Beyond Soyisation – Donau Soja as Assemblage

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Abstract

Soybeans embody the contradictions of progress in the Western imagination. They proliferated as a utopian promise (cheap vegetal protein for all) only to develop over a short two decades into a symbol of failure (GMOs). Most recently, as a response to the multiple crises of boundless capitalist accumulation and environmental degradation, concerted efforts were variously mobilized in Europe to re-think and re-make the ways in which soy is used along the food value chain. The Donau Soja project emerged as a hybrid, multi-level, transnational programme to assist and intervene in the transformation towards green and just soy supplies in Europe. This chapter gives an overview over this young project and takes the challenge of rendering the complexity of tasks it is confronted with, given the multiple contestations around global soy. It particularly emphasizes the processes involved in reassembling the materialities of soy as these emerge from dynamics of de- and reterritorialization that

work both for the re-localization of this agricultural crop as much as they do for decentring its significance in the global value chain.

Introduction

The assemblage approach allows us to adopt an oblique angle on a food standard introduced by *Donau Soja* (DS), an organisation concerned with the quality and origins of soybeans in Europe with the intention of redirecting the pathway of soybeans and related practices into specific sustainable avenues [Note 1]. It is, however, an oblique perspective, because in this chapter we do not approach the new standard and label as an end product or as a technology of regulation but rather as a process with a history and which has developed in distinctive socio-material contexts. DS is a multi-stakeholder initiative which operates on multiple levels and from many centres. While it is focused around the creation of a new standard for soy grown in Europe, this instrument stands for a whole agenda concerned with scientific research, seed breeding, farming and retail practices. So, this new standard emerges at the conjunction of a variety of actors, places, policies, and events, in ways which continually add to and multiply the scope of the initiative. In this sense, the aim of this chapter is to foreground DS as a unique assemblage of policies, partnerships, and regulations in Europe that emerge around a single crop, and which is, by its constitution and creation *performative*: it bears the promise of sparking change in the European food regime and new forms of agri-environmental governance in Europe.

This chapter is based on an ongoing research exploring the DS transnational network in several of its locations across Europe. Applying a multi-sited ethnographic method, this research "follows the thing" (Marcus 1995) - European-grown soybeans - through this particular initiative in order to understand the specific logics of governance it relies on and the assemblage-building work that is taking place in the making of DS. The data on which this chapter is based comes from twenty interviews with actors

in the DS network in Austria, Romania and Switzerland, document analysis, as well as participant observation at several conferences and events organised by DS.

We contend that DS particularly lends itself to be approached from an assemblage perspective in at least three ways. Firstly, DS, as an initiative, is very heterogeneous and thus incorporates a series of relations that have an emergent character and which acquire different qualities as a consequence of being enrolled in the initiative. Secondly, soybeans, as valued agricultural crop, circulate as a series of relations that make a difference to the development and outcomes of projects. As the assemblage perspective encourages including human and non-human actors in a more horizontally flattened ontology, we stress that the materialities of soy are multiple and closely bound not only to soy's notoriety but also to its ambiguity resulting from its ubiquity in different regimes of value and its role in the mobilisation of practices. And thirdly, we believe assemblage, as an approach and a method, supports non-linear ways of thought and perception, and in this way, it resonates with complexity theory and its emphasis on open systems, process, and states far from equilibrium. In the particular case study we depict in this chapter, we emphasise certain temporal configurations around the history of soybeans in order to give a sense of the sheer difficulty involved in reterritorialising soybeans. In other words, the nature of assembled and dis-assembled soy relations over spacetimes is intimately tied to multiple temporal trajectories that contribute to its incorporation into the global food regime. In this way, we align ourselves with Pálsson and Rabinow's view on the role of assemblage in highlighting "a specific historical, political, and economic conjuncture in which an issue becomes a problem" (2005: 94). Furthermore, Allen underlines that assemblage "holds together, despite being made up of a co-existence of diverse logics and priorities often pulling in different directions (2011: 155). DS is made up of a multiplicity of intentions and logics but still holds together and this not only produces internal tensions, but also very specific dynamics.

