for public health in reducing diseases and mortality caused by air pollution. Moreover, there is a common call for corporate social responsibility.

Civil society discourses are divided between social movements and NGOs. In general, the social dimension reported by these actors relates to the inclusion of small-scale family farms, land reform, human and labour rights, and the rights and respect towards indigenous peoples, *quilombolas,* and other traditional communities. Gender equality is also highlighted. Health and safety issues are connected to the harmful effects of pesticides used in large-scale monoculture.

Social movements are particularly critical towards biofuels as they consider as a threat to health, food production and small-scale family farm. Those critics are also grounded on and defended by NGOs studies. The Landless Workers' Movement cited a study developed by the international NGO ActionAid: "*The research questions biofuels as clean energies, since the social and environmental impacts of the practice of monoculture with the use of agrochemicals do not usually enter into this account*" (MST 2014, own translation; ActionAid Brazil 2014). This argument repeats itself against the 'agribusiness', which is based in large-scale monoculturesexport-oriented, high use of agrochemicals and with disregard for minority and vulnerable groups. Tthe Brazilian Association of Agroecology argues: "*As incentives and planted areas for export commodities and biofuel feedstocks grow, the chances of sustainable survival of traditional communities and family farms are reduced. (...) The increase in the use of agrochemicals, contamination and restriction of access to natural resources and the impoverishment of the food base of farmers, extractivists, indigenous and riverine peoplse are some of the socio-environmental costs*" (ABA 2015, own translation).

Land concentration issues and demands for land reform are often mentioned by social movements and NGOs They perceive land concentration as the cause of increased inequalities and social exclusion in rural areas and a clear relationship between land concentration and inequality. This is observed in a document from Oxfam Brasil arguing that historical reasons, there is a link between land ownership and the exercise of political power in Brazil and avidencing that municipalities with a lower concentration of land have also lower poverty rates. A typical discourse fragment from the NGO indicates that "l*ocal development and the overcoming of poverty in Brazil are associated, among other factors, with the distribution of land and agricultural resources. High rates of land concentration bring serious consequences for development, especially at the municipal level*" (Oxfam Brasil 2016, p. 14 own translation). Social participation and unequal relations of power between actors in the agriculture sector are also mentioned by the discourses of the civil society group. This also in relation to a rural parliament group also called *bancada ruralista*, influencing government policies, criminalizing social movements and acting against the agrarian reform (Oxfam Brasil 2016; ABA 2015).

Nevertheless, national NGOs also endorse the importance of biofuels as climate change mitigation strategy. A typical discourse in this direction is pointed by the Socio-Environmental Institute: "*Harming the biofuel industry also means damaging the climate. In addition to the goal of the Paris Agreement for the energy sector based, amongst others, on the sustainable production of ethanol, and facilitated by the RenovaBio law. Brazil also leads international efforts to develop biofuels for a fast decarbonisation of the transport sector*" (ISA 2018, own translation). Other national NGOs highlight health benefits with the use of biofuels as a renewable transport fuel contributing to better cleaner air quality. This is the case of Greenpeace, that also alert for safeguards in biomass production for biofuels: "*The production of biomass must respect the livelihood of people, without replacing food crops or causing social conflicts (...). Labour rights must also be respected, and (...) tackled in accordance with ILO standards*." (Greenpeace Brasil 2016, p. 26, own translation).

Finally, subtopics considered as fundamental elements of the social dimension by several discourses are difficult to be interpreted. Those are for example rural development, social development, and life quality. Rural development is used in some contexts as poverty alleviation and improvements in infrastructure in rural areas. Nevertheless, without further explanation within the discourses, it is difficult to grasp what is meant as a target to be worked in.

1.1.1 Sustainable Development Goals

Stakeholder's discourses cover several targets from the SDGs (Table 3). A total of 11 from the 17 SDGs are mentioned by the stakeholders. Although they are not all are covered by the political discourses. Topics not highlighted by the government but indicated by the private sector and civil society groups as important for the social dimension are marked with an asterisk (*) at Table 4. Those are representing the gaps in the political discourses on biofuels.

Table 4 - Sustainable Development Goals related to the discourses on social sustainability in agriculture in the context of biofuels in Brazil

SDG	SDG Description	SDG Target	Social Sustainability from stakeholders discourses
	Goal 1. End poverty in all its forms everywhere	1.1 1.3 1.4	- Income opportunities and income growth - Reduce poverty of smallholders and family farms - Vulnerable groups as traditional communities and indigenous peoples (*)
	Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	2.1 2.3	- Food Security - Inclusion of smallholders and family farms - Land regularization for family farms - Land reform for social inclusion (*)
	Goal 3. Ensure healthy lives and promote well-being for all at all ages	3.8 3.9	- Healthy living conditions - Health and safety - Health benefits from GHG emissions reduction regarding air quality
	Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	4.6 4.7	- Technical assistance (rural extension) - Education and workers qualification (*)
	Goal 5. Achieve gender equality and empower all women and girls	5.a	- Gender equality
	Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all	7.1 7.2	- Renewable energy: Natural resource conservation and reduction GHG emissions for climate change mitigation

	Goal 13. Take urgent action to combat climate change and its impacts	13.2 13.3	-	Renewable energy: Natural resource conservation and reduction GHG emissions for climate change mitigation
	Goal 10. Reduce inequality within and among countries	10.1 10.2	- -	Income increase in rural areas Inclusion smallholders and family farm
	Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	8.1 8.3 8.5 8.7 8.8	- - - - - -	Employment Job opportunity Income increase Human rights* Labour rights Working conditions
	Goal 12. Ensure sustainable consumption and production patterns	12.6	- -	Social responsibility Social standards
	Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	16.7	-	Social participation (*)

Note:*Here allocated on Goal 8 as it features in the discourses in the context of human and labour rights. It must be considered that the Agenda 2030 and therefore all the SDGs are based on the Universal Declaration of Human Rights (UN 2015).

4.1.1 The Gaps in the Political Discourse

The gaps represent the topics not covered by the political discourses on biofuels but highlighted by other stakeholders group (Figure 5). Education and workers qualification are present particularly in the discourses from the private sector. Social participation is emphasized by the actors of the civil society group. Land reform is approached by social movements and associated to a reduction of social inequalities. This issue is only named once by the government representative related to land regularization for family farms. Finally, considerations towards indigenous people, *quilombolas*, and traditional

communities are hard to see in the political discourses on biofuels. However, those groups are constantly mentioned as social aspects from NGOs discourses.