Moreover, our aim is to highlight some of the process dimensions involved in disassembling a series of soy regimes and reassembling certain capacities, possibilities, practices, and places. This chapter conceives of the process of reterritorialising soy as a move away from what we call 'Global Soy' towards 'Homegrown Soy.' In this way, our aim is to address the complexities involved in this attempted shift and specifically move the focus away from topographic dichotomies, and underline further that "an assemblage is the product of multiple determinations that are not reducible to a single logic" (Collier and Ong 2005: 12). As we focus on circumstances, events and socio-temporal configurations, we propose an entanglement between Global and Homegrown Soy, thus positing the impossibility of exploring the latter independently of the former.

Following on from this introduction we develop our chapter in three stages. We first describe how soy has become central in the food system, what problems this situation has generated and what have been the answers so far. Then we depict some of the distinctive traits of DS as revealed in the process of reassembling actors, places and knowledge. Finally, we highlight the prospects and possibilities opened up by DS in view of a set of dynamics that emerge in the articulation of re-territorialisation projects, desires, and forces.

Soy Territorialities

Soy is the fourth largest agricultural commodity in the world following wheat, rice and corn. Europe is the third largest consumer of soy following the US and China and relies for around 94% of total supply on imports from the US and countries in Latin America. While its roots in the US and Europe date to the second half of the 19th century, its global career started just about 70 years ago and has gone through exponential growth over the short span of the last 20 years. The strongest factor for its demand on the European market represents the livestock sector where it is fully embedded in the feed infrastructures and feed practices for conventionally reared chickens, pigs, and cows.

Apart from the utter scale of its use, there is further a striking ambiguity about soybeans. DS builds its initiative on a food product that a majority of consumers are largely unware of. Consumer imaginaries around soy are mostly related to its Asian origins and its more recent spread within the vegetarian and vegan market. Historically, there are reports of consumers never really crossing the threshold of acceptance of soy (Daniel 2005). This is because its ubiquity is to be found in the processed food sector or in what the food industry calls 'embedded' consumption. Its consumption is, in other words, almost invisible. As feed and as a food additive soybeans as a visible component of food systems is reserved to the experts in the respective fields. Mintz *et al*. refer to how soybeans involve highly modernised, industrial processes in the extraction of oil, the manufacture of feed, the fabrication of soy proteins and its many derivatives (2008: 6). Moreover, the value chain of soybeans is exceptionally long.

In the following we sketch soy's notorious global career with milestone developments in the post-WWII era, and a further defining stage with the advent of biotechnology, in order to then highlight a bundle of events that expose its 'peaking' in light of the wicked problems of environmental destruction linked to failed human decisions and actions.

Measurabilities beyond calculation

By numbers alone, soybeans demonstrate a staggering growth trajectory. In terms of production volume, land use, and international trade, soy is among the most important crops in the world today. Over the past 60 years soybean production has increased by almost 1,000 % (TNI 2014; WWF 2016), while the land area under soy cultivation has more than quadrupled (FAOSTAT n.d., USDA 2014). Globally, soy farms now cover 1 million square kilometres – equivalent to the total area of France, Germany, Belgium and the Netherlands combined (WWF 2016). In 2013, the world harvest amounted to 284 million tons from 113 million ha (Profundo 2015). The EU-28 countries consumed 31.6 million tons in 2013.

But the impacts and implications of such stunning growth turned strikingly dark and came to be recurrently denounced especially over the last decade, resulting in increased visibility and political contestation of the virtues of soy. Some of the most vocal reports and analyses come from several NGOs who took it upon themselves to critique soy. Organisations such as Friends of the Earth, the World Wildlife Fund, and the Transnational Institute trace some of the relations that came to be enacted through soy to demonstrate the unparalleled scale of political, economic, and environmental problems around this one crop. The unintended consequences of the soy revolution include: biodiversity loss, deforestation, land grabs, environmental pollution, intensive industrial-scale agriculture, and more generally, several high carbon practices derived from using soy. The reports relate soy's notoriety to factors such as national and supranational policies and trade laws in the aftermath of WWII. The Friends of the Earth report from 2010 links the expansion of soy cultivation to the EU's post-WWII CAP policies and explains how these created an opportunity for soy through the lack of import tariffs compared other major crops. Paradoxically, coupled payments per output did not lead to more soy cultivation in Europe but to the growth of what were conceived of as the more profitable crops of wheat and maize. Soy was to be outsourced and later also offshored (see GRAIN 2016). Lack of import tariffs for legumes made importing lucrative, embedding large economies of scale. An infrastructure of traders, oil processors and feed manufactures developed to feed cheap soy from abroad to the livestock industry in Europe.

Eventually, concerns with the security of vegetal protein supply in the European Union began to emerge, with a study from the European Parliament from 2013 stating that protein crops (grain legume species such as fava beans, peas, chickpeas, lupins and soybeans) are now grown on less than 2% of arable land in the European Union. The protein crop area as a proportion of all arable land had declined from 4.7% in 1961 to 1.8% in 2013. Over the same period, the actual use of protein-rich grain in animal feed had increased dramatically. Clearly, imported soy beans have become a central and strategic element of the whole European meat industry. This state of affairs is not a simple product of

inappropriate natural and agronomic conditions in Europe for soybean production. On the contrary, soybeans are not new to Europe. Some sources trace the history of its cultivation to well before that which has taken place in the Americas. European regions, especially those along the Danube, are reported to be particularly suited to soy production. Soy has been cultivated, for instance, in the Danube region since 1875.

Temporal configurations

The way that Global Soy was assembled and territorialised over little more than half a century is related to some of the major drivers to path-dependent patterns in the food system. These are intimately tied to dominant linear approaches in agriculture alongside anthropocentric rationales around food economy and food security which together have contributed to the consolidation of a productivist paradigm. But such consolidation, i.e. territorialisation, emerged from the intersection of processes which each have their own timescales.

The exponential growth of soy is undoubtedly related to the development of biotechnologies and their upsurge in the market since the "roaring nineties" (Stiglitz 2003). In 1994, the Roundup Ready soybean, the first genetically modified plant, was introduced to the market in the U.S. Benefiting from the coexistence policy of the European Union (see Reynolds and Szerszynski 2014) GM soybeans rapidly sneaked through the backdoors of market regulation as an 'embedded' food ingredient and feed compound. Today 90% of soybeans imported in Europe are genetically modified. The advent of GM soybeans can be regarded as a tipping point that experienced path dependency and created a lock-in situation from which it is very hard to break out. The techno-fix of biotechnology also largely contributed to further path-dependent patterns between soy, meat, and fossil fuels. These, in turn, led to a situation where total per capita protein consumption (including meat and vegetable-derived protein) is about 70% higher than recommended (Westhoek 2011: 13). Moreover, the path-dependent

character of the development of GM soy has triggered a further pattern where seeds and seed breeding are more and more inflexibly aligned to the infrastructure of biotechnology industries.

The moments in history that significantly propagated the enrolment of soya in industrial scale agriculture reflect nothing short of a fascination for its versatility along with its immense promise for catapulting post-WWII societies out of poverty. Yet, the imaginaries tied to its protein content as a gold standard for stock feed, its oil content as a magic refiner for processed foods, and its genetic modification as the ultimate source of unbounded growth, have 'tipped' it into cultures of excess (see Urry 2010) as well as made it an accomplice in death and destruction.

Environmental Politics and call for soy de-/reterritorialisation

But what was once a silver bullet solution for a huge commodity sector, now has turned towards potentials for soy also to act in a new role as a silver lining. The DS organisation was founded in 2012 to confront some of the lock-ins created by Global Soy in Europe. Pressures to enhance sustainability - especially in relation to climate change – have created the space an impetus for changing the rules of the game in which governments and markets act and count. A study conducted by the Sustainable Europe Research Institute, an independent research group from Austria, concluded that 77% of all CO2 in Austrian pork emissions were coming from soy. It claimed that around 50% of carbon emissions from Austrian pork meat (or 1.1 M tons of CO2 per year) could be reduced if (regional) home grown soy was used instead of overseas soy (see Hinterberger *et al.* 2011). In this way, the study drew attention on the fact that the decoupling of livestock production from feed production had created a heavy burden for the environment while disguising the total amount of external cost of meat production.

The intensification of the livestock sector went hand in hand with an upsurge in meat consumption: from 1960 to 2007 pig meat production increased by 294%, eggs by 353% and poultry by 711%

(WWF 2016). Yet cheapness and unbounded expansion came at a cost. When tropical forests and grasslands are lost to soy plantations, CO2 is released and deforestation is major contributor to global CO2 emissions. Moreover, the production of 1 kilogramme of intensively-reared beef requires 10 kilogrammes of animal feed (including soybeans) and 15,000 litres of water (Friends of the Earth 2010).