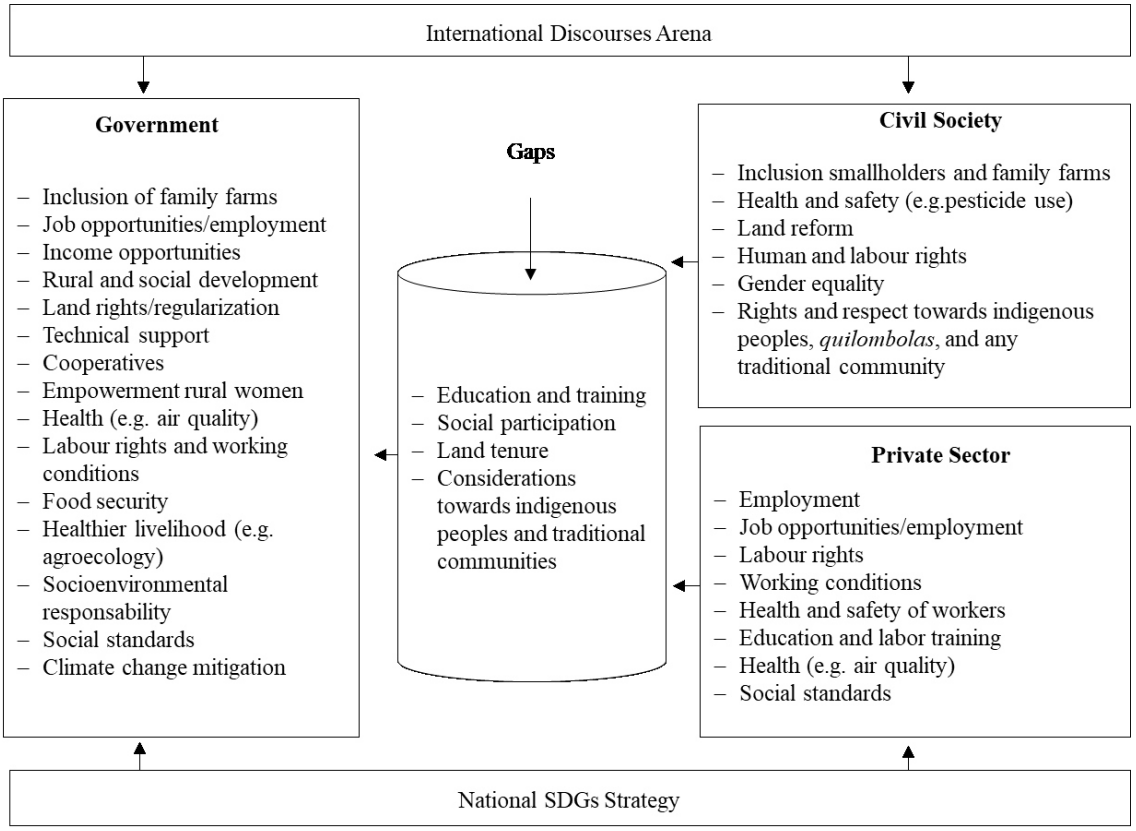


Figure 5 - The gaps in the political discourses on biofuels in Brazil

4.2 Biofuels and Social Sustainability Discourses in Germany

The common topics identifying the social dimension of sustainability in Germany according to stakeholder discourses were organized by frequency (Table 5). The arrow points towards the most frequent topics on the social dimension from a total of 67 official websites and documents analysed from 29 stakeholders. Employment and working conditions are the most important social aspect of social sustainability in relation to agriculture. Food security and social standards are usually social elements of sustainability related to biofuels. It is important to notice that several of the topics identified are actually related to the production of biofuels outside Germany. This is observed for example in relation to social standards, food security, human rights, labour rights, inclusion of smallholders, indigenous people, land rights and fighting poverty.

Table 5 - Frequent tendencies in stakeholder discourses on the social dimension of sustainability in Germany

Frequent topics about social sustainability in the context of biofuels
↑ Working conditions/ labour rights
Job opportunities/employment
Food security
Social standards and certification
Health
Income opportunities (e.g. to fight poverty)
Human rights
Land rights
Rural development
Inclusion of smallholders
Social responsibility
Social security
Quality of life
Access to information/education
Agricultural payments (e.g. income security and equality)
Income equality
Social participation
Rights and inclusion of local population/indigenous peoples
Social inclusion
Social acceptability
Solidarity of alternative agriculture methods (e.g. organic)
Incentivise young farmers
Cultural values
Social justice
Social cohesion

Each stakeholder group approached these topics differently (Figure 6). The topics were organized in categories ordered by similarity, representing the tendency in discourses position towards topics considered important for each stakeholder group. The elements occurred with different frequencies in the materials analysed and also mentioned with different frequencies according to each stakeholder group. This is represented in the Figure 6 with different colours. In the centre of the circle are the less frequent topics mentioned in the materials analysed and towards the external circles the most frequent ones. Each element was counted only one time for document/website. That means that the topic touching the most external circle represent also the most mentioned topic for the social dimension of sustainability and considered particularly important for the respective stakeholder group. For example, labour rights and working conditions are mentioned in four websites/documents in the total of 24 materials analysed from the government group. Job and employment is also mentioned in four websites/documents. Those are the two

most frequent topics in the government group in Germany, but still with a small representation because within all materials analysed, only 13 had something about the social dimension. In the private sector, 15 from 20 websites/documents had something from the social dimension, nine from them focusing on social standards and certification and also nine on labour rights and working conditions. Whereas the civil society group had 18 websites and/or documents from 23 with something from the social dimension and with a strong focus on human rights in eight of them.

Overall, employment, working conditions, labour rights and social standards are constantly named by the private sector. NGOs, on the other hand, are more concerned with the social impacts of biofuel production in developing countries. Therefore the discourses are converge on human rights, social responsibility and food security issues. The common social elements identified in the discourses reflect tendencies in discourse positions by each stakeholders group. Hence, there are differences but also many similarities in how each group perceives social sustainability in the case of Germany, for example, in relation to social standards and certification, labour rights and working conditions.

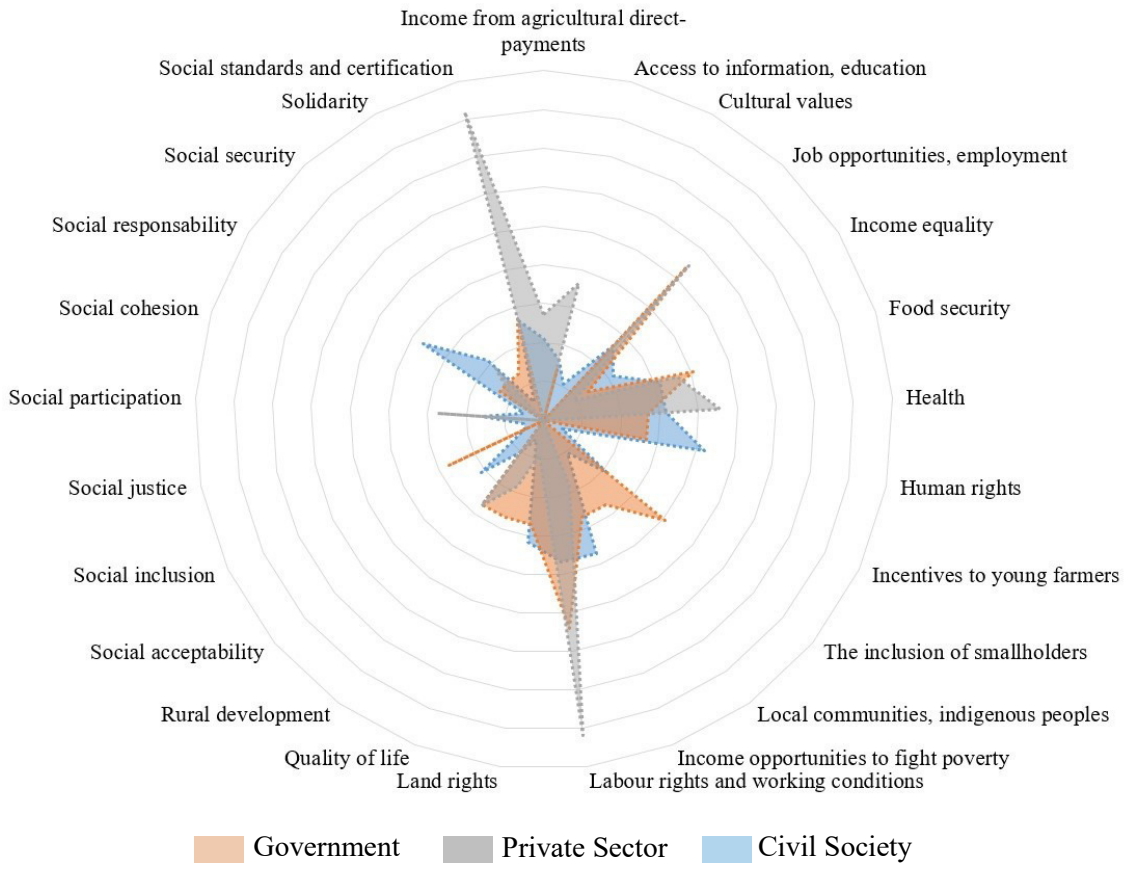


Figure 6 - Social sustainability of biofuels from agricultural-derived biomass according to stakeholders discourses in Germany

In general, the political discourses in Germany only consider the environmental aspect of sustainability. This is a result of the ordinance for biofuel sustainability (Biokraft-NachV) and the biomass-electricity sustainability ordinance (Biomassestrom-Nachhaltigkeitsverordnung -BioSt-NachV). These policies for biofuel sustainability observe similar sustainability criteria as those determined by the EU RED, which means a reduction of GHG emissions and the protection of natural resources (BMJV 2009; BMJV 2012). Further, the Biokraft-NachV also requires sustainable agricultural management following common rules for direct support schemes for farmers and ecological requirements established by the CAP (Bundestag, 2009). Moreover, biofuel sustainability is frequently justified through social standards and the compliance with certification schemes. This is observed in a typical statement from the Agency for Renewable Resources: "o*n the basis of the EU-approved certification systems, the relevant certification bodies follow and control the entire production, processing and supply chain of energy crops, raw materials and biofuels in a complex process, ensuring that all biofuels meet the applicable sustainability criteria*" (FNR 2014, p. 15, own translation). In the agricultural sector, and in relation national to sustainability strategies, it is possible to identify other social aspects. These are, for example, employment, income generation, working conditions, prosperity, social cohesion, equality, quality of life, social responsibility, and support towards small and medium enterprises. However, in the context of agriculture, sustainability is mostly only communicated as a synonym for environmentally sound practices.