The extent of the ubiquity of soy in the food system is captured in a report by the WWF which calculates the 'soyfootprint' of European consumers (2016). This amounts to a staggering 60 kilogrammes a year and is primarily associated with the consumption of conventional meat, dairy and processed foods of the most diverse kinds. Soy has been transmogrified into both a building block of the industrial processed food regime and an engine for its growth. In this way, it liaises with other ubiquitous ingredients such as salt, sugar or fat. The path-dependent pattern observable here in the industrial processed-food sector is similar to the pattern already observed in the meat sector.

In this section, we used these statistics not only to give a sense of the 'spatial fixes' (Harvey 2001) used in the governance of soy but also a sense for the far-reaching interdependent processes and trajectories over time that piled-up to create a clarion call for change. As such, accounts of the pernicious influence and effects of soy created momentum for alternatives, with concerned groups such as the European-based DS and the global-level Roundtable for Sustainable Soy initiating action.

The creation of DS was substantially influenced by the fact that Europe is almost totally dependent on imports of protein crops for feeding livestock. Whereas Europe is mostly self-sufficient regarding the three other major crops of wheat, corn, and rice, in terms of soy, it imports 94 % of soy supplies from the Americas - a large proportion of it being genetically modified. The degree to which soy consumption has increased over the past decades is seen to further add not only to European dependency on other continents but also to the unsustainability of intensive livestock practices across Europe. The consequences are both an accentuation of reliance on cheap protein from afar being fed to

European livestock - which further disconnects feed from livestock production - as well as creating an excess of phosphates beyond the carrying capacity of soils. Thus, the tensions behind the creation of DS bring into focus a double lock-in whereby European markets are almost totally depend on GM soy on the one hand, but most supplies come from overseas. DS sought to respond to these tensions by creating a certification programme to guarantee GM-free and origin-controlled quality for soybeans.

Relations of exteriority and first steps to soy reterritorialisation

The DS scheme was not created in a vacuum. To the contrary, DS arrived with good timing. It benefited from the convergence of at least three main distinct developments. Firstly, at the supranational level, the "Greening" of the Common Agricultural Policy created payments for ecosystem services that were intended to strengthen the ecological dimensions of agriculture. In this respect, soybeans are particularly well suited to act as a cover crop and thus improve soil fertility. Moreover, they do not need fertilizers due to their nitrogen fixing capacity. Secondly, at the national level in countries like Germany, strategies were being developed to address the sustainability of protein supplies by facilitating research, shorter supply chains based on increased regional cultivation of legumes, and, last but not least, specific agricultural policy interventions. Thirdly, European consumers' resistance to GMOs (see, for instance, Konefal and Busch 2010), and the associated proliferation of GMO-free labelling at national levels, created further momentum for initiatives like DS.

The DS initiative needs also to be regarded against the background of an emerging array of programmatic agreements and declarations relating to soy. These included: the Brussels Soy Declaration, whereby European soy industries and retailers support the cultivation and even expansion of non-GM soy from Brazil; the Basler Criteria for Responsible Soy, where deforestation and land conversions are rejected; and similarly, the Roundtable for Responsible Soy and the 2015 Berlin Declaration for a GMO-free Europe. Some of these agreements resulted in the creation of certification

systems, audits, labels and standards. Currently, there are about fifty different standards for soybean globally. This begs the question of how DS has emerged and become something different to other standards and how it is related to co-existing initiatives.

Figure 1

Soy Reterritorialisation

The DS project is a unique endeavour because of its focus on the traceability, quality assurance, and certification of a single crop grown in Europe. It has gathered a multitude of actors around two main projects: the certification of GM-free soy and the certification of 'place of origin' provenance for soy grown in the Danube region. (Figure 1: Map of the Danube River Basin as pictured on DS brochure). DS is a multi-stakeholder initiative with its headquarters in Vienna and further offices in Serbia, Romania, Ukraine and Germany (and also has representatives in Italy, Moldova and Poland). The organisation has a board of 12 members, a steering committee with 14 members, an advisory board of