Food security issues, human and labour rights, social inclusion and land tenure are other social factors often mentioned in the discourses related to the production of biofuel feedstock in developing countries. Sustainable agriculture is defended by the National Policy Strategy on Bioeconomy. Renewable resources such as modern biomass are supported as a policy strategy by the Ministry for Food and Agriculture. In the scope of a 'bioeconomy', employment, income generation, social responsibility, social inclusion, social cohesion as well as attention to human rights (right to food and water) and the inclusion of local population are some of the social aspects necessary for a sustainable bioeconomy (BML 2014).

Private sector stakeholders related to agriculture or specifically to biofuel production centre their discourses on income. These often refer to direct payments to farmers as important for providing income equality, growth, and security. This is normally indicated

as better and more equitable income result in better social outcomes for farmers and therefore also a better quality of life. Specifically to biofuels, the private sector refers to social standards as a validation for social sustainability. A common statement is observed from the German Biofuels Industry Association: "*Throughout the production chain, labour and social minimum standards must be respected. The sustainability directive covers directly issues of ecological and economic sustainability. Social sustainability is also ensured through the most important certification systems, which are often based on social standards that have been defined by the UN"* (VDB 2018). The validation of social aspects of sustainability is also related to the social standards of the ILO conventions. In this sense, the Federal Association of the German Bioethanol Industry affirms that it must be ensured "*that the country has ratified all of the following conventions of the International Labor Organization (ILO) and its implementation*" (BDBe 2017, own translation). The private sector has concerns regarding the production of feedstock known as `social dumping` in developing countries.. 'Social dumping' is defined as a "*process whereby a country with poor labour standards and low manufacturing costs is able to export goods at lower prices than its international rivals, to the social and economic disadvantage of competing countries with higher employment standards and costs*" (Oxford Dictionary 2018) Accordingly, the private sector advocates for "no dumping practices", demanding for social responsibility through social standards. This may be observed by the statement from the German Union for the Promotion of Oil and Protein Plants: "*In the southern hemisphere, above all, the enforcement of social standards and the question of land acquisition and ownership are the decisive prerequisites for sustainable biomass production*" (UFOP 2017).

German NGOs are very critical towards biofuels, focusing onnegative impacts of biofuel production in developing countries. Human and labour rights are the most discussed aspect, together with food security. Further aspects are highlighted such as land rights, incentives for smallholders and considerations about minority groups like local communities and indigenous people. The NGO Friends of the Earth Germany reproduces a common declaration in this regard: "[There must be] *evidence of compliance with minimum criteria of cultivation methods, the protection of human rights, the protection of indigenous peoples and the ILO Convention*" (BUND 2010, p. 11, own translation). The impacts to local communities and indigenous people are also reported by NGOs. This also in regard to the disregard for the damage to health from pesticides use related to large-scale monoculture. A typical statement is provided by the Heinrich-Böll

Foundation: "*It is very difficult for those affected to prove that* [diseases such as cancer or breathing difficulties] *is related to the intensive expansion of industrialized agriculture and the use of pesticides*" (Heinrich-Böll-Stiftung 2017, own translation).

Nevertheless, when addressing national circumstances, NGOs such as the Friends of the Earth Germany focus on social acceptability, social justice and income equity. In relation to renewable energy sources produced in the country, the social focus is centred on climate change mitigation, social acceptance and social justice i.e. affordable energy for all (BUND 2017).

1.1.2 Sustainable Development Goals

Stakeholder's discourses towards social sustainability in the context of biofuels in Germany cover several targets from the SDGs (Table 6). A total of 9 from the 17 SDGs are mentioned by the stakeholders. Topics that are lacking in attention by the political discourses on biofuels in Germany but are important for the social dimension are marked with an asterisk (*) in Table 5. In this case, several social elements are named for the social dimension of sustainability related to the production of biofuels outside the country. However, when considering the national context, the political discourse generally only considers the environmental aspect of sustainability. Accordingly, this represents the main gap in the political discourses on biofuels in Germany.

Table 6 - Sustainable Development Goals related to discourses on social sustainability in agriculture in the context of biofuels in Germany

SDG	SDG Description	Target	Social Sustainability from stakeholders discourses
	Goal 1. End poverty in all its forms everywhere	1.1 1.a	- Income opportunity to fight poverty
	Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	2.1 2.1	- Food Security - Land tenure - Inclusion of smallholders and local communities - Indigenous peoples' rights - Incentives for young farmers - Lack of social dimension of sustainability at the national level (*)

	Goal 3. Ensure healthy lives and promote well-being for all at all ages	3.8 3.9	- - - -	Healthcare Wellbeing Quality of life Health benefits from GHG emissions reduction regarding air quality
	Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	4.4 4.6 4.7	- - -	Education Access to information Training
	Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all	7.2 7.a	-	Renewable energy: Natural resource conservation and reduction GHG emissions for climate change mitigation
	Goal 13. Take urgent action to combat climate change and its impacts	13.2 13.3	-	Renewable energy: Natural resource conservation and reduction GHG emissions for climate change mitigation
	Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	8.1 8.3 8.5 8.7 8.8 8.10	- - - - - - - -	Employment Labour rights Human rights* Working conditions Health and safety of workers Higher incomes Income opportunities Prosperity Incentives for small and medium enterprises Incentives for young farmers
	Goal 10. Reduce inequality within and among countries	10.4	- -	Income equality Social inclusion
	Goal 12. Ensure sustainable consumption and production patterns	12.6 12.a	-	Social responsibility, social standards, certification

Note: *Here allocated on Goal 8 as it features in the discourses in the context of human and labour rights. It must be considered that the Agenda 2030 and therefore all the SDGs are based on the Universal Declaration of Human Rights (UN 2015).

4.2.1 The Gaps in the Political Discourse

The gap in the political discourses on biofuels in Germany refers to the lack of the social dimension of sustainability when considering the national context (Figure 7). The

political discourses on biofuels in Germany cover several social aspects but usually in relation to developing countries. Within the national context, sustainability is communicated as environmentally friendly practices. It is required that work standards from the ILO convention are followed, as well as criteria from certifications schemes.