10 members and a scientific advisory board of ten members. Members are individuals from a variety of sectors - from the private to the public - including businesses along the soy chain, breeders, farmers, governments, NGOs, and civil society. Apart from the two main projects there are at least a dozen more objectives that the DS initiative follows. The multiplicity of objectives illustrates the complexity of the initiative. As stated on the DS website [Note 2]:

The project's most important objectives are the promotion and expedition of regional soya bean cultivation according to clearly defined quality criteria, as well as the expansion of infrastructure in order to attain these objectives. In the forefront are:

- promoting both cultivation and processing of GM-free soya within the Danube region for Europe – using the Donau Soja trademark;
- establishing reliable supply and value-added chains via member businesses, contributing to the independent European supply of protein;
- directing a funded breeding, research and monitoring programme for GMO-free soya seeds and soya plant protection concepts for the Danube region.

These core objectives already point to the fact that DS calls for a substantial overhaul over policies, farming practices, cultivated areas, retail chains, and seed breeding research. This rhizomatic incorporation of heterogeneous food domains suggests the promise of bringing about change in multiple relationships in the governance of soy. Yet, these objectives did not emerge in a linear manner, nor were they all present from the very start of the initiative. A handful of farmers and businesses, who used soy on a daily basis, came together to facilitate the sourcing of soy from Europe of non-GM quality in an effort to reduce dependency from other continents. In this process - similar to the opening of Pandora ’s Box - a whole set of troubles came to be disclosed, such that the need emerged to address the web of relations created by soybeans as they permeated a multitude of elements of the food industry. Soy was not simply a technical problem, it was a network of relations. Not only did global soy cause problems in the Global South but was also complicit in the

intensification of the animal production sector, the related uncoupling of animal sector from the feed sector, the excess of phosphates in the ground, the abuse of herbicides, the concentration of seed breeding, the shrinking of the number of seed varieties, mono-cropping, and the halving of legumes grown in Europe. DS brought hope and launched a "process of qualification" (see Allaire 2004) of soybeans not just to counter 'GM soy from nowhere' but to boost and transform a wider assemblage of European practices in agriculture, trade, and seed breeding, as well as agricultural policies. Thus, non-GM European soy started to multiply its qualities.

Re-forming soy networks

DS, as an assemblage, does not act alone. Within few years it developed into a transnational poly-centred 'network' of like-minded agricultural experts where each regional or national chapter is steered by consultants, researchers or business persons from twenty countries. Currently, DS has 257 members including civil society bodies, businesses and entrepreneurs, governmental and non-governmental organisations, and members from most of the sectors of the value chain, such as seed breeding companies, soy producers, traders, soybean processors, feed and food industries, and many of the largest retail companies in Europe.

DS has created differentiated financing to support the formation of networks of heterogenous parts. Extraordinary members such as non-profit organisations and associations are exempt from membership fees. Ordinary members such as producer associations or retailers pay fees that are differentiated according to their annual turnover. For example, a business with a turnover of less than 100,000 Euros per year pays 50 Euros, while a business with a turnover of 50 to 150 Million Euros pays 4,500 Euros. Additionally, DS charges licence fees for first processors of soybeans amounting to 2 Euros per ton of soybeans. Financial support also comes from public partners such as the Austrian Development Agency (ADA) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The aim of DS over the next couple of years is to become self-financed.

The DS project entails a huge array of interventions across the supply chain (ranging from production methods, storage facilities, traders, transport and logistics, first processors, feed manufacturers, and retail companies) as well as actors adjacent to the supply chain, like seed breeders, various scientific consultants, and political bodies. Finally, DS aims to raise acceptance of soy among consumers. Interventions entail various degrees of complexity, change, and control in the food system and add up to a substantial re-ordering of infrastructural relationships.

Some of the initiatives build on pre-existing work by other initiatives, and this provides the opportunity to further consolidate trajectories that have already been traced into existence, or to focus on other areas which were left behind. In Austria, for instance, where a non-GMO certification system was already established, work at the local level focused in areas which were more neglected than others, such as support for the mountain farmers. Switzerland presents an interesting case in several respects. Switzerland does not use GM soy either for food or for feed. However, sustainability initiatives for responsible soy sourcing by the dominant retail chains in the country - Coop and Migros - exist and they emerged few years prior to the conception of DS.

One valued activity that acts to boost DS goals is the creation of a sense of belonging and of enthusiasm through the organisation of frequent “speed-networking events” in Vienna, annual conferences in Austria, Germany or Hungary, as well as demonstrative “field days” where interested participants exchange knowledge. Such events are intended to create the kind of horizon of expectation and hope that is necessary for a business endeavour to take off and prosper.

Geographical reterritorialisation: Re-localisation in the Danube basin

The DS project aims then at reconnecting diverse actors and places and, in this process, the Danube itself is poised to act as the main connector. The Danube region has a need for significant development, with a desire for improved shipment, logistics and infrastructure. Alongside this infrastructure, there are about 1.8 million ha of fallow land that could be used for soy without the need to produce less of anything else and without replacing other crops. This last point made the choice of the Danube region even more attractive as it theoretically would allow the avoiding of competition between soy (for feed) and other crops (for food). Furthermore, some scenarios posit Eastern Europe as having a high potential to increase food production. In countries transitioning to free trade economies, agricultural outputs are expected to increase by 2.5% every year over the next 15 years. In this respect, DS proposes that rather than increasing cereal exports from Europe, it would be better to reassemble some of the existing elements and future potentials for homegrown protein and legume production (Kröhn and Bittner 2015: 3).

These objectives point towards a re-localisation of soy along with a structural re-ordering of the power relations that steer the cultivation and circulation of soy. This endeavour marks a shift away from the 'Global Soy' system and the path-dependencies of its global value chains and instead steer towards 'Homegrown Soy'. The Danube region is set to act as both the symbol and agent of this transformation. A second stage that is currently being pursued is the development of regional processing facilities and short value chains with the aim of creating added value for the countries and regions that produce it.

Preliminary research shows us that Homegrown Soy does not mean the replacement of Global Soy nor the invention of a new system. In 2012, European soy production amounted to 3.8 million tons and almost doubled within three years to 6.6 million tons in 2015. The targeted growth for 2025 is 17 million tons of soybeans along with an increase of other grains and legumes. Thus, DS envisions that

by 2025 half of soya demand will be covered by non-GM European production. The other half is to be covered with sustainable imports.

The re-localization and re-ordering of soy relations is centred on a powerful attractor - the Danube river basin - that is invested with both material and symbolic value. The “process of qualification,” referred to earlier, becomes one where soy is no longer ubiquitous and invisible, but is conferred an identity cloak. This identity cloak steers all efforts and intentions on Homegrown Soy in a way which is concerned with a harmonized European standard as much as with working through uneven developments in various regions.

Reassembling knowledge

Thus DS takes a different direction from the more orthodox (and limited) linear visions of technologically-leveraged agricultural change as well as from backward looking trade protectionism. Moreover, differentiated foci depending on the specificities of each site, region or country, further support the situated and ‘site-sensitive’ features of the projects. This general positioning results from a conjunction of diverse types of knowledge and their circulation within the DS network. In other words, knowledge is central in DS as a project of re-assemblage around soy.

The distinctive features envisioned for each region and country originate from a profoundly relational understanding of place by the founder of the initiative, Matthias Krön. Having previous knowledge of soy processing and trade through a non-dairy drinks business he co-owned for some years in Austria, Krön developed a sense of the structures, agents, and socio-political geographies that drive soy. He got to know Eastern European landscapes and the roots and routes of soy in Romania’s Danube River basin. He became aware of the uneven nature of agricultural developments as much as the uneven geographies of power that still persist (almost three decades after the fall of the Iron Curtain) between

Eastern and Western Europe. Indeed, at the core of the DS project, there is a feeling that Eastern European farmers are excluded from more fully participating in the European agricultural market.

The technical figures and measures of soy in the Danube area and future action plans rely and build upon research from Vienna's Institute for Soil Sciences and the Working Community of the Danube Regions. This research envisions possible scenarios based on the analysis of two parameters that are brought into interdependence: the yield gap and the diet gap (see Foley et al. 2011 and Rittler 2016). The concept of yield gap recalls notions of under- and over-productivity when environmental conditions are similar. In this way, Eastern Europe / Romania counts as being 50% underproductive while Western European countries count as being over-productive. The diet gap refers to consumption patterns that 'overshoot.' The Institute's research concludes that halving the production of meat, eggs and dairy production in Europe could lead to: 40% reduction in nitrogen emissions, 25-40% reduction in greenhouse gas emissions, 23% per capita decrease in cropland use for food production, enhanced human health (40% reduction of intake of saturated fat), soymeal use reduced by 75%, and nitrogen-use efficiency in the food system would increase from 18% to 41-47%. So DS is not only a certification programme but also a science-based platform of measures and metrics that co-constitute knowledge through the promotion of different collaborations at scientific, business, and practical farm/cultivation level. It has a scientific board which readily and regularly contributes to the decisions and communications of the organisation's steering committee.