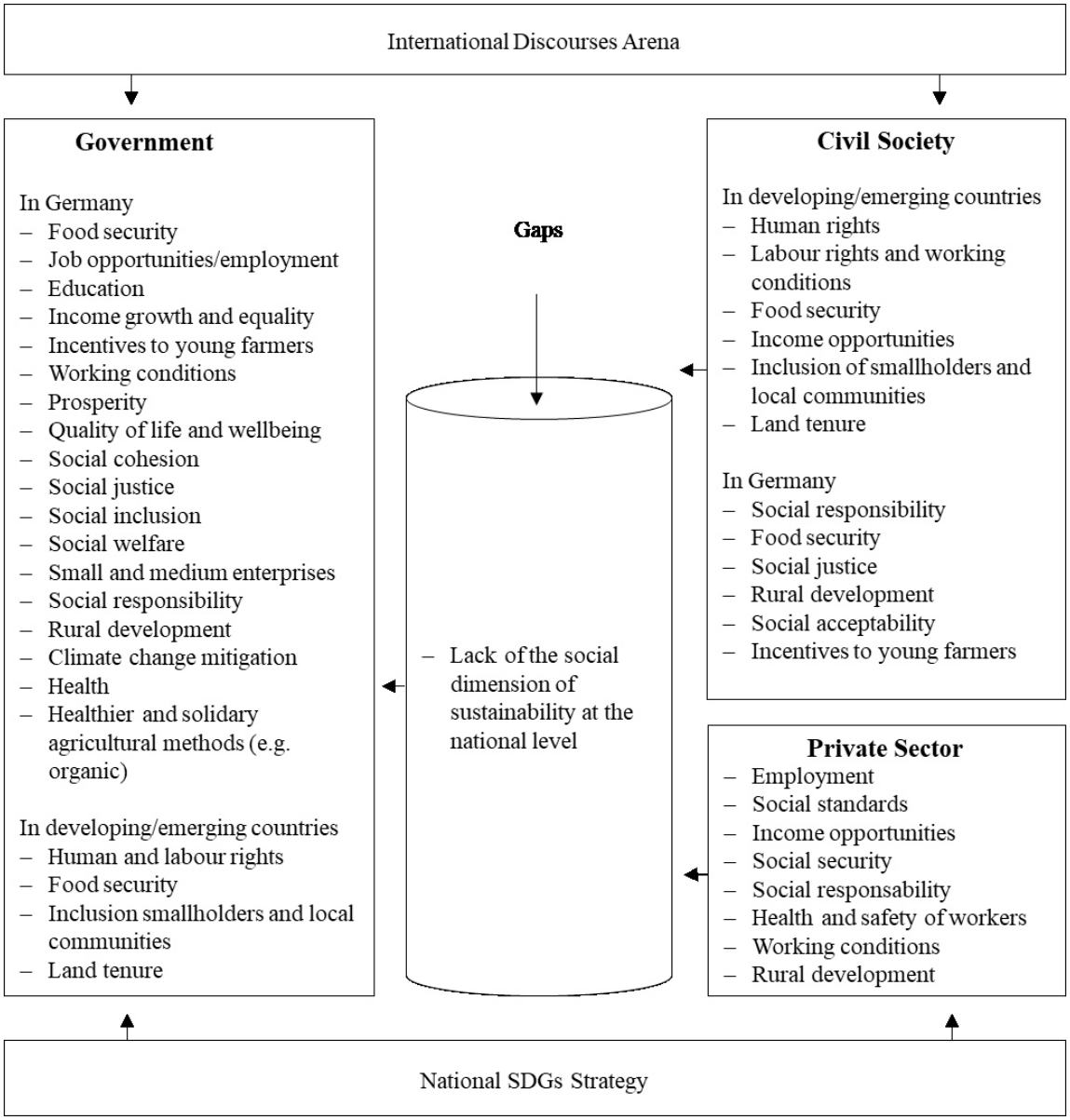


Figure 7 - The gaps in the political discourses on biofuels in Germany

4.3 Biofuels and Social Sustainability Discourses in the International Arena

There is a clear influence of international stakeholder's discourses on the national discourses from Brazil and Germany. The discourses from the international arena sometimes overlap the discourses on biofuel in national contexts. The stakeholders from

the international arena may be categorized in four main groups: (i) United Nations, (ii) European Commission, (iii) intergovernmental organizations and multi-dialogue platform related to renewable energy, and (iv) international NGOs.

The United Nations refers to the potential role of renewable energy in fighting poverty. This was discussed at the WSSD in 2002 and later, the food security threats related to biofuels were highlighted when discussing the MDGs. (WSSD; 2002; UN 2008). The discourses from the UN are mentioned in the development of national policies. This occurs in the development of the RenovaBio policy in Brazil, for example. It makes reference to the definition of sustainable development according to the WCED 1987 and the role of energy in poverty alleviation according to the WSSD. UN institutions and frameworks such as the ILO and the SDGs are also used by national political discourses in Germany and Brazil to validate social aspects or sustainability. The ILO is used as a reference for the RED and therefore also in Germany to corroborate compliance with human and labour rights. The SDGs are used in political programs in Brazil aiming to address gender equality in rural areas, for example. Accordingly, it is observed that UN discourses strongly influence national political discourses and are used as a reference to validate arguments and practices.

Some examples of intergovernmental organisations and multi-dialogue platforms include the IEA, the International Renewable Energy Agency (IRENA) and the Biofuture Platform.. Those are initiatives intending to promote exchanges and support for bioenergy deployment. This stakeholder group has a tendency to focus on the social dimension of the positive aspects of bioenergy and on fighting climate change, as observed in the purpose from the multi-dialogue Biofuture platform: "*help in the global fight against climate change, nurturing solutions in low carbon transport and the bioeconomy that can aid countries to reach their Nationally Determined Contribution targets (NDCs), as well as to contribute towards the Sustainable Development Goals*" (BioFuture Platform 2016). This group is strongly related to the private sector and therefore jobs creation, promoting of rural and social development, as well as improvement in livelihoods and quality of life are common elements in the discourses. Subjects such as food security and land tenure are also often considered a matter of importance.

In contrast, international NGOs focus its discourses on human rights, negative impacts on local communities and indigenous people, as well as food security issues. This group is usually very critical towards biofuels sustainability and also on the criteria adopted by

the EU RED towards social impacts in developing countries. This is observed by a common statement from a joint publication from several NGOs including BirdLife Europe, Friends of the Earth Europe, Oxfam International and European Federation for Transport and Environment (T&E): "[The RED sustainability criteria] *is inadequate to ensure social sustainability as it ignores what actually happens at the level of the plantation. (...) Another weakness in the definition of social criteria is that it does not take into account the land grabbing happening in many countries in the southern hemisphere, which has an impact on the development and livelihoods of numerous communities*." (BirdLife et al. 2009, p. 24). Nevertheless, several from the same NGOs also support the development of a bioeconomy at the European level. This includes the BirdLife Europe and the T&E Biofuels, which support a 'bioeconomy' comprehended by "*the production of renewable biological resources and the conversion of these resources, residues, by-products and side streams into value added products, such as food, feed, bio-based products, services and bioenergy*" (Bioeconomy 2017, p. 2).

5 Discussion

5.1 Gaps in the Political Discourses on Biofuels in Brazil

The results indicate that when considering social sustainability in agriculture for the production of biofuels in Brazil, several topics need to be addressed. These are, for example, the inclusion of smallholders and family farms in the national market, income opportunity, the creation of jobs, labour rights and working conditions, health and safety, education, gender equality, food security, land tenure, social participation and the rights and respect towards indigenous people, and other traditional communities. Very similar social issues were also identified by (Pashaei et al. 2018) in their study on the social sustainability of the sugarcane biojet fuel supply chain. Several of these elements are highlighted by the literature as being constituents of the social dimension of sustainability related to biofuels and bioenergy systems (Fritsche et al. 2005; Roman et al. 2010; Ajanovic 2011; Kaphengst et al. 2012; Fritsche 2012; Labruto 2014; Romijn et al. 2014; Müller et al. 2015; Acheampong et al. 2017; Oliveira et al. 2017). In relation to the SDGs, the discourses address targets from 11 of 17 SDGs (Table 2). This means that if those aspects were really implemented in practice, there would be reasonable advancements towards the social sustainability of agricultural-derived biofuels in the country.

In Brazil, the inclusion of family farms is the flagship feature of the political discourses on biofuels. They are used to validate social inclusion and therefore social sustainability. Sparovek et al. (2016) affirm that small-scale family-based agriculture is of high priority for the parliament and the civil society as a whole. This is also because the majority of food producers have small areas and low income. Considerations such as production efficiency, food security and quality, social and economic security as well as the mitigation of migration from rural to urban areas are of much concern towards small-scale family farms (Sparovek et al. 2016). Of course, their relevance in the political discourses does not mean that family farms are considered as a priority in practice. For instance, the incentives provided by the PNPB to include smallholders and family farms in the biodiesel production chain clearly need improvements. This is particularly salient when considering small farmers in vulnerable conditions and located in poorer regions of the country (Padula et al. 2012; Wilkinson and Herrera 2010; Motta 2015). In the economical wealthier regions in the south and south-east of Brazil, the program has been more successful. Although this can be related to advantages provided by *collective action*

(Olson 1989) that increased bargaining power of social organizations such as cooperatives. The cooperatives enhanced farmers' ability to benefit from government programs like credit and support policies directed to family farming (Stattman and Mol 2014).

Even though the presence of social elements in the political discourses does not mean that they are successfully adopted in practice, the identification of such topics in the discourses points towards a positive development in regards to the social sustainability of biofuels in Brazil. The identified gaps are an expression of the topics lacking in support and that should be further improved in policies.

5.1.1 Education and Training

Education and training are rarely addressed by the political discourses besides being essentially important in Brazil. There are high rates of education inequality in the country's labour force (Souza et al. 2018). Herrera et al. (2017) draw attention to the fact that the majority of family farmers in Brazil have low levels of education, and that the majority has not even completed elementary school. Low schooling levels might prevent small-scale family farmers from accessing government programs and benefiting from policies. For example, rural credits providers such as the National Program to Strengthen Family Farming (Pronaf) are a possibility of social transformation in rural areas. The program is focused on strengthening family agriculture by providing financial credits to individuals or collective projects with low-interest rates (Henig and Santos 2016). Low educational levels or lack of technical knowledge might prevent the access to such to such financial assistance. The reasons for this are the relatively complex bureaucratic procedures and formal documentation that is required to have access to the program. (Copetti 2008; Rocha Junior et al. 2017).

Labour force training is also a social element indicated by the discourse of the private sector. However, the rural youth was not the priority of public policies up to the 2000s (Redin 2017). Besides some improvements over the last years, the members of family farms able to benefit from education policy and access higher educational levels are still those coming from families with a relatively good economic structure (Redin 2017). Education is a basic human right (UDHR 2017) and an important element for a socially sustainable agriculture (Bicalho et al. 2002; Gomes 2005; Shreck et al. 2006). Education, training and capacity building are important elements of the social dimension of

sustainability when supporting bioenergy (OECD/IEA and FAO 2017). It is a crucial factor in a context where about 20% of the population aged 25 or over only have up to 3 years of school as in Brazil (IBGE 2015). This also highlights the role of rural extension policies and the importance of technical assistance in facilitating the access to public national policies but also in contributing to improvements in agricultural productivity (Freitas et al. 2016).

The Brazilian strategy for Agenda 2030 indicates engagement in supporting programs directed at elementary, secondary and higher education, as well as the planned expansion of vocational and technological programs. These strategies are presented only in general terms without specific support to rural areas (Estrategia ODS 2018). Furthermore, the HDI is commonly used as a synonym for social development in the discourses from the private sector. The HDI is an indicator related to education, life expectancy and gross national income. This further endorses the importance in addressing this political gap once the HDI is, in fact, an indicator directly related to educational level. The HDI index is used by Machado et al. (2015) to assess socio-economic impacts of sugarcane production in Brazil. It is worth mentioning that if considering the Inequality-adjusted HDI (IHDI), there is a worsening in the indicator level for Brazil. The lowered performance when considering this indicator is because IHDI also considers the distribution of income in the measurement (UNDP 2016). This reveals the pervasive and deep-rooted problem of social inequality related to income distribution in the country (Azzoni 2001; Brito et al. 2017). Accordingly, using the HDI to validate social development not only relates to filling the gap connected to the SDG 4 –*education* but also to the SDG 10 -*reduce income inequalities*.

5.1.2 Vulnerable Groups and Traditional Knowledge

Although political discourse consider human and labour rights as social aspects, it is lacking when considering vulnerable groups such as indigenous people and traditional communities. Biofuels are based on large-scale agricultural systems in Brazil (Lapola et al. 2013; Cremonez et al. 2015; Selfa et al. 2015) and there is a direct relationship between the expansion of agriculture and the impacts on traditional peoples and communities. It is particularly connected to conflicts over land and impacts on the environment and human health from the use of pesticides (Camacho et al. 2011; Montenegro 2012; Rigotto 2012).

Brazil is a very large country with different biomes and agricultural cultures (Herrera et al. 2017). For this reason, it is difficult to generalize the impacts towards traditional peoples and communities by agricultural practices. It will depend on the region, biome and biofuel feedstock. In this sense, it is very important to consider the local setting for biofuel sustainability (Efroymson et al. 2013; Dale et al. 2013; Duarte et al. 2013; Kline et al. 2017). Nonetheless, the attention towards indigenous people and traditional communities is directly demanded by the ILO Convention n° 169 that Brazil ratified in 2002. It affirms in its Article II that governments shall have the responsibility to protect the rights of indigenous and tribal peoples and to guarantee respect for their integrity (ILO 1989).

Giving voice to civil society organizations such as NGOs and social movements seems particularly important, facing the lack of consideration towards such vulnerable groups in the political discourses. Also because there is a great diversity and differences between traditional peoples and communities throughout Brazil and therefore a great difficulty in addressing such diversity by public policies. This is related to historical processes of miscegenation and cultural syncretism, which have created several ethnic and racial categories. These ethnogenesis processes are related for example to the emergence of *caboclos*, and the *quilombolas*. According to Little (2004), the political-historical invisibility of such groups is associated to their economic marginality and their location in remote areas distant from economic centres (cf. Little 2004, p. 256).

For the national SDGs monitoring, the disaggregation of indicators by vulnerable groups, such as indigenous people, *quilombolas* and other traditional populations was recommended as absolutely fundamental and related to the target 2.1 (PNUD 2015). However, the indicator developed ended up being only related to food security from private permanent domiciles (IBGE 2018).

5.1.3 Land Reform and Regularization

Territorial struggles of traditional peoples and communities were also fundamentally transformed by joint action with social movements and NGOs. This increased their visibility and bargaining power (Little 2004). In this respect, respecting the rights and concerns of vulnerable groups includes the access to natural resources and therefore to land. This is directly related to the target 1.4 of the SDG that is to "*ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic*

resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources"(UN 2015, p. 15). Land regularization is present in the political discourses related to family farm inclusion (Sead 2017a). However, the gap is addressed by the discourses of the social movements, who do not only aim at land regularization, but also at the redistribution of land. This involves a historical discussion and many attempts to solve the problem of land concentration in Brazil, considered as one of the causes of social inequalities in rural areas (Gehlen 2004; Carter 2010). Land reform might be a tool to fight poverty, promote social inclusion and could contribute to improvements for food security (Herring 2000; Deere 2007; Fitz 2018; Wittman and Blesh 2017). This relates to the biofuel sector when considering that social gains could be hindered because of the concentration of land ownership and therefore also economic wealth (Cremonez et al. 2015).

The Brazilian SDGs strategy indicates land regularization as a strategic measure for rural and sustainable development. It promises to deliver 250,000 land titles in 2018 in the scope of the National Agrarian Reform Program (Brazil 2017a). However, the national indicators for this target (1.4) have no data available for its measurements (IBGE 2018). This emphasizes the crucial role of government policies with necessary joint actions to avoid retreats in reform, regularization and social conflicts over land caused by the expansion of biofuel production (Castellanelli and Cunha 2015). Accordingly, this gap is immediately connected to SDG 1 and 2.

5.1.4 Social Participation

Joint actions or social participation are also referred to as a significant topic of the civil society group that is lacking in the political discourses. Social participation means the inclusion of several social groups in decision-making processes (Murphy 2012). One could argue that this relies merely on the institutional level of sustainability and addresses democratic processes (Omann and Spangenberg 2002). However, the settings at the institutional level are those that enable the development of social sustainability and therefore are equally important (Omann and Spangenberg 2002). Democratic governments, civil society participation and fairly shared benefits and losses in policy-making are important elements of social sustainability (Giddings et al. 2002; Dillard et al. 2009).

A participatory approach for policy-making has been more investigated in the public health sector, where intersectoral strategies are accompanied by social participation which often results in positive outcomes (Dubois et al. 2015; Lencucha et al. 2017; Fiorati et al. 2017; Rantala et al. 2014). Hence, social participation could be also here related as "*a political problem relating to power relations and (im)balances within a given context"*(Lacroix et al. 2011, p. 159). In this regard, there are power asymmetries identified by the political discourses on biofuels in Brazil. This is also related to what Sparovek et al. (2016) call a "*weakened and fragmented civil society and an organized, powerful and resourceful agricultural sector"*(Sparovek et al. 2016, p. 216). These power asymmetries may hinder potential participatory processes in biofuel policy, as a powerful agricultural sector led by corporations has a strong influence on political decisions (Lehtonen 2011). It is considered that more gaps were found in the political discourses on biofuels related to the civil society than by the private sector. This is an indication that the political discourses on biofuels are more aligned to the interests of biofuel producers that to the interests of civil society.