In Romania, for instance, the work of the past two years focused on the creation of several demonstration fields where regular meetings with farmers and agronomists could facilitate the dissemination of knowledge about the most varied aspects of soy cultivation and thus encourage farmers to take up a practice that has been largely discontinued especially over the last decade. Furthermore, it also served to get the new generation of farmers accustomed to soy. Last but not least, the goal is to do away with the notion that GM soy produces higher yields.

DS projects presuppose various degrees of coordination across sites and this, in turn, entails consolidation of its main programmes. As a hub for scientific research and seed improvement companies, DS pushes the idea that seed breeding is important in upscaling seeds adapted to European conditions and stresses further that this is even more important in a context where seed breeding largely serves big corporations dedicated to transgenic research. So, what DS does, is to provide a meeting ground for research from various countries and institutions to be shared in order to first create a database of genotypes and then to mega-zone and harmonize the different maturity groups of various seeds for Europe.

Many farmers and agricultural experts believe that soybeans are very demanding agricultural crops and require in-depth knowledge and expertise on cultivation. This is one reason why DS believes that many farmers need to be informed about its versatility and benefits on the European market and also gives so much importance to knowledge creation and exchange. The soybean assemblage is the realm of experts. Mutual learning between farmers, soy processors, and breeders is one key element for the development of a long-term understanding of the sort of changes and practices to be undertaken. These intersections of different knowledges emerge as hubs where the many materialities and qualities of soy are made visible, talked about, debated, and weighed and measured.

Soy Reassembled: Dynamics, Tensions, Prospects

Through the formation of new networks, the process of re-localisation, and the constitution of new flows of knowledge, the assemblage that is consolidating around DS produces strong dynamics of harmonisation and development as a European standard. DS is reclaiming soy for Europe. Soy is set to be uncoupled from its global trajectories and placed on a transition pathway to sustainability. The move from Global to Homegrown Soy is, however, much more than a spatial reclamation. As with other environmentally oriented standards, DS is a process that entails sanctioning a series of

agricultural practices such as banning the use of desiccants prior to harvest as, for instance, glyphosate or diquat. This is a strategy born not only out of reaction to the current contestations around the use and abuse of a series of herbicides but also a statement against monoculture crops and in support of crop rotation along with other best practices included in the manual and guidelines published by DS. Possible measures of success are located by DS in the harmonisation of standards at a European level. At the moment, DS aligns with efforts from non-GMO campaigners to have a unitary GMO-free labelling system rather than one for each country or region. The shared view is that a single label is beneficial to trade and ultimately also would aid the take-off of DS programmes.

However, DS is not a merely resistance to GM and Global Soy. It is a dynamic project focusing on future possibilities for soy production in Europe. This points to another set of dynamics resulting from this assemblage, which are more counterintuitive because they work towards reducing the need for soybeans wherever possible, by changing the protein provision in feed strategies. This entails the enrolment of other practices such as crop rotation, animal husbandry, plant protection, all of which require improvement and adjustment, and further, a stronger, more sustainable, protein strategy. Indeed, while DS aims to boost soybean cultivation in the Danube region and its status among farmers, it at the same time attempting to decentre it. This is strategized, on the one hand, by reducing its use and centrality in the food system (see Westhoek 2014) and, on the other hand, by aligning the role of soybeans with those of other legumes and sources of vegetal proteins and in this way strengthening the protein transition strategy for Europe. The articulation of these two sets of dynamics - consolidating the standard and decentring soy - generates, on the one hand, a series of tensions, and, on the other hand, a stimulating context open to possibilities and innovations.