The development of the RenovaBio policy aimed at reaching participatory processes and represented a step forward as it combined the contributions of several actors (Novato and Lacerda 2017). It foresees decarbonisation certificates and the continued inclusion of smallholders and family farms within the scope of the PNPB (BRAZIL 2017). In spite of that, the additional '*financial*' pillar to sustainability as the ability to provide (financial) returns for stability and expansion (EPE 2017) indicates clear concerns of the policy-making in securing private investments through the biofuel sector. Hence, a national biofuel policy will only be effective if it addresses power asymmetries and approaches sustainability in its environmental, social and economic dimensions. This study is, therefore, a step forward in direction of the recognition of missing points to be addressed in policies. Social participation is also relevant for the SDG target 16.7 – *to ensure responsive, inclusive, participatory and representative decision-making at all levels*. However, there is no indication of a national strategy in this concern or any indicator developed for this specific target (IBGE 2018).

Altogether, the gaps identified in the political discourses on biofuels in Brazil might have more to do with historical dilemmas of the agrarian sector than with biofuels themselves. Nevertheless, without political engagement towards these issues, very limited changes will occur towards the accomplishment of the SDGs.

5.2 Gaps in the Political Discourses on Biofuels in Germany

The results indicate that when considering sustainability in agriculture for the production of biofuels, mainly ecological aspects are considered in Germany. Social sustainability is basically only related to the prevention of social impacts in developing countries. Biofuel sustainability in the political discourses is connected to the commitment to protecting natural resources and to the reduction of GHG emissions. There is a clear tendency to focus on advanced biofuels such as lignocellulosic and synthetic fuels (FNR 2016). This might also distance the biofuel discourse from the agricultural sector. However, the current market for biofuels in Germany is still closely related to agricultural practices (FNR 2017; Daniel-Gromke et al. 2018). Moreover, future scenarios indicate the production of advanced biofuel still relying on agricultural biomass (Millinger et al. 2017; Millinger and Thrän 2018).

The social sustainability of biofuels in the political discourse is commonly approached as being the conformity with 'social standards'. This relates to social standards employing global frameworks such as the ILO. This tendency is confirmed by Boström (2012) as being the result of the difficulty in realizing and operationalizing social sustainability in policies. Elements such as job opportunities and income generation are sometimes present in the discourses. This is supported by Kaphengst et al. (2012) who remarks that social impacts of biofuel in Europe are mostly perceived as positive impacts regarding jobs creation and diversification of income for farmers, while the negative impacts are usually related to the environmental problems associated with land use intensification. The discourses on sustainable agriculture focus on environmentally friendly practices. This also occurs in the national sustainability strategy. The SDG 2 encourages sustainable agriculture as the promotion of ecologically sound practices (Bundesregierung 2016). Accordingly, national indicators for this SDG are related to environmentally sound production practices such as nitrogen surplus and organic farming (Statistisches Bundesamt 2016).

When not related to biofuels, Germany's government discourse provides a very wide vocabulary for social aspects of sustainability. Those are even more extensive than from the civil society or private sector groups. It ranges from social cohesion and quality of life up to cultural values. Nevertheless, the use of such terms indicates only a vague meaning for practice. For instance, social cohesion (*gesellschaftlichen Zusammenhalt*) is referred to as an important factor for prosperity and quality of life (Bundesregierung

2018). In fact, there are several definitions of social cohesion depending on the underlying assumptions (Bruhn 2009). Hence, it is very difficult to grasp political goals behind such broad concepts.

In the context of biofuels, political discourses also use concepts such as social responsibility and social justice. Those are often related to the debate about food security. This is an indicative outcome from the food vs. fuels biofuels debate and related to the impacts of biofuel feedstock production in developing countries (Kaphengst et al. 2012; Fritsche 2012). There are several potential social impacts closely related to the context of developing countries (Huang et al. 2012; Koizumi 2015; Sacchelli 2016). Hence, "social responsibility" or "social justice" concerns in biofuels political discourses in Germany are related to what Horst and Vermeylen (2011) categorize as *different spatial scales of cause and effect* (Horst and Vermeylen 2011, p. 2437). This means that once the demand for biomass feedstock for biofuel production is encouraged through political incentives in the country of consumption, for instance, Germany, the social effects are felt in the place of production. That means that the negative externalities on the social dimension might be actually outsourced to another country.

The concerns about a social responsibility for impacts occurring in other country are related to the SDG 12 (*Responsible consumption and production*). In this sense, one of the indicators to approach this topic is the increase of goods certified by independent labelling schemes. Besides, there are actions planned outside Germany through international cooperation. A continuous promotion of sustainable supply chains is expected and this includes the pursuing of biofuels sustainability criteria (Bundesregierung 2016). In practice, this would mean social sustainability of biofuels in accordance with 'social standards', such as the ratification of ILO conventions and social criteria of approved certification schemes (cf., Biokraft-NachV; 2009/28/EC). If the compliance with social standards validates social sustainability of biofuels is not within the scope of this research. But reducing the social dimension of sustainability to the conformity of 'social minimum requirements' and therefore basically the conformity with "human rights" is per se already a gap. Hence, it is a place for policy improvement.

5.2.1 Lack of Social Dimension

If social sustainability equals the conformity with ILO labour standards and social criteria of certification schemes, it seems logical that so few of the social dimensions are present

in the political discourses on biofuels in Germany. International labour standards formulated by the ILO set basic principles in the form of conventions that are legally binding international treaties (ILO 2018a). The fundamental conventions cover the following principles and rights: (i) the elimination of forced and compulsory labour, (ii) the abolition of child work, (iii) the elimination of discrimination of employment and occupation, (iv) freedom of association and the right to collectively bargaining, (v) equal remuneration, and (vi) a minimum wage (ILO 2018b). Germany has ratified all these conventions and according to the Global Rights Index, is one the world's best countries for workers, having no regular violations of rights based on indicators derived from ILO Conventions (ILO 2018b; ITUC 2017).

However, in a context where an issue is already practised, the indicator related to this issue turns out to be irrelevant (Myllyviita et al. 2013). That means that considering ILO standards already practised in Germany becomes an irrelevant indicator for social sustainability in the national context. Then, it only misses the assurance that such criteria are followed by other countries, meaning that social impacts are prevented in the biofuel feedstock production in other countries. Here comes the role of certification. Voluntary certification schemes might be a convenient tool for monitoring social sustainability. This is because demands for social criteria by consumer countries might contravene WTO trade rules (Franco et al. 2010; Levidow 2013). In this respect, “social standards” conferred to biofuels sustainability will depend on the main social issues covered by the certification body (de Man and German 2017). However, the social criteria vary greatly among the certification schemes approved by the EU and therefore also by Germany (German and Schoneveld 2012). Hence, important social factors for biofuel sustainability such as land use and food security might be overlooked by some certification body with low standards (De Man and German 2017).

Of course one could say that Germany’s biofuel policy is observing of social sustainability as there are implicit social benefits from GHG emissions reduction. Those are, for example, related to climate change mitigation and health benefits from improvements in air quality (Tseng and Hung 2014; Mayrhofer and Gupta 2016; Levy et al. 2018). In the same way, the consideration of ILUC factors (land expansion for energy cropping in previously non-cropland) contemplated by the last amendment to the European RED (2015/1513/EU) could be related to the reduction of social impacts in developing countries. ILUC factors might be indirectly associated with changes in land used for food production, displacement of communities or reduced water supply

(Kaphengst et al. 2012). However, the best modelling choices for ILUC, that is accounted in terms of emissions, are still in discussion (Saez de Bikuña et al. 2018). There are high uncertainties related to different components that determine ILUC effects and its variance according to biofuel pathways (Woltjer et al. 2017). Altogether, there is not one line dividing social and environmental sustainability. Instead, there are direct and indirect interlinkages and interactions between the three dimensions of the system that should be considered (Fischer et al. 2015). Nonetheless, we should better understand the social pillar of a sustainable agriculture also in order to consider improvements for the whole system. There is a need to account for more than just GHG emissions reduction in biofuel policy (Millinger et al. 2018).