As an example, one central measure of territorialising the above mentioned practices and aims went into advocating for the Danube basin as an appropriate region for developing the aims of the initiative. The instrument of stabilisation of this process is the DS standard. But setting these boundaries does

not lead to an immutable, exclusive, or homogeneous entity. In order to include those European suppliers which are not from the Danube basin, DS has created Europe Soya, an additional trademark following the same certification procedures as DS. This shows that the initially created boundaries are actually porous. Moreover, DS is co-constituted by dynamic spatialities. These emerge not only from within DS, but also from its partnerships with other organisations that have already built up certain networks in specific regions, as for instance the 5 year long collaboration with the *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) which runs activities in Serbia and Bosnia-Herzegovina. Other partnerships and collaborations keep emerging as DS organises networking events, conferences or field demonstrations with farmers' organisations which are themselves already implicated in lobbying or advocacy activities for sustainable farming.

A further dynamic element of the strategies enacted by DS is the targeting of food retailers. DS assigns the food retail chains a role as key players in shaking up the multiple ways in which soy is used, sourced, and translated. A bundle of soy-related practices have the potential to be enrolled in a mix of push and pull strategies. DS calls for and actively engages in the initiation of varied programmes by the retail industry. Currently, the Swiss companies Coop and Migros and the British supermarket chain Waitrose are taking the lead in this kind of experimentation. Waitrose has become the first UK retailer to introduce responsibly sourced non-GM soy for animal feed from Europe. In October 2016, the supermarket chain landed its first shipment of soy grown in the Danube Region for use as a source of protein in pig feed used by the retailer's dedicated pork supplier - Dalehead Foods. The two Swiss retailers have also initiated similar programmes in respect to dairy, chicken meat, and eggs, using a variety of labels, such as Donausoja Poulet or Coop-Naturafarm eggs.

These possibilities and experiments developing in the open space created by the articulation of the two major dynamics characterising DS have not emerged from nowhere. They are held in a productive tension by the processes involved in upscaling soy and its materialities. We understand upscaling as an intricate and meticulous process that is shaped substantially by monitoring, measuring, and controlling the different qualities and standards of soy along and beyond the value chain. It is a process that

results from a close and deep understanding of the materialities of soy, such as: where it can grow, it's relation to soil as a plant (pesticides and nutrients), its nature as a source of protein in order to generate more sustainable diets which also require lowering of environmentally costly meat consumption.

Conclusion

In this chapter we have set out to show how soybeans catalysed the mobilization of a diversity of processes that are partially steered by a group of actors interested in boosting the versatility and significance of soy in European agriculture. Leveraging off soybeans as a controversial contested global crop, their re-rooting and re-localization in the European soil and market as an alternative to Global Soy has been implemented in ways that have not imitated what are imagined to be orthodox agricultural development pathways. Rather, it is an intricate work of reassembling the many spaces it inhabits in its "career" including scientific, regulatory, political and economic relationships. Therefore, we found it important to refer to some key temporal dimensions that framed its biography not just for the sake of contextualizing but also as a way to re-centre analysis on the tangled range of issues that have directly and indirectly shaped the inception and direction of the DS initiative. In this way, we started off by first highlighting the centrality of soy in the current globalised food system. DS emerged in the context of a growing contestation over soy as a silver bullet for commodity production of plant protein, resulting in massive international trade, deforestation and monoculture in producing countries, and utter dependency of a whole food system in importing countries. DS developed as a complex assemblage of actors, places and knowledge, working to re-localise soy production within the European boundaries and build new relations between places of production and consumption.

This reterritorialisation of soy as Homegrown Soy as an alternative and countermotion to Global Soy has developed through efforts of harmonisation and coordination, and encouragement of production through: the formation of an organisation, the creation of a standard and a certification programme, and the designation of a label, all of which are held together by a sense of belonging and enthusiasm

shared among its participants. The resulting spark has animated the subsequent dynamics of upscaling. But these dynamics are aligned with another, somewhat counterintuitive, set of dynamics that works to de-centre soy by reducing overall uses in globalised food systems. This line of creative tension between the two dynamics, far from blocking the processes, creates a fertile space for innovative development and an openness toward new possibilities. Furthermore, soy reterritorialization in the DS network is definitely still an ongoing process. Applying an assemblage perspective here certainly allowed us to emphasise both the performativity of the assemblage and the dynamics and motions resulting from perpetual processes of de- and reterritorialization.

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NOTES

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