Narrowing social sustainability to "minimum social standards" overlook important factors of the social dimension as for example social participation, interaction and collaboration. Those are elements that could help to solve environmental problems and contribute to sustainable development. The role of collaboration for social sustainability is highlighted by Källström and Ljung (2005) referring to the importance of including farmers into decision-making arenas. Likewise, farmer's collaboration and participation are demonstrated as a strategy to minimize environmental problems (Taylor and Van Grieken 2015; de Krom 2017; Baur et al. 2016).

Participation should be reasoned in local, national and international contexts. This also because the definition of sustainability varies greatly according to the considered stakeholders (Fritsche and Iriarte 2014). Biofuels have a transnational aspect, often involving different producing and consuming countries (Ponte and Daugbjerg 2015; Selbmann and Ide 2015). To address this issue, international multistakeholder initiatives such as so-called 'roundtables' included participatory processes in their agendas. The 'roundtables' raised as private multi-stakeholder mechanisms in order to permit participatory spaces for international governance (Schouten et al. 2012). For the certification of sustainable biofuels and biomaterials, such multi-stakeholders initiatives aimed to gather multiple interest actors in the development of sustainability standards (de Man and German 2017). Such initiatives might be a good non-hierarchical transnational governance mechanism (Bellantuono 2017). On the other side they also might give rise to less democratic systems better aligned to the concerns of the industry (Ponte 2014). Due to the great variance on social criteria between certification schemes (German and Schoneveld (2012), stakeholders from the biofuel sector also demanded an harmonization of standards between the certification bodies (Cortez et al. 2014). Finally, 'multi-

stakeholder' initiatives as 'roundtables' also tend to be weak in participatory processes related to *inclusiveness of actors and discourses* (Schouten et al. 2012, p. 42). In this sense, even the most meticulous standards for social criteria as the as the RSB will present its limitations (German and Schoneveld 2011; Dale et al. 2015).

5.3 Correlations between Brazil and Germany

The vagueness of concepts related to the social dimension of sustainability is observed in the political discourses of both countries. Rural development, social development, prosperity, quality of life etc. are used to refer to social aspects of sustainability. These concepts show the difficulty in approaching social sustainability in government policies. Rural development is occasionally employed in the context of poverty alleviation and improvements in infrastructure and services in rural areas. However, without specific targets being addressed, it is impossible to know what it is meant in terms of practical political goals. This is observed by Hunsberger et al. (2017) when analyzing bioenergy policies and the difficulty in assessing rural development as a coherent category due to widely differing interpretations.

Inclusion and equality are also constants in the discourses about the social dimension of both countries. These are partially covered with specific goals such as, for example, the social inclusion of small-scale family farms to the market, gender equality, income (in)equality addressed through financial transfers for family farms or direct payments favouring small and medium-sized enterprises. These discourses are directly related to the SDGs 1, 2, 5, 8, 10 (Table 2 and 4). Moreover, employment, job opportunity and income generation are used as social elements in the discourses of both countries and directly connected to several targets of the SDG 8. This indicates the importance of this goal for social sustainability in agriculture in the two contexts. Nevertheless, it also highlights the common tendency in measuring social sustainability in terms of economic output and the difficulty in approaching social sustainability separately from environmental and economic perspectives (Lele 1991; Parkin et al. 2003).

It is remarkable that both countries have a tendency in adopting certification for social sustainability validation. German et al. (2017) confirms that governments tend to externalize biofuels sustainability through market regulatory mechanisms. However, such market-oriented governance instruments should be considered as a policy tool among many (Dubois 2008). It should not be a substitute for public regulation (De Man and

German 2017). Certification is a monitoring tool at the top of a pyramid with several previously necessary governance elements for sustainable biofuel development, and would only work if several other elements are in place (cf., Dubois 2008). Furthermore, when encouraging certification to validate social sustainability, important elements of the social dimension such as the inclusion of small-scale family farm are hindered. Certification costs are a substantial barrier for small-scale family farms even if incentives for group certification are provided (German and Schoneveld 2011; Stattman and Mol 2014). This highlights the limitations of certification schemes to validate sustainability, and that they may only work together with a strong public governance system engaged in fulfilling certification deficiencies and not only committed with environmental concerns (De Man and German 2017).

Social participation is indicated as an important element for social sustainability and a gap to be filled in the political discourses for both countries. Social participation might be the right way towards the transition to a sustainable agriculture. In this sense, the role of organized civil society groups is a important key in this process. It gives voice to less 'powerful' actors as vulnerable groups and call for more inclusive policies. Without giving a voice to the actors of a system, it will be difficult to find and work on political gaps. Hence, without addressing power inequalities it will be impossible for biofuel policies to meet sustainability goals (German et al. 2017). Likewise, it will be difficult to make tangible improvements regarding the Agenda 2030. Increased multilateral and cross-sectoral collaboration is crucial for the development of a sustainable bioeconomy (GBS 2018). Through social participation and collaboration, common way might be found towards inclusive processes in bioenergy policy-making and development of a sustainable agriculture.

Finally, the results indicate that while there are common topics about the social dimension of sustainability identified in the stakeholder discourses, they are addressed differently by each country. This suggests that although the SDGs are important as a common narrative for sustainable development, their use as a framework for sustainability is limited, since improvements might only to be seen if addressed properly by the national strategy.

6 Summary

The main objective of this thesis was to improve the understanding of social sustainability in agriculture through the political discourse on biofuels. The hypothesis relied on the assumptions that i) there are gaps in the political discourse on biofuels related to social sustainability, and that ii) social sustainability might be perceived differently depending on the context. Because of this, Brazil and Germany were chosen to be compared.

The social dimension of sustainability is still the least understood dimension of sustainability, being underrepresented in both agriculture and biofuel sustainability studies. Biofuels were approached by this study as biomass-derived fuels with agricultural origin. Brazil and Germany have a history of biofuel production and policy aims to expand its deployment in more ‘sustainable ways’. The poor understanding about socially sustainable agriculture might lead to practical consequences, for instance inadequacies in policy-making, such as narrowing sustainability issues only to environmental aspects. In order to address this problem, this study sought to answer what different stakeholders have been communicating as 'socially sustainable' and if there are gaps in the political discourse on biofuels.

To answer these questions, a combined procedure of content and critical discourse analysis was conducted. The analyzed materials include official documents and websites from government, private and civil society stakeholders, focusing on the period of 2015 onwards. The gaps in the political discourses on biofuels were identified by comparing the topics covered in government discourses with the ones from the private sector and civil society in relation to the social dimension of sustainability.

The results indicate that there are common topics approached by the discourses on social sustainability in the two contexts analysed, and that differet gaps exist in the political discourses on biofuels in the two countries. In Brazil, there is a strong focus on the inclusion of family farms in the national market as a social aspect, as well as labour rights, jobs and income opportunities. Nevertheless, there is a gap in the discourse around topics such as education and training, traditional peoples and communities, land tenure and social participation. In Germany, sustainability is commonly understood as simply meaning environmentally friendly practices. Moreover, there is a strong tendency to reduce the social dimension of sustainability to work standards by the International Labour Organisation and according to certification schemes criteria. It was identified in

the two cases a vagueness in political goals regarding social sustainability and a tendency to legitimize social aspects through ‘minimum social standards’. Moreover, the SDGs were presented as an important framework for giving a common global narrative for sustainable development. However, as a normative framework for sustainability, it might only provide important information once applied to national strategies and indicators.

In conclusion, a common agreement on basic social criteria for biofuel sustainability already exists, such as working conditions, labor rights, employment, human health, food security and land tenure. Those topics are already supported by scientific knowledge and that should be observed at local levels. However, the gaps in the political discourses on biofuels are relate to the social dimension of the agricultural system as a whole and this may be improved by policies addressed to national level. In order to overcome these gaps, asymmetries in power relations need to be addressed. This means giving voice to ‘less powerful actors’ through social participation. It seems that the political discourses on biofuels might have been more aligned with the interests of the private sector than those of civil society. In this sense, it is important to giving dialogue opportunities to civil society organizations such as NGOs and social movements in order to fill these gaps. Social participation should be included as a crucial aspect of the social dimension of sustainability; not only to fill policy gaps, but also for improvements towards a sustainable agriculture through more holistic approaches in bioenergy policy-making. How participation and collaboration could help in this process would be an interesting question for future research.

7 References

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Appendix

Stakeholders Discourses Analyzed in Brazil

0	Brazilian Biofuel Policy - RenovaBio
Government	
1	MME – Ministerio Minas e Energia [Ministry of Mines and Energy]
2	CNPE – Conselho Nacional de Política Energética [National Energy Policy Council]
3	EPE – Empresa de Pesquisa Energetica [Electric Energy Research Company]
4	ANP – Agência Nacional do Petróleo, Gás Natural e Biocombustíveis [National Agency of Petroleum, Natural Gas and Biofuels]
5	BNDES – Banco Nacional de Desenvolvimento Econômico e Social [National Bank for Economic and Social Development]
6	MRE – Ministério das Relações Exteriores [Ministry of Foreign Affairs]
7	MAPA – Ministério da Agricultura, Pecuária e Abastecimento [Ministry of Agriculture, Livestock and Food Supply]
8	MMA – Ministerio do Meio Ambiente [Ministry of Agriculture, Livestock and Food Supply]
9	EMBRAPA – Empresa Brasileira de Pesquisa Agropecuária [Brazilian Agricultural Research Corporation]
10	SEAD – Secretaria Especial de Agricultura Familiar e do Desenvolvimento Agrário da Casa Civil da Presidência da República [Special Secretariat for Family Farming and Agrarian Development in the Executive Office]
Private Sector	
11	ABBM - Associação Brasileira de Biogás e Metano [Brazilian Association of Biogas and Methane]
12	ABIOVE - Associação Brasileira das Indústrias de Óleos Vegetais [Brazilian Association of Vegetable Oils Industries]
13	APROBIO - Associação dos Produtores de Biodiesel do Brasil [Biodiesel Producers Association]
14	UBRABIO - União Brasileira do Biodiesel e Bioquerosene [Brazilian Biodiesel and Biojetfuel Union]
15	UNICA - União da Indústria de Cana de Açúcar [Brazilian Sugarcane Industry Association]
16	FEPLANA - Federação Dos Plantadores de Cana do Brasil [Sugarcane Growers Federation of Brazil]
18	CEISE Br - Centro Nacional das Indústrias do Setor Sucroenergético e Biocombustíveis [National Center of Industries of Sugarcane and Biofuels Sector]

19	UDOP - União dos Produtores de Bioenergia [Union of Bioenergy Producers]
20	ORPLANA - Organização de Plantadores de Cana da Região Centro-Sul do Brasil [Organization of Cane Planters from the Central-South Region of Brazil]
Civil Society (Social Movements and NGOs)	
21	MST - Movimento dos Trabalhadores Rurais Sem Terra [Landless Workers' Movement]
22	Oxfam Brazil
23	Repórter Brasil
24	IOS - Instituto Observatório Social [Institute of Social Monitoring]
25	ISA - Instituto Socioambiental [Socio-Environmental Institute]
26	Greenpeace Brazil
27	WWF Brazil - World Wildlife Fund
28	CONTAG - Confederação Nacional dos Trabalhadores na Agricultura [National Confederation of Agricultural Workers]
29	ASA Brasil - Articulação no Semiárido Brasileiro [Articulation in the Brazilian Semi-Arid]
30	ASPTA - Agricultura Familiar e Agroecologia [Family Agriculture and Agroecology]
31	ABA - Associação Brasileira de Agroecologia [Brazilian Association of Agroecology]
32	ASBRAER - Associação Brasileira de Entidades Estaduais de Assistência Técnica e Extensão Rural [Brazilian Association of State Entities of Technical Support and Rural Extension]
	⬇ **International Stakeholders**

Stakeholders Discourses Analyzed in Germany

0	European Renewable Energy Directive (RED)
Government	
1	BMWi - Bundesministerium für Wirtschaft und Energie [Federal Ministry of Economic Affairs and Energy]
2	BMUB - Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit [Ministry of the Environment, Nature Conservation, Building and Nuclear Safety]
3	BMEL - Bundesministerium für Ernährung und Landwirtschaft [Ministry for Food and Agriculture]
4	BLE - Bundesministerium für Ernährung und Landwirtschaft [Federal Office of Agriculture and Food]

5	BReg - Deutsche Bundesregierung [Cabinet of Germany]
6	BMJV - Bundesministerium der Justiz und für Verbraucherschutz [Federal Ministry of Justice and Consumer Protection]
7	DBFZ - Deutsches Biomasseforschungszentrum [German Biomass Research Centre]
8	FNR - Fachagentur Nachwachsende Rohstoffe e.V. [Agency for Renewable Resources]
Private Sector	
9	VDB - Verband der Deutschen Biokraftstoffindustrie e.V. [German Biofuels Industry Association]
10	UFOP - Union zur Förderung von Oel- und Proteinpflanzen e.V. [Union for the Promotion of Oil and Protein Plants]
11	DBV - Deutscher Bauernverband e.V. [German Farmers' Union]
12	BDP - Bundesverband Deutscher Pflanzenzüchter e. V. [German Association of Plant Breeders]
13	OVID - Verband der ölsaatenverarbeitenden Industrie in Deutschland e.V. [Association of the Oilseed Processing Industry in Germany]
14	BDBe - Bundesverband der Deutschen Bioethanolwirtschaft e. V. [Federal Association of the German Bioethanol Industry]
15	BBE - Bundesverband Bioenergie e.V. German BioEnergy Association [ ]
16	BVA - Bundesverband der Agrargewerblichen Wirtschaft e. V [German Association of the Agricultural Business]
17	VLK - Verband der Landwirtschaftskammern [German association of the chambers of agriculture]
18	FML - Forum Moderne Landwirtschaft e.V. [Forum Modern Agriculture]
19	VLI - Verbindungsstelle Landwirtschaft-Industrie e. V. [Agricultural Industry Association]
Civil Society (NGOs)	
20	DLG - Deutsche Landwirtschafts-Gesellschaft [German Agricultural Society]
21	Germanwatch e.V.
22	NABU - Naturschutzbund Deutschland e. V. [Nature and Biodiversity Conservation Union]
23	BUND - Bund für Umwelt und Naturschutz Deutschland [Friends of the Earth Germany]
24	DUH - Deutsche Umwelthilfe e.V. [Environmental Action Germany]
25	Greenpeace Germany
26	WWF Deutschland - World Wildlife Fund
27	BfdW - Brot für die Welt
28	Heinrich Böll Stiftung [Heinrich Böll Foundation]

29	AbL - Arbeitsgemeinschaft bäuerliche Landwirtschaft e. V. [Association for Peasant Farming]
	⬇ **International Stakeholders**

Stakeholders Discourses Analyzed in the International Arena

	International Stakeholders
0	United Nations
1	Biofuture Platform
2	Ethical Sugar
3	Transport & Environment (T&E)
4	ETIP Bioenergy - European Technology and Innovation Platform Bioenergy
5	La Via Campesina
6	International Energy Agency (IEA)
7	International Renewable Energy Agency (IRENA)
8	Global Bioenergy Partnership – (GBEP)
9	Sustainable Energy for All SE4All -multi-stakeholder coalition, co-chaired by the UN Food and Agricultural Organization (FAO) and the Roundtable on Sustainable Biomaterials (RSB)
10	below50 - from SE4All and WBCSD created
11	World Business Council for Sustainable Development (WBCSD)
12	Roundtable on Sustainable Biofuels (RSB)
13	World Trade Organization (WTO)
14	ActionAid
15	World Bank

Declaration

I hereby declare that the present thesis has not been submitted as a part of any other examination procedure and has been independently written. All passages, including those from the internet, which were used directly or in modified form, especially those sources using text, graphs, charts or pictures, are indicated as such. I realize that an infringement of these principles which would amount to either an attempt of deception or deceit will lead to the institution of proceedings against myself.

Date: 01.07.2018 Signature: