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Danube Soya – Soybean Cultivation and Land Use in the Vojvodina province of Serbia

GEO 511 Master's Thesis

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Summary

Soya has been introduced into Serbia's agrarian structure in the 1970s by a governmental decision. Over the last forty years, farm land under soy cultivation grew from 2'000 to 200'000 hectares. Today, soya, although comparatively new to a region having previously been dominated by corn, wheat, sunflower and sugar beet, is well embedded in the crop management of most farms, making the Republic of Serbia the third largest European soybean producer after the Ukraine and Italy and ranking 16th on the global scale of the biggest soybean producing countires. Serbia is concurrently the only self-sufficient European country in the production of soya for the domestic feed compound industry. The Vojvodina province is Serbia's most important agricultural area with about 93% of the total soybean acreage.

Literature on the 'agrarian question' as well as the global land rush debate provide the theoretical framework for the empirical research performed in the Vojvodina, looking into the process of soybean production and the specific factors having allowed soya to gain a foothold in the local agrarian economy and grow considerably over the past decade. The socio-economic context and the role of the non-profit organization Donau Soja, which aims to promote GM-free, origin-controlled soybean cultivation in the Danube basin, were also an integral part of this research. Global soybean production systems with the dominance of the Americas present both background and benchmark for the findings, with non-GM soybean cultivation crystalizing as an important aspect and differentiation factor for the Vojvodina. Land, mechanization and labor are further key factors this thesis focused on.

The methodological approach was based on data assessment through qualitative semi-structured interviews, followed by a qualitative content analysis.

The research revealed an agricultural structure in the Vojvodina with a predominance of family farms, who quickly recognized the advantages of soya in their crop rotation. The demand from the livestock feed industry, having been continuously higher than supply, granted good and stable prices and therefore a comparatively high profitability over the last decades. During the beginning of its local activity in 2014, Donau Soja focused mainly on enhancing production know-how. A new focus is to raise the awareness of a broader public towards the socio-ecological advantages of a direct human food consumption of soya. This vision, combined with the European protein deficit, are two aspects allowing further growth of the soy production in the Vojvodina, both by increasing the production efficiency through further mechanization and the further increase of the share of soya on the available arable land.

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Contents

I. Figures v

II. Tables v

III. Abbreviations vi

1. Introduction 1

2. Theory 4

2.1 Origins of the agrarian question: Marx and rural change 5

2.2 Harvey's accumulation by dispossession 8

2.3 The agrarian question in the 21st century 10

2.4 Global land rush debate 12

2.5 Research question 16

3. Global soybean production systems 17

3.1 Development and distribution of soybean production 17

3.2 Expansion of GM-soybean cultivation 22

3.3 Soya certification standards 24

3.4 Forms of production 25

3.4.1 Mechanization 26

3.4.2 Labor 27

3.4.3 Land 27

4. Methods 28

4.1 Data assessment 28

4.1.1 The problem-centered interview (PCI) 29

4.1.2 The explorative and systemizing expert interview 30

4.1.3 Fieldwork and empirical data overview 30

4.2 Qualitative content analysis 34

5. Structural context of Serbian agriculture 36

5.1 Historical context of the Vojvodina 36

5.2 Agriculture in Serbia and the expansion of soybean production in the Vojvodina 37

5.2.1 Structural changes in the Vojvodina 40

5.2.2 Serbian law on Genetically Modified Organisms (GMO) 42

5.3 Land tenure 43

5.3.1 Ownership structure of agricultural holdings in Serbia 43

5.3.2 Significance of land control 47

6. Soybean production in the Vojvodina 49

6.1 Field production 49

6.1.1 Inputs and cultivation 49

6.1.2 Mechanization 55

6.1.3 Labor 56

6.1.4 Professionalization in agricultural production 59

6.2 Advantages of soybean production in the Vojvodina 60

6.2.1 Crop management and growth conditions ... 61
6.2.2 Profitability and demand ... 63
6.3 Challenges of soybean production in the Vojvodina ... 64
6.3.1 Weed control ... 65
6.3.2 Climate condition and water management ... 67
6.4 Comparison of soya and other cultivated crops ... 69
6.5 Organic production ... 71

7. Socio-economic embeddedness of soybean production in the Vojvodina ... 72
7.1 Processing chain ... 72
7.1.1 Storage ... 72
7.1.2 Buyers ... 73
7.1.3 Local processing industry ... 74
7.2 Certification ... 75
7.3 'Donau Soja' in the Vojvodina ... 76
7.4 Economic focus ... 79
7.4.1 Economic situation of producers ... 79
7.4.2 Foreign investors ... 82

8. Status and perspectives of soybean cultivation in the Vojvodina ... 84
8.1 Soybean production and land use – Vojvodina's agrarian question ... 84
8.2 Conclusion and outlook ... 87

9. Literature ... 89

IV. Appendix ... 100
IV.I Danube Soya Standard ... 100
IV.II Map and satellite imagery ... 103
IV.III Impressions fieldwork ... 108
IV.IV List of interviews ... 112
IV.V Interview guidelines ... 114
IV.V.I Interview guide experts ... 114
IV.V.II Interview guide producers ... 116
IV.V.III Interview guide 'Donau Soja' ... 119
IV.VI Code system ... 122
IV.VII Personal declaration ... 123

I. Figures

Figure 1: Production/acreage quantity of soybeans in world, 1961 to 2016. 17
Figure 2: Production share of soybeans by region with the top five producers in 2016. 19
Figure 3: Share of regions that imported soybeans in 2016. 20
Figure 4: Share of regions that exported soybeans in 2016. 20
Figure 5: Share of GM soybeans compared to soybean production worldwide, 1998 to 2016. 23
Figure 6: Example of a category-code nexus within the Network View of Atlas.ti. 35
Figure 7: Share of the main export destinations of soybeans from Serbia in 2016. 38
Figure 8: Production/acreage quantity of soybeans in Serbia from 1955 to 2005. 40
Figure 9: Overview of the Vojvodina and its seven districts with study-areas highlighted. 103
Figure 10: Satellite image of the Vojvodina with the locations of study-areas. 104
Figure 11: Satellite image of Nadalj. 104
Figure 12: Satellite image of Čurug, located on the Theiss, tributary river to the Donau. 105
Figure 13: Satellite image of Plandište with surrounding fields. 105
Figure 14: Satellite image of Bela Crkva, close to the Romanian border. 106
Figure 15: Satellite image of Telečka, example for the typical village structure of traditional Serbian hamlets in the region. 106
Figure 16: Satellite image of Bački Petrovac near Novi Sad. 107
Figure 17: Satellite image of Zmajevo and surrounding area. 107
Figure 18: Center pivot irrigation system with drop sprinklers near Lugovo, Sombor. 108
Figure 19: Soybean storage in the open, Plandište municipality. 108
Figure 20: Tractor-drawn (pull-type) combine on the farm of an organic producer in Čurug. 109
Figure 21: Abandoned truck on the outskirts of Čurug. 109
Figure 22: Company grounds of 'Global Seed' with soybean storage- and processing facilities in Nadalj. 110
Figure 23: Small subsistence garden (organic production) with large fields in the background, Čurug. 110
Figure 24: Two older combine harvesters in a shed, conventional production farm in Zmajevo. 111
Figure 25: Advanced machinery of 'Global Seed' in Nadalj. 111

II. Tables

Table 1: Soybean area, volume and share of global production and exports in 2015. 21
Table 2: Summary of conducted interviews arranged by classification of interviewees. 33
Table 3: Overview of the farm structure in Serbia 2012. 44
Table 4: Comparison of AFH and corresponding UAA in Serbia and the Vojvodina 2012. 44
Table 5: Land ownership structures of interviewed producers and seed supplier company. 45
Table 6: Labor structure of interviewed producers. 57
Table 7: Earnings per hectare of soya compared to other crops. 63
Table 8: Share of soya compared to total area under production of interviewed producers and seed supplier company. 69
Table 9: List of conducted interviews arranged in chronological order. 112
Table 10: Main code system for qualitative data analysis. 122

III. Abbreviations

AEAS	Agricultural Extension and Advisory Services
AFH	Agricultural Family Holdings
BSE	Bovine Spongiform Encephalopathy (Mad Cow Disease)
GIS	Geographic Information System
GMO	Genetically Modified Organism
HACCP	Hazard Analysis and Critical Control Points
IMF	International Monetary Fund
IPA	Instrument for Pre-Accession Assistance
NAM	Non-Aligned Movement
NTAE	Non-Traditional Agricultural Exports
PSS	Agricultural Extension Service
QDA	Qualitative Data Analysis
RDS	Serbian Dinar
RR	Roundup Ready
RTS	Roundtable on Responsible Soy
SAP	Structural Adjustment Program
SEZ	Special Economic Zone
UAA	Utilized Agricultural Area
UNDP	United Nations Development Programme
WB	World Bank
WTO	World Trade Organization

1. Introduction

Soya has become one of the most important agro-industrial commodities in the world (Oliveira & Hecht 2016: 251; Hartman et al. 2011: 5). In 2016, the global area harvested amounted to around 121 million hectares and resulted in a yield of 334 million tons (FAOSTAT). The United States of America (USA), Brazil and Argentina are the top three producers and exporters of soya, in 2016 they harvested 81% of the world production (FAOSTAT). Europe and the European Union (EU) on the other hand are facing a major deficit on soy protein (Nemecek et al. 2008: 381; Dima 2015: 4). European agriculture is characterized by low levels of legumes production and a predominance of cereals due to higher productivity in comparison (Roman et al. 2016: 180). This imbalance between production and consumption creates a strong dependence on protein imports.

Imported soybeans, which represent about 97% of the annual European consumption, are mostly produced with genetically modified (GM) seeds. GM foods and crops are not accepted by many European consumers and public perception is controversial (Roman et al. 2016: 180; Gaskell et al. 1999: 384). In addition, while the EU authorized the import and trade of certain registered GM soybeans, cultivation is prohibited. Despite concerns regarding food safety and raising various other issues[1] (Bonetta 2001: R201), GM crops have been a swiftly adopted technology in the history of agriculture and food biotechnology (Singh 2006: 598) with much having been written on the staggering potential of GM crops to stimulate a seminal change in nutrition and farming (Huang et al. 2002; Halpin 2005: 141). The Green Revolution of the 1960s and 1970s with the development of new varieties of crops and the usage of fertilizers and pesticides can be regarded as a precursor of the GM biotech package (Dicken 2011, 283). Since their introduction into the commercial market 1996 in the USA, GM crops have seen an expeditious proliferation, appear in many processed food products and are now prevalent worldwide (Perr 2002: 475).

In 2007, the global area cultivated with transgenic crops reached 114.3 million hectares, of which 57 percent (58.6 million hectares) is devoted to Roundup Ready (RR) soybean (Altieri 2009: 237). Along with various environmental problems such as deforestation, soil-degradation and endangered animal and plant biodiversity, large-scale application of industrial fertilizers and pesticides with subsequent weed resistance as well as whole ecosystem disruption (Fearnside 2001: 24; Altieri 2009: 239-241; Leguizamón 2014: 155; Delvenne et al. 2013: 159), the soybean expansion has led to drastic income and land concentration (Baletti 2014: 18; Kaimowitz et al. 1999: 508; Garrett & Rausch 2016: 473).

[1] These include potential problems regarding environmental, social, political, ethical, technological, economic and scientific aspects (Jones 1999: 581; Perr 2002: 475).

The international, non-profit association '*Donau Soja*' based in Vienna wants to lessen the import dependency of Europe on soya from non-sustainable sources overseas by promoting GM-free, origin-controlled soybean cultivation in the Danube basin. The *Danube Soya Standard* and its *Guidelines* constitute the foundation pillars of this objective. The standard ensures controlled origin and quality, namely that the soybeans originate from the Danube region and are non-GM. Other requirements include compliance with EU regulations regarding labor and human rights and the use of pesticides as well as aspects of land use such as the interdiction of new agricultural land development resulting in loss of nature reserves, forests and moors and consequently the restriction of cultivation to land designated for long-term agricultural use.

Because the global production of soya is strongly focused on North- and South-America, current literature is similarly concentrated, which leaves a substantial gap of research concerning the soybean cultivation in Europe. Within Europe, Serbia is one of the three largest soybean producers and concurrently the only country that is self-sufficient in the production and processing of soya for the domestic feed compound industry. Additionally, the country is completely closed to imports of genetically modified (GM) products (Živkov et al. 2016: 9). In June 2009 Serbia adopted the law on Genetically Modified Organisms (GMO) which banned all commercial cultivation and trade of biotechnology crops (Brankov et al. 2013: 8296; Smigic et al. 2015: 99). The most important agricultural area within the Republic of Serbia is the Vojvodina province, where soybean production is mainly concentrated, about 93 percent of the total soybean acreage is in this region (Nikolić et al. 2009: 639; Bošnjak et al. 2013: 46). According to the press, the Vojvodina is also more and more attracting the attention of foreign investors, luring with fertile soils, good climate conditions, an ongoing privatization process, comparatively good infrastructure, sufficient labor supply and most importantly a favorable cost structure with low priced land and labor costs (Diethelm 2007: 9; Exner 2010: 5; Weber 2012: 10; Reidl 2013: 9). At the same time, Serbian agriculture urgently needs a push for modernization and with modest financial means of most local farmers, foreign investments are proposed as a possibility to remedy the situation. Thus, there has for example already been interest for a joint venture from investors from the United Arab Emirates (UAE) and China is actively investing in the region as well (Lichter 2010; Triebel 2014). This strongly reminds of the global land rush debate with mainstream media often focused on China buying or leasing large tracts of farmland particularly in Africa (Sub-Sahara). However, Saudi Arabia and the UAE (gulf-state corporations), the USA as well as domestic companies in their respective home countries, invest in a similar fashion not only in Africa but also Europe, South-America and South-East-Asia (Bodenatlas 2015, 26). Accordingly, this could leave Serbia and the Vojvodina highly susceptible to some forms of land deals and changes in land use. The agricultural

structure of Serbia, with mostly small and fragmented family farms, low investment rates and missing efficient high-quality machinery, favors or even necessitates such changes (Manić et. al. 2017: 11).

Although the *Danube Soya Standard* is concerned about land related aspects of soybean production and consequently, as outlined above, has two criteria dedicated to the issue, these are primarily focused on an environmental perspective. Questions regarding ownership, concentration and privatization of land, how agricultural land is utilized or changing agrarian structures (e.g. number and size of farms), that due to the socialist history of Serbia are highly relevant for the Vojvodina, are not included. Nevertheless '*Donau Soja*' constitutes an interesting intersection point of the European soybean commodity chain and as an internationally operating organization, mediating between various players with diverging interests and trying to create market access opportunities, is (following Peluso & Lund 2011: 670) an example of a new kind of actor inducing new terms of land control and influencing agrarian transformation. Thus, the purpose of this master's thesis is to provide an overview of the soybean production in the Vojvodina province and assess the implementation of the *Danube Soya Standard* in the region from a politico-economic perspective. The focus within this localized soybean commodity chain is on the level of the producers and theories on the agrarian question and the global land rush debate will serve as the main theoretical framework for the analysis of the empirical findings.

The master's thesis is structured as follows: the following chapter presents the theoretical approach by expanding on ideas inherent to the just mentioned agrarian question and global land rush debate, based on which the research question is formulated. Chapter three offers a short overview of some existing literature on soybean production, for the purpose of being able to compare the processes currently taking place in the Vojvodina against a global background and identify similarities and differences. Chapter four describes the empirical research methods, detailing the process of data assessment and -analysis. Chapter five introduces the study case with the historical and agricultural context of the Vojvodina province of Serbia, touching upon topics of land tenure, GMO legislation and structural changes. This is followed by two chapters addressing the production of soybeans in the study area, illustrating the cultivation process and various inputs, challenges and advantages, the economic context and certification as well as briefly considering further processing. Chapter eight provides the concluding discussion.

2. Theory

> *"The 'land question' has invigorated agrarian studies and economic history since Marx and early twentieth century writers on agrarian questions" (Peluso & Lund 2011: 667).*

The classic so-called 'Agrarian Question', with its origins in the works of late-nineteenth/early-twentieth century Marxist theorists[2], essentially concerned itself with the establishment of capitalist relations of production in farming and agriculture, the transformations caused thereof and the process of agrarian capital accumulation or to put it concisely, the influence of capitalist economy on agriculture and the nature of such developments (Akram-Lodhi & Kay 2010a: 186; Bernstein 2006: 450; Mann 1990: 1; Moyo et al. 2013: 95; Peluso & Lund 2011: 668). Today, over a century later, this classic agrarian question about the dynamics of capitalist agriculture has been further developed and reformulated multiple times by a host of different authors, making the more than 100-year-long debate over the agrarian question and associated discussions centered on land control[3] one of the most enduring controversies in political economy literature (McLaughlin 1998: 25; Byres 1995: 568). Clearly, as a frame of reference for the impact of capitalist transformation in agriculture, the specifics of the world-historical context within which the agrarian question is embedded, must be considered. Therefore, recent contributions[4] have focused on the implications of neoliberal globalization on the process of agrarian transition, giving rise among other academic research to a growing body of literature[5] on 'land grabbing' (Borras et al. 2011: 210-211; Ouma 2014: 162; Akram-Lodhi & Kay 2010a: 180). The term 'land grab' has become a well-established conception, portraying and examining the phenomenon of "transnational and domestic corporate investors, governments, and local elites taking control over large quantities of land (and its minerals and water) to produce food, feed, biofuel, and other industrial commodities for the international or domestic markets" (Margulis et al. 2013: 2).

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[2] Within political economy, the agrarian question as a distinctive area of research with its own established problematic developed in the 1890s through the fundamental texts of Friedrich Engels (1894): *The Peasant Question in France and Germany*, Karl Kautsky (1899): *The Agrarian Question* and Vladimir Ilyich Lenin's: *The Development of Capitalism in Russia* also published in 1899 (Akram-Lodhi & Kay 2012: 7).

[3] Several transformative periods of time and accompanying paradigm shifts have stimulated the discourse around land control such as the spread of colonial rule, the rise of nationalism and the nation-state followed by an era of neoliberal globalization promoting market economy and global free trade or privatization versus collectivization. The nature of land control and its importance, struggles over issues such as land use and labor practice as well as the effects of these struggles, are therefore "largely products of their times and geographic locations" (Peluso & Lund 2011: 668).

[4] See Terence J. Byres (2009), Bill Warren (1980), Henry Bernstein (2001; 2006), Farshad Araghi (2009) & Philip McMichael (2012).

[5] See Ben White et al. (2012), Klaus Deininger (2011), Olivier De Schutter (2011), James Fairhead et al. (2012), Matias E. Margulis et al. (2013), Wendy Wolford et al. (2013) & Lorenzo Cotula (2013).

As mentioned in the introduction, this master's thesis will discuss the structural change and transition of the agricultural sector in the Vojvodina observed within the context of soya cultivation. Looking at the agrarian question as an interpretative framework offers both the necessary analytical sensitivity and analytical tools to comprehend continuous processes of agrarian change in contemporary developing capitalist countries plus empirical and theoretical consistency. Essentially then, the agrarian question provides a "highly nuanced approach to understanding rural change, one that captures both the common processes at work in the countryside of a range of developing capitalist countries as well as the substantive diversity that can be witnessed within and between those countries" (Akram-Lodhi & Kay 2010a: 198-199). Conversely, a deeper understanding of the current situation in the Vojvodina concerning the soybean expansion and agriculture in general, could provide a discussion on the agrarian question with valuable ideas and examples.

Another important strand of literature for this theoretical framework addresses the global land rush and how the growing interest of global finance in agriculture and particularly farmland creates new kinds of property dynamics, namely expropriation of land and other common property resources; their privatization and concentration which in turn can lead to a transformation of agrarian labor regimes (White et al. 2012: 620). The perspectives these conceptions offer, allow for a contextualization of the processes presently at work in my research area, the Vojvodina. Thus, the main theoretical approach of this thesis will be based on literature about the characterization of the agrarian question and the global land rush debate.

2.1 Origins of the agrarian question: Marx and rural change

The origin of the concern of agriculture's place within political economy can be traced back to the times of Physiocracy[6], but it was not until the works of Karl Marx's and his breakdown on the emergence of capitalism that a distinctively agrarian political economy developed. His most complete analysis on the development of capitalism in agriculture came relatively late in his life through the usage of the concept of 'primitive accumulation', first published at the end of *Capital*, volume I (orig. 1867), where he examines the incurrence of the first agrarian capitalism and its dynamics in England (Bernstein 2006: 499; Lodhi & Kay 2010: 181; Glassman 2006: 610). For Marx (1965: 507-508), primitive accumulation is first and foremost:

[6] Developed during the 18th century in Europe (Enlightenment) by French economist, Physiocracy was possibly the first well developed theory of economics and marks the beginning of political economy as a discipline. Particularly the ideas of François Quesnay with his analysis on the role of the farmer and agriculture in the physiology of society were foundational to the theory (Meek 2013: 5-27).

> *"The process … that clears the way for the capitalist system, … the process which takes away from the labourer the possession of his means of production; a process that transforms, on the one hand, the social means of subsistence and of production into capital, on the other, the immediate producers into wage labourers. The so-called primitive accumulation, therefore, is nothing else than the historical process of divorcing the producer from the means of production."*

In this sense, primitive accumulation is not accumulation per se, but rather a retrospective historical explanation[7] of how the premises of capitalist development came to be, the subsequent conversion of pre-capitalist production means into capital and as a result of this, the formation of the capital-labor relation (Levien 2012: 937; Perreault 2013: 1052; Glassman 2006: 615; Akram-Lodhi & Kay 2010a: 182). Within the therefrom emerging literature on primitive accumulation it is possible to identify a certain ambiguity in the manner scholars have understood Marx's theory and consequently two main analytical frameworks. The main distinction between these approaches is the question whether the principal focus should be on the *function* or the *means* specific to the capitalist mode of production (De Angelis 2001: 2; Levien 2012: 937).

The first approach sees primitive accumulation as the process of generating the pre-conditions for capitalism by focusing on the separation of people from their means of production. It is within this point of view that much of the 'classic' agrarian question is located, represented by the studies of Lenin and Kautsky (both in 1899) on the development of capitalism in Russia and tendencies in agriculture including agrarian policies respectively. Both men saw capitalism as a system that was simultaneously both progressive and dispossessing[8], putting at the heart of their analysis the process by which agrarian capital was established. As Kautsky (1988: 12) succinctly described it, the agrarian question is concerned with "whether, and how, capital is seizing hold of agriculture, revolutionizing it, making old forms of production and property untenable and creating the necessity for new ones". The meaning of primitive accumulation in this context came to be (as described above) any mechanisms through which the peasants became separated from their means

[7] Admittedly, there are suggestions in *Capital* that primitive accumulation was more than a particular (historically and temporally defined) process of capitalist development (Perelman 2000: 29). For instance, Marx (1965: 508) states that the "expropriation of the agricultural producer, of the peasant, from the soil, is the basis of the whole process. The history of this expropriation, in different countries, assumes different aspects, and runs through its various phases in different orders of succession, and at different periods." He recognizes that while primitive accumulation has already largely passed in England it was far from complete and still under way in the colonies at the time of his writing (1965: 543). Nonetheless, the predominant opinion when looking at the textual evidence from Marx suggests that he attempted to make a case for the comprisal of the historical origins of capitalism and trying to argue that to the extent that primitive accumulation continues, it does so sequentially as different countries pass into capitalism (Levien 2012: 937). Hence, his description of primitive accumulation not as "the result of the capitalistic mode of production, but its starting point" (1965: 507).

[8] Glassman (2006: 610-611) also argues, that Marx recognized and exposed this dualism of primitive accumulation, mentioning on one hand the hypocrisy of its capitalist rhetoric about equality and human rights while at the same time insisting that it is a "necessary step in the direction of fuller human development" by setting in motion new possibilities that should exclude any sentiment for the past.

of production, which often happened through a gradual proceeding of class differentiation. (Banaji 1990: 295-296; Akram-Lodhi & Kay 2010a: 185-186, Levien 2012: 938). In summary, the result of the establishment of capitalist relations of production into agriculture through "(…) those moments when great masses of men are suddenly and forcibly torn from their means of subsistence, and hurled as free and "unattached" proletarians on the labour-market" (Marx 1965: 508) seems to be the genesis of agrarian wage-labor and –capital.

The second, different interpretation is pre-eminently concentrated not on the quiet coercion of mere economic relations subjecting the laborer to the landlord in a fully developed capitalist system, but rather on the extra-economic means of accumulation that accompany this aforementioned process of separation, such as theft, fraud and violence (Perelman 2000: 31; Bair & Werner 2011: 990; Glasman 2006: 611; Levien 2012: 937). According to Marx (1965: 512-513) the annexation of common property started in England by use of individual acts of violence which at first legislation unavailingly tried to stop. Eventually though it was the law itself that acted as an instrument of forceful usurpation[9]: "The parliamentary form of the robbery is that of Acts for enclosures of Commons, in other words, decrees by which the landlords grant themselves the people's land as private property, decrees of expropriation of the people" (Marx 1965: 513). Nevertheless, while Marx acknowledged the violent coercion that often went hand in hand with primitive accumulation, he saw resistance against it as a backward endeavor towards a livelihood strategy which he believed had little potential for the future and as such had little sympathy for the peasant way of life whom he sometimes even characterized as a representation of the dead weight of the past (Kaup 2013: 110; Glassman 2006: 613). The theoretical assumption within this approach is that capitalism depends upon something other than just its intrinsic properties to ensure ongoing accumulation (Perreault 2013: 1052-1053; Bonefeld 2011: 381). Instead of regarding primitive accumulation as an illustration specific to England, it is understood as a permanent feature of capitalist reproduction. The origins of the understanding of primitive accumulation as an ongoing process go back to Rosa Luxemburg's (1913) *The Accumulation of Capital*. Although she accepted the perception of primitive accumulation as a historical presupposition of capitalism, her theoretical framework led to a different argument, namely that the vulnerability of capitalism to crisis makes the constant acquisition of land for the extraction of natural resources and the reinvestment of surplus a requirement for stability and accordingly primitive accumulation a permanent necessity. Through the imposition of conditions of primitive

[9] Inter alia, this is evidently manifested in the consolidation of land: "The systematic robbery of the Communal lands helped especially, next to the theft of the State domains, to swell those large farms, that were called in the 18th century capital farms or merchant farms, and to "set free" the agricultural population as proletarians for manufacturing industry" (Marx 1965: 513).

accumulation upon new territories with new populations, cheaper proletarians[10] are mobilized and new markets created, thus creating a temporary resolution to crises of capitalist accumulation. Insofar primitive accumulation is seen both as a precondition as well as a necessary element of reproduction for capitalism (Bonefeld 2011: 380, 381; De Angelis 2001: 3; Glassman 2006: 613). Ultimately then, the fundamental proposition underlying this approach is that "the extra-economic prerequisite to capitalist production - what we shall call primitive accumulation - is an inherent and continuous element of modern societies and its range of action extends to the entire world" (De Angelis 2001: 3).

This train of thought constitutes the foundation of David Harvey's reconstruction and conceptualization of primitive accumulation under the notion of 'accumulation by dispossession', where he similarly to Luxemburg analyses primitive accumulation as a constantly evolving phenomenon and examines the processes happening within capitalist countries of the Global North and the expansion of capitalism into the periphery in times of neoliberal globalization (Glassman 2006: 608; Bonefeld 2011: 380; Rossi 2012: 355).

2.2 Harvey's accumulation by dispossession

> *"A general re-evaluation of the continuous role and persistence of the predatory practices of 'primitive' or 'original' accumulation within the long historical geography of capital accumulation is … very much in order (…). Since it seems peculiar to call an ongoing process 'primitive' or 'original' I shall … substitute these terms by the concept of 'accumulation by dispossession'" (Harvey 2003: 144).*

Although Harvey fails to provide a clear and concise definition of accumulation by dispossession[11] in either *The New Imperialism* (2003) or *A Brief History of Neoliberalism* (2005) and provides instead a number of phenomena that fall under its category, the prevalent understanding of the concept is that accumulation by dispossession has become the predominant form of accumulation under neoliberal capitalism and represents a strategy in response to recurring capitalist crises of over-accumulation[12]. The attempts to overcome over-accumulation are not only occurring at

[10] Although within Marx's view on primitive accumulation multiple dimensions can be discerned, including the effects of changes in property relations and consolidation of capital as well as a shift in the human-environment relationship as a byproduct, his primary focus was on process of proletarianization and the resulting class struggles from it (Kaup 2013: 110; Glassman 2006: 611).

[11] This ambiguity in the concept has led to a rather diffuse and wide-ranging discussion in the emerging literature, for one thing on what exactly defines accumulation by dispossession but mostly on detailed aspects of its interpretation. Some scholars such as Arrighi et al. (2010: 411) for example consider it to be largely synonymous with Marx's conception of primitive accumulation (Levien 2012: 937, Bonefeld 2011: 380; Perreault 2013: 1052).

[12] "Overaccumulation within a given territorial system means a condition of surpluses of labour (rising unemployment) and surpluses of capital (registered as a glut of commodities on the market that cannot be disposed of without a loss, as idle productive capacity, and/or as surpluses of money capital lacking outlets for productive and profitable investment)" (Harvey 2004: 64).

capitalism's periphery as means of developing capitalist social relations and appropriating further surpluses, but also in the global core. (Harvey 2003: 144, 149, 153; Perreault 2013: 1051-1052; Levien 2012: 939; Bonefeld 2011: 379-380; Glassman 2006: 621). His argument is that because one of the main features of neoliberalism is its redistributive rather than generative character[13], there must be ways that "transfer assets and redistribute wealth and income either from the mass of the population towards the upper classes or from vulnerable to richer countries" (Harvey 2006: 43), which is achieved through these aforesaid mechanisms of accumulation by dispossession. Although Harvey (2004: 74-75) discerns a lot of different aspects within Marx's definition of primitive accumulation[14] that he wants to incorporate under the category of accumulation by dispossession, he professes it to comprise four main features:

1) Privatization and commodification: Through the privatization and commodification of formerly public goods and commons, neoliberalism seeks to create new possibilities for capital accumulation in domains hitherto considered to be taboo to considerations of profitability, including but not limited to public institutions (universities, research laboratories, prisons), social welfare provision (education, health care, pension funds, social housing), public utilities of all kind (transportation, telecommunications, water supply) or global environmental commons (water, land, air). Within agriculture the focus is on the physical and legal conversion of open-access or communal resources to private resources and the preclusion of anything but capital-intensive modes of agricultural production (Castree 2003: 279; Harvey 2005: 160).

2) Financialization: Increased financial activity in thus far non-financial realms commenced around 1980 and was characterized by its predatory and speculative manner. Through fraudulent investment operations, asset-stripping and general corporate 'thievery' (e.g. raiding and decimation of pension funds) by various means (e.g. credit and stock manipulations) the capitalist financial system became one of the main drivers of redistributive activity (Harvey 2005: 161).

3) The management and manipulation of crises: Under the 'Washington Consensus' structural adjustment programs (SAP) administered by the International Monetary Fund (IMF) and World Bank (WB) as an instrument to resolve economic crises, pressure to open markets for capital and financial flows and the imposition of other neoliberal practices allowed for the deliberative redistribution of wealth on a world stage from poorer countries to richer ones. The springing of the 'debt trap' and subsequent debt crises in many developing countries helped legitimizing expropriation

[13] See also Shepard et al. (2009: 155): "A few people accumulate wealth through the dispossession of others, rather than by creating new wealth."

[14] Forceful expulsion of peasant populations and land grabs, colonialism and slave trade, the national debt and credit system, the suppression of rights to the commons and alternative, indigenous forms of production and consumption, to just name a few (Harvey 2003: 145).

processes disguised as 'bail-outs' to keep global capital accumulation going. "These debt crises were orchestrated, managed, and controlled both to rationalize the system and to redistribute assets" (Harvey 2005: 162).

4) State redistributions: Concerning redistributive policies the role of the state is pivotal, assuring the flow from lower to upper classes through privatization schemes and cutbacks in social spending. Other means include tax breaks for larger corporations, provision of subsidies and government funds for investments (Harvey 2005: 163-164).

As mentioned before these mechanisms can not only be observed in the Global South but also within countries of the Global North. In the case of Serbia and Eastern Europe in general, according to Harvey (2005: 71) the conditions that prevailed after the collapse of communism were special insofar as the speed with which privatization took place in the 1990s created enormous stress with implications to this day. The *Human Development Report* by the United Nations Development Programme (UNDP) roughly ten years later (1999: 3) as an example noted that "the countries of Eastern Europe … have registered some of the largest increases ever in the Gini coefficient, a measure of income inequality." In terms of the agrarian question the relevance of Harvey's concept of accumulation by dispossession lies in its applicability to describe how capital and capitalism have reorganized the technical and social arrangements governing farming on a world scale in the new context of neoliberal globalization. The demise of centralized, planned economies[15] and the afore-stated neoliberal policies pushed by the IMF and WB led to the abolition of a wide spectrum of trade and financial restrictions, which in turn allowed for the integration of developing capitalist countries and their transition economies into a 'corporate food regime'[16] through the global agro-food transnational capital (Akram-Lodhi & Kay 2010a: 178). Naturally this 'transnational' character of capital[17] and globalization in general must have ramifications for the contemporary agrarian question and agrarian transition which are discussed in the next chapter.

2.3 The agrarian question in the 21st century

> *"In seeking to understand the impact of neoliberal globalisation on agrarian transformation, a number of often divergent and at times diametrically opposed understandings of the contemporary character of the agrarian question can be identified" (Akram-Lodhi & Kay 2010b: 263).*

[15] Yugoslavia during the 1990s and subsequently Serbia after the collapse of the federation can be regarded as an example for this.

[16] "The 'corporate food regime' (1980s–present) specifies a neoliberal project of agricultural liberalization via structural adjustment mechanisms and WTO rules encouraging universal agro- exporting and requiring states in the Global South to open their economies to the Northern-dominated international food trade, dismantle farm sector protections and adopt intellectual property protections. All of these rules have institutionalized market and property relations privileging agribusiness in the name of production 'efficiencies', 'free trade' and global 'food security'" (McMichael 2012: 682).

[17] As already discussed in chapter 2.1, it is exactly this capital which lies at the heart of the classic constructed agrarian question.

The question at the center of the discussion is, if under a system of neoliberal globalization agrarian transition is relevant or even possible. Henry Bernstein (2006: 452) argues that because of its transnational nature the agrarian question of capital on a world scale has been resolved. Global capital accumulation is no longer solely dependent on access to surplus agricultural resources as it now also has the possibility to build on non-rural sources. Therefore, the reorganization of agricultural production through capital and consequently agrarian transition as a presupposition for the development of capitalism is no longer necessary (Akram-Lodhi & Kay 2010b: 263). However, as an effect of this internationalization of capital, labor regimes on a global scale are becoming increasingly fragmented because of transnational capital's ability to bypass regimes that do not raise surplus value within production. Through these increasingly fragmented classes of labor, neoliberal globalization has created an agrarian question of labor while the agrarian question of capital has been suspended (Bernstein 2006: 450, 455; Akram-Lodhi & Kay 2010b: 263).

Michael Levien in his study on Special Economic Zones (SEZ) in India takes up Bernstein's inference but rather than arguing that there has been a decoupling of labor and capital within the agrarian question, he concludes that "their intersection has shifted from the surpluses from agriculture to the control over land" (Levien 2012: 966). 'Land control' can be defined as processes that determine or strengthen claims over land, exclusion thereof and manners of access. Mechanisms that serve these processes to control land include territorialization, enclosure, legalizations and (threat of) force or violence. (Peluso & Lund 2011: 668) The somewhat bold statement by Sassen (2010: 23) that for the global market land itself has more value than the people on it, further emphasizes the importance of land and control over it from an agrarian political economy perspective.

Lastly, Akram-Lodhi & Kay (2010b: 270) pinpoint the implications of 'neoliberal agrarian restructuring' in altering dynamics of rural change, namely the intensification of production regarding land, labor and capital, the reconfiguration of rural production processes and cropping patterns possibly accompanied by expanded labor commodification as well as a gradual transition of the production purposes from domestic use to production for the domestic or export market. Naturally crop specificities also play an important factor in this context and together with the just mentioned ramifications of globalization help distinguish different forms of production on farms. Van der Ploeg (1993: 241) suggests that such specific farming practices are shaped by the interaction between 'human activity' and 'resources' that result in different farming styles which he defines as "a specific way of organizing the farm enterprise: farmer practice and development are shaped by cultural repertoire, which in turn are tested, affirmed or adjusted through practice. Therefore a style of farming is a concrete form of praxis, a particular unity of thinking and doing,

of theory and practice." A farming style furthermore represents a pattern of agrarian resources such as knowledge, machinery, labor and land, that are tied together, utilized and refined over time with both a social and material category[18] (Van der Ploeg 2010: 4). The following chapter picks up on this notion of land as a resource and fundamental aspect of a contemporary agrarian question and examines how the term is framed within the broader discourse on the global land rush.

2.4 Global land rush debate

The politico-economic turmoil that ensued from the 2007-2008 global financial and food crisis once again called the attention of a wider public sphere and academia to the argument about the characteristics of capitalism. Historically, besides aggravating already existing social- and spatial inequalities as well as creating new ones, economic crisis have often functioned as "turning points in the evolution (the management, organization and restructuring) of capitalist economies and societies, opening the way for novel regimes of accumulation and politico-economic regulation" (Rossi 2012: 348). It comes as no surprise then, that around 2008 marked the beginning of a still ongoing heightened transnational acquisition of farmland, that drew attention to land, its value and usage, in the context of the so called global land rush or land grab (Li 2014: 590; De Schutter 2011b: 504). Generally, the concept of land grab relates to "large-scale, cross-border land deals or transactions that are carried out by transnational corporations or initiated by foreign governments" (Zoomers 2010: 429). The main drivers behind this process are the before mentioned 2007-2008 global food price crisis as well as investments in 'offshore farming' where the government is losing confidence in global markets as a stable and reliable source of food and is concerned about food (or fuel) security at home or on the contrary when a hedge- or pension fund is speculating and hoping for scarcity as a means of capital accumulation (i.e. due to rising land prices) (Arezki 2013: 207; White 2013; 39-40; Zoomers 2010: 429; De Schutter 2011a: 251). China with the changing dietary preferences of its population and the Gulf-States having to feed their rice-eating migrant workforce are additional influencing factors in the process (Li 2014: 592). Thus, 'land' within this framework, is described as available for conversion into new economic structures and can consequently be regarded as a resolution to the problem of over-accumulation through the absorption of a surplus of capital in the form of spatial displacement[19] (Borras & Franco 2013:

[18] Gavin Bridge (2009) similarly defines resources, asserting that they contain a dual quality: besides being a 'natural' material entity originating from the world of physical science, there is always also a cultural level encompassing notions of value and utility. "Resources, then, are a cultural category into which societies place those components of the non-human world that are considered to be useful or valuable in some way" (Bridge 2009: 1219).

[19] This is based on the theory of a 'spatio-temporal fix' by Harvey (see chapter 2.2). The central point of his argument is that through geographical expansion (*spatial component*: access to new markets, production capabilities, labor and resource opportunities somewhere else) and temporal deferral (*temporal component*: investments in long-term project that lock-up capital or social spending

1723-1724). In the recent past, this concept of the global land grab has created a large amount of literature in the academic community and sparked an active political debate around it (White 2013: 38; Borras & Franco 2013: 1724; Ouma 2014: 162), but there is firstly a certain danger to confuse this novel interest in the topic with novelty of the phenomenon itself[20] (Levien 2012: 935) and secondly some difficulty in the ambiguity of the term 'land grabbing' in regard to the baggage it carries from the mainstream discourse and as a result of different empirical and theoretical choices made by scholars working on the phenomenon (Ouma 2014: 163; Borras & Franco 2013: 1725; Cotula 2013: 1611). Notably regarding the mechanisms of land grabbing, there are differences that can be observed in how scholars perceive the term; while Levien (2012: 941) for example argues that it is only sensible to speak about a 'grab' when land is dispossessed through coercion rather than voluntarily sold on the market and therefore emphasizes the aspect of extra-economic coercion, other authors also include "straightforward private-private purchases and public-private leases" (Borras et al. 2011: 209) or focus more on the changing contexts and emerging processes that produce new conditions and aid in the shift of control over land and consider the 'grab' itself, while important, to only be the beginning of a process of gaining access (Ribot & Peluso 2003: 165; Peluso & Lund 2011: 669).

Since in the examined Vojvodina province incidents of land grabbing, as far as it appears, are not happening through mechanisms of extra-economic coercion (violence, force or theft) this master's thesis seeks to focus more on the underlying conceptualization of the commodification of land and how the formulation of the idea of land as a resource created new sorts of land control (Peluso & Lund 2011: 668). To better understand the productive relations regarding the soya expansion in the Vojvodina, it is therefore helpful to apply Ribot & Peluso's (2003) *Theory of Access* whereby they argue that the "ability to benefit from resources is mediated by constraints established by the specific political-economic and cultural frames within which access to resources is sought" (Ribot & Peluso 2003: 164). Based on the differentiation between the *right* and the *ability* to benefit from things, access is defined as a 'bundle of powers' rather than a 'bundle of rights', thus broadening its definition from a rights-based approach to resources and property and including a wider range of social relationships that influence the utility of resource use[21] (ibid.: 153-154). Against this

such as research and public education), conditions of surpluses resulting from the inner contradictions of capitalism susceptible to crises of over-accumulation, are absorbed and thus 'fixed' (2003: 87-88, 109, 115).

[20] Occurrences of dispossession and consolidation of land (as previously discussed in chapter 2.1) have a long history, for instance already settlers from England, Spain, Netherlands, Portugal and France during the colonial period were strongly involved in both the establishment of private property and land grabbing. The underlying procedures to enforce land control often changed over time and differed from one another by crop, the geographical location of the colony or by the legal logic behind the process. What is different today is the political economic context of neoliberalism as well as new mechanisms and the justification of land grabs (Deininger 2011: 237; Li 2010: 387; Cotula 2013: 1605-1606; White 2013: 40; Peluso & Lund 2011: 672).

[21] McKay & Colque (2016: 585) summarize this thought nicely: "While people may hold the right to certain property, they may not necessarily have the ability to use the property/resource in a productive way in order to reap benefits from it."

background, they develop a set of mechanisms by which actors such as institutions, groups or individuals are enabled to gain, control and maintain access to resources (ibid.: 160-161). The first of these categories is rights-based access, including legal (sanctioned by law, custom or convention) and illegal (not warranted by state and society) access. Structural and relational mechanisms of access refer to the abovementioned political and cultural circumstances and include several additional factors that operate parallel to rights-based mechanisms and can affect the latter through reinforcement or exclusion[22]. These structural and relational access mechanisms include technology, capital, markets, labor, knowledge, authority, identities and social relations (ibid.: 161-162). *Access to technology* and different tools assist in the extraction of resources that often could not be obtained without the former; more advanced technology benefits those who can afford and access it (ibid.: 165). *Access to capital* is commonly referring to wealth in the form of equipment (see also technology) and finances that help to derive benefits from resources trough a number or processes such as extraction, production, conversion and mobilization of labor. The purchase of rights and payment of rent and formal fees with capital can also be regarded as rights-based mechanisms that control and maintain resource access (ibid.: 165-166). *Access to markets* is an important factor to be commercially able to profit from a resource. Broad market forces of supply and demand influence prices and can often not be controlled by individual actors, thus shaping distribution and ability to profit from things (ibid.: 166-167). *Access to labor* and labor opportunities (jobs) enables to work for oneself, mobilize labor if it is required for the harvesting of the resource at some point along the commodity chain or if no access to a resource through property rights exists, seek employment with the resource owner (ibid.: 167-168). *Access to knowledge*, information, higher education and specialized training or apprenticeship can provide people an expert status which in turn permits privileged access to resources and labor opportunities, often entails membership to groups and networks otherwise inaccessible and may even carry the authority to be able to influence the utilization of a resource and how others think about and perceive it[23] (ibid.: 168-169). *Access to authority* is essentially a juncture where multiple strands of the previously mentioned 'bundle of powers' intersect at one institution or person, such as state agencies and government officials, with the jurisdiction to legally shape an individual's ability to benefit from

[22] As mentioned in the previous chapter (2.3), land as a resource has a material and a societal quality. Two core properties of its material aspect are the immovability of land (stays in place, cannot be removed) and closely connected with that is the dependence on exclusion in order to be useful for humans: "*To turn it [land] to productive use requires regimes of exclusion that distinguish legitimate from illegitimate uses and users (...)*" (Li 2014: 589) and *"... all land use and access requires exclusion of some kind*" (Hall et al. 2011: 4). The range of human application to land is extremely large: agriculture (food, fuel, fodder), religion (spiritual place), mining (oil, coal or minerals), protection of the environment (national park, forest), territory of ancestors (place to build a home), access to other natural resources (water) etc. These overlapping intentions create a conflict of interest; the same area cannot be used by different people for their respective purposes (Li 2014: 591).

[23] "Discourse and the ability to shape discursive terms deeply influence entire frameworks of resource access" (Ribot & Peluso 2003: 169).

resources (ibid.: 170). *Access through social identity* allocates the benefits from a resource along identity lines constituted of attributes like age, gender, place of birth, ethnicity, religion, profession, education and status, thus affecting primarily the distribution of resource access. Identity-based access mechanism are both influenced by and can influence themselves market- and labor access as well as authority, which inherently is also a kind of social identity and can be classified as such[24] (ibid.: 170-172). *Access through social relations* of for example trust, friendship or dependence are similarly to identity pivotal to all other elements of access and represent important strands in the 'bundle of powers' that is access. "In sum, all of the mechanisms of access … discussed above are forms of social relations. Understanding the multiplicity of ways that these work is key to understanding the complexities of resource access" (ibid.: 172).

Another approach to address the topic of land ownership and therefore also questions about control over- and access to land, is to examine it through the lens of different land tenure systems which also references back to the agrarian question due to the implications of such tenure contracts on agricultural development. Against the background of 'land reforms'[25], Griffin et al. (2002: 280) identify four main types of land tenure systems that can be observed throughout the world: cultivation of the land by a peasant owner-operator with household labor; cultivation of the land by the landowner with the help of hired labor (both seasonal and permanent) at fixed wage rates; cultivation of the land by a tenant who pays the landowner a fixed rent for the use of the land and cultivation of the land by a tenant who pays the landowner a fixed share of the output for the use of the land (sharecropping). Each system has already been subject to debate in academic literature with criticism often focused on aspects of efficiency, dependency and tenure security of the respective land tenure type (Griffin et al. 2002: 280-283).

In conclusion, current kinds of land control are a result of increasingly globalized political economies (*chapter 2.2*), new patterns of investment and access (*chapter 2.4*), movement of capital, labor and ideas across borders (*chapter 2.3*); but are also situated within their respective historical moments and geographies (*chapter 2.1*) (Peluso & Lund 2011: 677; Hart 2004: 97).

[24] Ribot & Peluso (2003: 170) argue that "because of the importance of socially sanctioned powers or "authorities" who make and enforce rules and decisions concerning resources" they should however be treated separately in resource access.

[25] This includes, inter alia, a discussion on the difficulties of reforming collective and state farms in ex-socialist countries of central and eastern Europe with the conclusion that the transition overall has not gone well, though Serbia is implicitly as part of the former Yugoslavia briefly mentioned as an exception to this general picture due to a comparatively large private farming sector remaining during the communist era (see chapter 5.1) (Griffin et al. 2002: 298-302).

2.5 Research question

The comprehensive theoretical framework presented above covers a wide scope of literature, in order to provide a holistic interpretation of the somewhat explorative empirical evidence[26]. As pointed out, under the new political context of neoliberal globalization the emphasis of the agrarian question has shifted, from its classical understanding in the sense of how agricultural production is influenced by capital accumulation, to questions of control over land and the creation of new labor regimes, closely linked to the land grab debate that similarly explores the reorganization of land tenure structures and the associated changes on the livelihoods of rural populations. The Vojvodina province is a paragon of such a rurally shaped region and the most important agricultural area in Serbia[27], it is where Donau Soja has been active since the foundation of the organization and it is increasingly catching the attention of foreign and domestic investments. According to the above discussed theories on the agrarian question and the global land rush debate this should leave the region highly susceptible to changing characteristics of labor and land utilization against the background of a general agrarian restructuring processes. In this context, the purpose of my master thesis is to (**1**) provide an overview of the soybean production in the Vojvodina province and (**2**) assess the implementation of the *Danube Soya Standard* in the region, by addressing the following two research questions:

1) **How is soya produced in the Vojvodina?**

i) *How is soya produced regarding land?*

ii) *How is soya produced regarding labor?*

iii) *In what ways does soya cultivation in the Vojvodina contrast to large-scale GM soybean production systems?*

2) **How has Danube Soya affected farmers in the Vojvodina?**

iv) *How has Danube Soya affected farmers regarding the cultivation of soya?*

v) *In what ways does Danube Soya generate a surplus value for the farmers?*

[26] As will be shown in the following chapter, current literature just like global production is strongly focused on the Americas. Particularly in South-America various case studies, investigating the diverse effects the rapid expansion of GM soya had in the area, have been conducted. This leaves a substantial gap of research focusing on soybean production in Europe.

[27] Revolving around the background of soybean production in Europe, as already mentioned in the introduction, Serbia is a special case insofar that it is the only country that is self-sufficient regarding the cultivation of soya for domestic use (meaning no need for soybean protein imports, one of the main objectives of 'Donau Soja') and has completely banned cultivation and trade of GM products.

3. Global soybean production systems

3.1 Development and distribution of soybean production

As already mentioned in the introduction, soya has risen to one of the most valuable crop and top-traded agro-industrial commodities in the world[28], with a multitude of uses, representing an intersection point of food production, livestock feed and manifold industrial products while driving a significant and rapid landscape alteration (Oliveira & Hecht 2016: 251; Hartman et al. 2011: 5; Masuda & Goldsmith 2009: 144). Soybean (*Glycine max*) is a species of legume native to East Asia. Over the past fifty-five years the land area devoted to soy cultivation has more than quadrupled[29] and combined with large yield gains per hectare[30], global soybean production has increased by over 1000 percent from 26 million t in 1961 to 334 million t in 2016 (FAOSTAT).

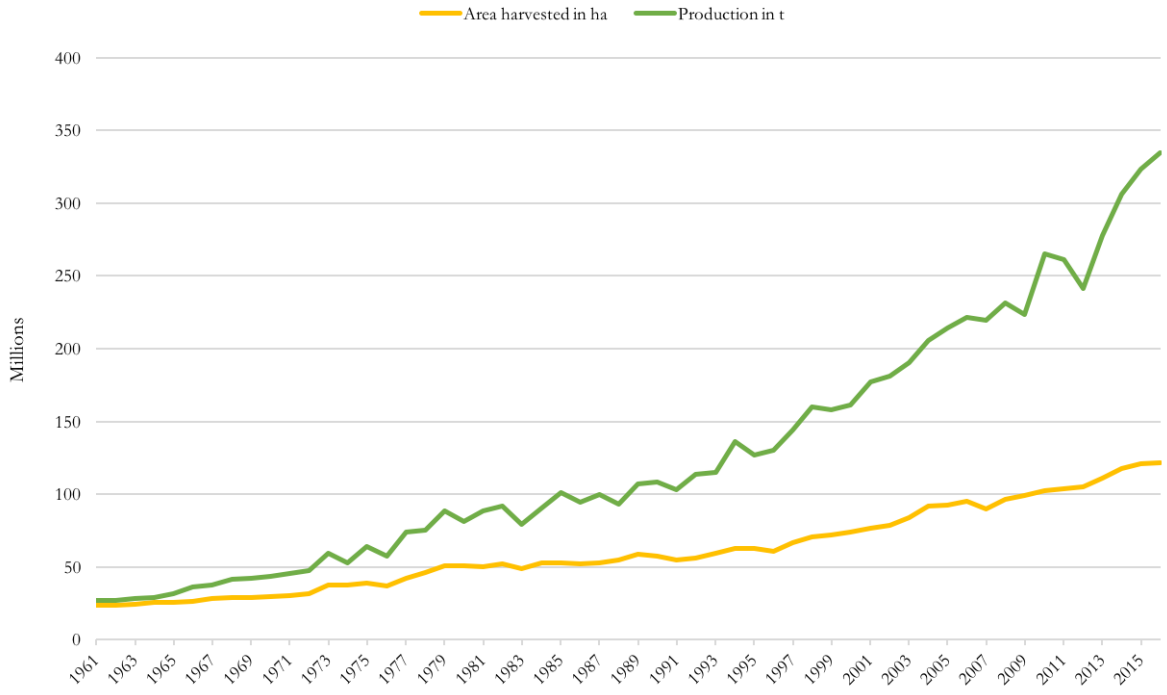

Figure 1: *Production/acreage quantity of soybeans in world, 1961 to 2016 (own representation, data from FAOSTAT).*

Soybean as the multi-purpose, 'flex-crop' that it is today, connecting food, animal feed, edible oils and industrial products such as biodiesel, has its origins in the USA in the mid-twentieth century. During wartime shortages of animal protein, came the discovery of soybean as a veritable 'protein-pill', high in crude digestible protein and low in fiber, which proved highly suitable for the use of livestock feed. In combination with corn, soybean meal provided an ideal, cheap high-energy and

[28] Concerning international trade, land use and production volume, soy is among the most important crops in the world today (Oliveira & Schneider 2016: 167).
[29] Compared to any other major food crops, this is the highest percentage of yearly increases in production area.
[30] This was augmented, inter alia, by tremendous input-intensive agricultural production (Weis 2013: 68-69).

high-protein source, while on the farm level the soybean production helped in replenishing the nitrogen taken up by corn. Embedded in larger changes of the United States (U.S.) agriculture[31], soybean steadily equalized corn and even surpassed wheat as one of the main agricultural products and exports of the U.S. (Borras et al. 2016: 94; Oliveira 2016: 354; Boyd 2001: 645-646). Until the 1990s, which marked a key turning point and drastic shift in the political geography of the global soybean complex, the world's soybean industry was therefore shaped by North Atlantic-based agribusiness governance: together with Europe as the major export destination, the USA controlled the global soybean crushing industry with a share of 51 percent and dominated worldwide production; half of which was concentrated in the USA. Moreover, North Atlantic (European and U.S.-based) transnational companies created a virtual global monopoly in the soybean market; ADM (Archer Daniels Midland), Bunge, Cargill and Dreyfus, collectively known as the ABCD firms, are still the leaders in the world trade of soya to date with an estimated share of 80 percent. This was achieved through vertical integration of those corporations, extending their control over the value chain via joint ventures and strategic alliances (e.g. Cargill with Monsanto or Bunge with DuPont), thus monopolizing much of the storage-, transport- and processing capacities (Leguizamón 2016b: 317; Oliveira 2016: 349; Goldsmith et al. 2004: 88; Oliveira & Schneider 2016: 170; Wesz 2016: 294). In terms of production however, the mid 1990s, as previously mentioned, marked the beginning of a veritable soy boom in South America, "the main characteristic of which was the high rate of planted area growth, which doubled in less than 10 years" (Wesz 2016: 288). Nonetheless, the agro-industrial mode of production into which soya became integrated in South America still had its technical and ideological origins in the USA; through neoliberal reforms (see chapter 2.2) the five countries in the 'southern cone' of South America (Brazil, Argentina, Paraguay, Uruguay and Bolivia), which constitute half of the list of the top ten soybean producing countries (see *Table 1*), established various policies to promote export-oriented production and attract foreign investments, which coincided with the above mentioned efforts of the ABCDs to expand along the value chain (Oliveira & Hecht 2016: 257). As a result, soybean farms in both North- and South America looked increasingly the same, operated in a similar manner[32], utilized the same technologies and "ultimately purchased from and sold to the same markets controlled by these few major North Atlantic agribusiness companies" (Oliveira & Schneider 2016: 171).

[31] Significant increases in corn yields, despite a reduction in total harvested acreage, proved particularly essential to the growth of the commercial feed manufacturing industry. As the American corn belt was also ideal for growing soybeans, this decrease in corn acreage along with declines in the amount of farmland devoted to oats, hay, and pasture, created the necessary space for the soybean production to expand. Moreover, the adoption of solvent extraction methods in soybean processing meant that soybean meal could be produced on a much larger scale and much more cheaply than before (Goldberg 1968: 47, 101; Houck et al. 1972: 44-45; Schaub et al. 1988: 31).

[32] See chapter 2.3 and 3.4 for the topic of these 'forms of production' and eventual differences.

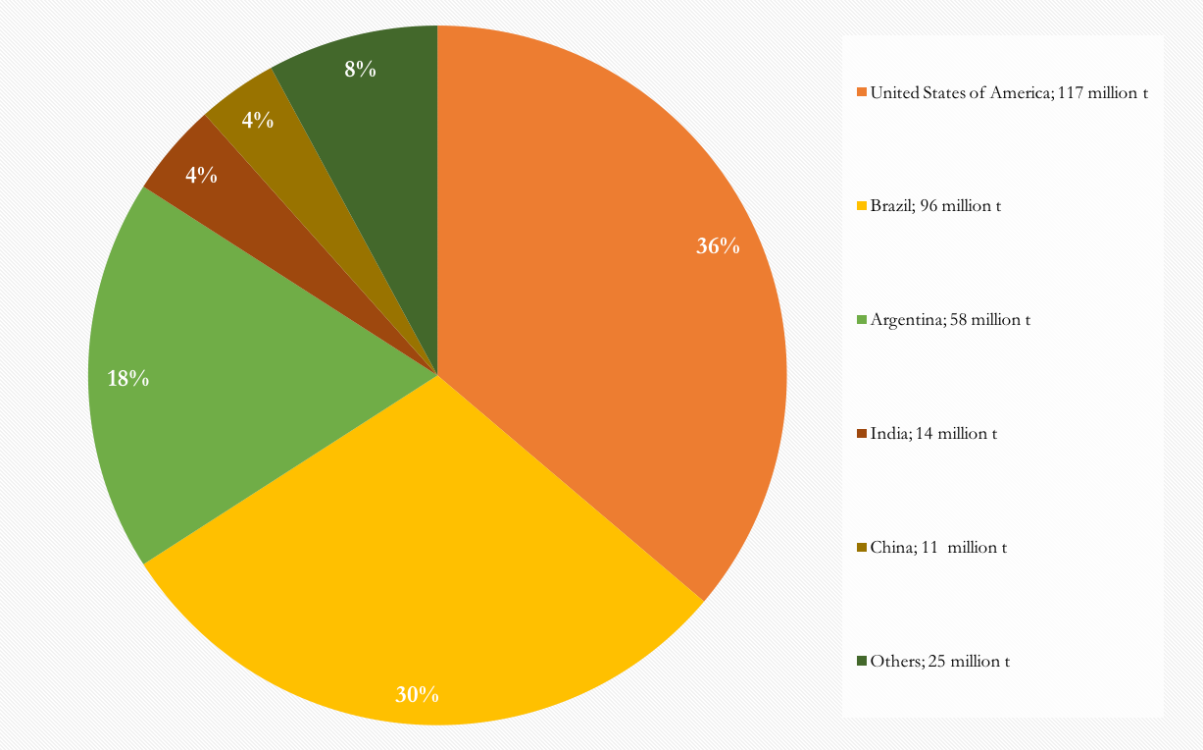

Figure 2: *Production share of soybeans by region with the top five producers in 2016 (own representation, data from FAOSTAT).*

Consequently, by 2003 South America had superseded North America as the world's leading soybean producing region while around the same time, Northeast Asia surpassed Europe as the leading consumer and importer of soybeans from international markets[33] (Oliveira & Hecht 2016: 257; Oliveira & Schneider 2016: 168). China in particular, in order to secure the feed for their growing livestock sector and to meet cooking oil needs, has consistently increased its share and imported 67% of all raw soybeans traded in international markets in 2016 (Garrett et al. 2013b: 395; UN Comtrade 2016a; Trostle 2010: 10). The striking 'imbalance' between the import- versus export market of soybean, depicted in *Figures 2* and *3*, can thus in parts be attributed to this previously mentioned specialization in a few commodities for the export market at the core of the neoliberal agenda for many Latin American countries, also referred to as the Non-Traditional Agricultural Export program (NTAE) (Leguizamón 2014: 150; Oliveira 2016: 353-354; Robinson 2012: 357; Craviotti 2016: 331). In the case of Europe, a strong dependency on protein imports is caused, inter alia, due to the minor role of protein crops in European agriculture. "Compared with other major agricultural regions of the world, the EU is characterized by a low level of vegetal protein production" (Roman et al. 2016: 178).

[33] A prime example in this context is Brazil: until 2003, Europe had absorbed 54 percent of the country's whole-bean exports which were processed domestically to supply the livestock feed industry and vegetable oil markets while only 30 percent went to China. Ten years later however, once local processors, under pressure of the European farming lobby, had switched to rapeseed to meet the demand for vegetable oil and biodiesel and China had changed the tax and tariff structure for soybeans to promote whole-bean imports, as a result of these concurrent processes Europe's share had decreased to 12 percent while China's was now a considerable 75 percent (Oliveira & Schneider 2016: 172; Goldsmith et al. 2004: 92).

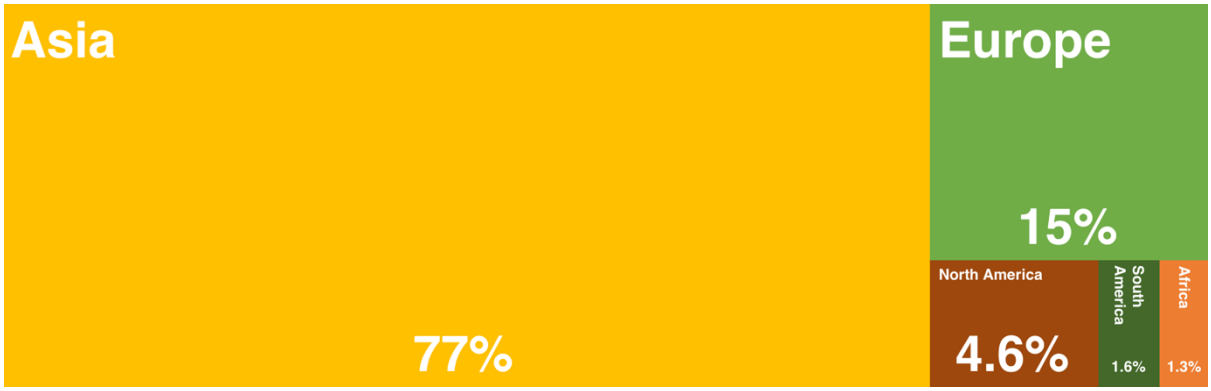

Figure 3: *Share of regions that imported soybeans in 2016 (own representation, data from UN Comtrade 2016a).*

Figure 4: *Share of regions that exported soybeans in 2016 (own representation, data from UN Comtrade 2016a).*

The reasons for the increased global production (see *Figure 1*), processing and consumption of soybeans are varied, one major factor to consider is that an overwhelming 94 percent of all soybeans produced worldwide are crushed to produce soybean meal and -oil for further processing[34] and only the remaining 6 percent are consumed directly as human food in the form of whole beans, tofu or other whole-soy and fermented foods (Oliveira & Schneider 2016: 168). When concerns over BSE (Mad Cow Disease) led to the ban of using many animal derived by-products (bone- and blood meal), agricultural wastes and recycled food as animal feed protein supplements, soybean meal presented itself as a, in this regard, risk-free alternative (Antoniou et al. 2010: 22; Benbrook 2005: 16). Another important factor is the rapidly increasing global demand for biofuels. Although soya is a relatively low-yielding oilseed crop[35], around 750'00 hectares of RR soybean were used for biodiesel production in 2007 in Brazil alone (Goldfarb & Zoomers 2013: 73; Tomei & Upham 2009: 3891; Altieri 2009: 237). All in all, the massive expansion of soybean cultivation will probably continue in the future because of changing dietary preferences of populations in emerging economies and general income growth as well as a heightened demand

[34] "The meal portion of the crush is predominantly used in livestock feed (98 percent), while the remainder becomes soy flour and soy protein for food processing industries. Soy oil is largely refined as edible oil (95 percent), with the rest funneled to industrial products, including biodiesel" (Oliveira & Schneider 2016: 168).

[35] On average 500 liters of oil are produced per hectare, while oilseed rape yields three times this amount (Tomei & Upham 2009: 3891-3893).

for animal feed, biodiesel and cooking oil (Garrett et al. 2013b: 395). In summary then, soy is not just a simple species of legume and staple food, it is also "an agro-industrial feedstock, a complex assemblage of technologies and techniques for the flexible implementation of its production across highly variable landscapes, a global network of machinery, warehouses, trucks and ships channeling commodity flows to multiple markets around the world, structured by an even broader diversity of institutions, social relations and practices." (Oliveira & Hecht 2016: 252).

Table 1: *Soybean area, volume and share of global production and exports in 2015 (adopted from Oliveira & Hecht 2016: 258).*

Rank	Country	Area (million ha)	Production (million t)	Share of global production (%)	Share of global exports (%)*
1	USA	33.40	106.88	33.54	35.96
2	Brazil	32.10	96.20	30.19	44.53
3	Argentina	19.30	60.80	19.08	7.69
4	China	6.80	12.35	3.87	-63.75
5	India	10.90	9.00	2.82	0.20
6	Paraguay	3.24	8.10	2.54	3.63
7	Canada	2.23	6.05	1.90	2.77
8	Ukraine	1.80	3.90	1.22	1.91
9	Uruguay	1.33	3.11	0.96	2.24
10	Bolivia	1.08	2.65	0.82	0.21
11	Russia	1.90	2.59	0.81	-1.35
12	South Africa	0.69	1.06	0.33	-0.06
13	Italy	0.32	0.90	0.28	n/a
14	Nigeria	0.65	0.65	0.20	-0.08
15	Indonesia	0.43	0.60	0.18	-1.67
16	**Serbia**	**0.18**	**0.44**	**0.14**	**0.00**
17	Mexico	0.19	0.36	0.09	-3.25
18	Japan	0.13	0.23	0.07	-2.38
19	Iran	0.08	0.20	0.06	-0.76
20	Burma	0.17	0.20	0.06	0.00

*Negative numbers are provided for net importers, indicating share of global imports.
Source: USDA-FAS data, elaborated by the authors.

3.2 Expansion of GM-soybean cultivation

As already mentioned in the previous chapter, there has been a trend towards an increased homogenization in soybean production worldwide (see Oliveira & Schneider 2016: 171). A main driver of this development has generally been assumed to be the strong concentration on GM soya as a commodity crop (Vennet et al. 2016: 397). "The homogeneity of production techniques is a result of the strong exogenous character of the soy, where most of the knowledge, technologies and markets are neither locally produced nor created. Soy production has always been strongly embedded within an institutional environment that fits within the Green Revolution paradigm and that provides the necessary technological package to the farmers" (Vennet et al. 2016: 413-414). These Green Revolution technologies of the 1960s and 70s, such as development of a new varieties of crops and the usage of fertilizers, pesticides and irrigation systems as production inputs, were in many respects a precursor of the GM biotech package (Dicken 2011: 283). The agronomical characteristics of GM soybeans allow producers to follow a straightforward and predetermined step-by-step process, contrary to 'traditional' crops which require closer monitoring to ensure and stimulate sufficient growth and to control pests. It is important to note in this context that against popular belief, "GM soybeans do not necessarily increase yields but rather simplify agricultural production: they can be sown without plowing the land because glyphosate eliminates weeds but not GM plants, which are engineered to resist this herbicide" (Lapegna 2016: 518).

In South America, the introduction of GM soya in the 1990s went hand in hand with the previously discussed neoliberal economic restructuring under the 'Washington Consensus', based on privatization, deregulation, free trade and export-oriented commodity-specialization[36]. Within this neoliberal context, the possibility for growers to achieve higher profits[37] when switching to GM soy production coupled with the rising demand on the global market, was ultimately one of the main reasons which lead to the aforementioned soy boom (Lapegna 2016: 522; Leguizamón 2014: 150). Argentina as an example, was able to expand its production from a meager 26.8 tons in the 1969/70 season to 52.7 million tons in 2009/10 (Leguizamón 2014: 152). Broadly recommended as a macroeconomic success model for other less developed countries to encourage commodity-driven development, the benefits of the introduction of large-scale GM soy production become less apparent when looking at other indicators beyond the economic scope such as sustainability, justice, socio-cultural and environmental consequences. In the northern parts of Argentina, the

[36] See chapters 2.2 and 3.1.

[37] In Argentina, the comparative advantage achieved through the 'no-tillage' (direct seeding), RR soybeans package including the Monsanto herbicide (glyphosate Roundup) and protection of the farmers under UPOV 78 (legitimately being able to plant saved seeds) signified an estimated 15% profit increase compared to traditional farming techniques and crops (Bisang 2003: 437; Leguizamón 2014: 151).

monocultures of GM soy threaten fragile ecosystems, robbing indigenous inhabitants and peasant campesinos of their livelihood accompanied by land-grabbing related violence, a tendency coined as 'Pampeanization' by Delvenne et al. (2013: 159). Rural displacement[38] is going alongside an increase in farm size but conversely the total number of farms is decreasing (Leguizamón 2014: 152-153). Large agribusinesses like the ABCDs become powerful actors pushing for vertical integration along the value chain and controlling huge amounts of hectares through leasing contracts (Leguizamón 2016b: 317). The introduction of genetically engineered soy in Brazil resulted in increased labor productivity and consequently fewer employed workers per unit of land (Bustos et al. 2016: 1362). Environmental aftermaths of soybean production in South America include deforestation, soil-degradation and endangered animal and plant biodiversity (Fearnside 2001: 24; Altieri 2009: 239-241; Cavalett 2009: 770; Lathuillière et al. 2017: 688). The use of toxic agro-chemicals caused the emergence of resistant 'superweeds' and is associated with severe health problems (cancer, miscarriages and birth defects) in affected communities (Leguizamón 2014: 155). These developments, besides increasing pressure from European consumers demanding more ethical products, growing media coverage as well as tensions with environmental organizations (see next chapter 3.3), also led to various local peasant-indigenous movements protesting the negative consequences of the GM soy model and mobilizing against the resulting environmental injustice (Elgert 2012: 299-299; Leguizamón 2016a: 684-685).

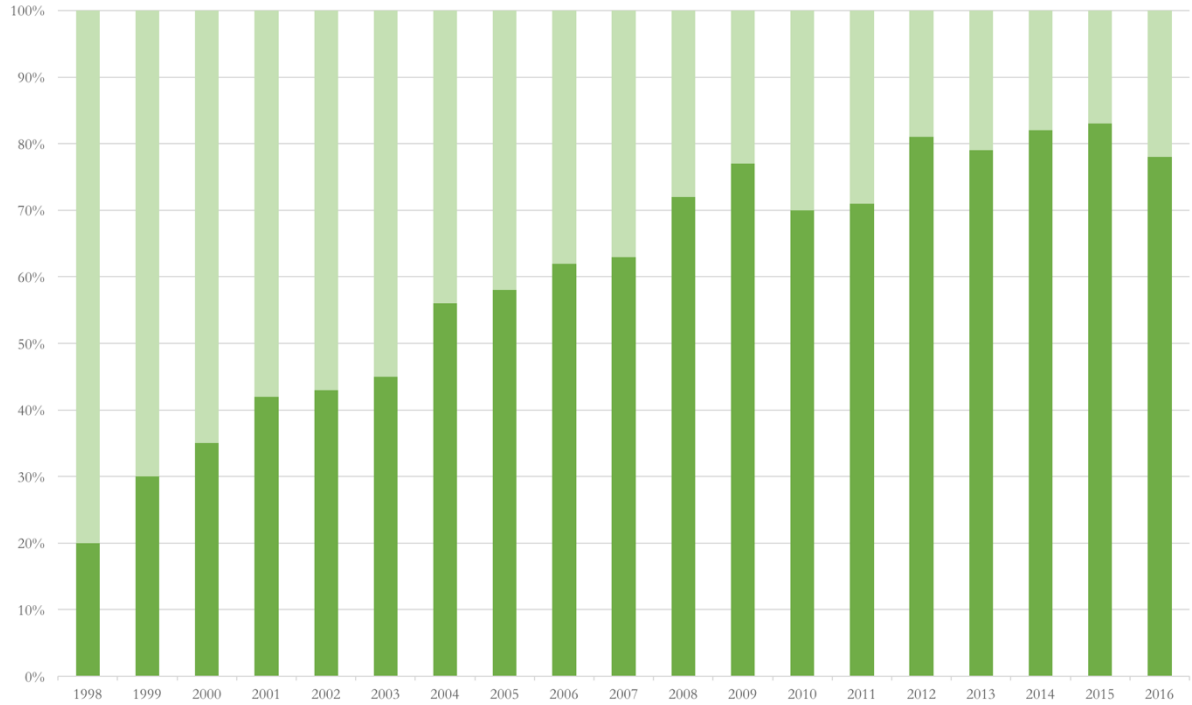

Figure 5: *Share of GM soybeans compared to soybean production worldwide, 1998 to 2016 (own representation, data from FAOSTAT).*

[38] In Argentina, total population living in the countryside decreased from 20.2% in 1970 to 6.9% in 2010.

3.3 Soya certification standards

Due to the growing publicity of some of the above-mentioned problems associated with GM soy production, a number of certification systems emerged, such as the *Roundtable on Responsible Soy* (RTRS) in 2005 which "aims to develop criteria for the production of 'responsible' soy" (Elgert 2012: 299) or the *Soy Moratorium*, another voluntary certification agreement geared towards limiting illegal deforestation. Both monitoring programs include major agribusiness corporations such as Cargill or Monsanto and international environmental nongovernmental organizations (e.g. WWF) (Baletti 2014: 13). A difficulty of developing criteria for the certification of sustainability - or issues regarding fairness and responsibility in general - however, is that within the decision-making process and negotiations, powerful agendas are often imposed on the less powerful actors. Thus, while labels based on the RTRS criteria "may put the global consumer at ease, and may well even result in reduced environmental impacts through improved agricultural practices and planning and zoning (…) such a label is unlikely to address issues such as a more equitable distribution of land and opportunities that, for many peasants, are at the heart of the problems with the soy industry" (Elgert 2012: 303). As a result, the RTRS has been accused of 'greenwashing' by its opponents, claiming that in order to receive a 'responsible' label, only little changes have to be actually made by producers (Elgert 2016: 542). Donau Soja, similarly to the RTRS, connects various actors centered around soy production, but in their case, that process is happening along the 'European' soybean value chain; besides incorporating criteria of controlled origin (as the name suggests) and non-GM status, they are however likewise concerned about issues of sustainability and fair conditions in their standard[39] (for the complete document, Version March 2017, see Appendix I). Not surprisingly, this resemblance leads the association having to face similar challenges[40] such as avoiding a segregation within the commodity chain, ensuring that the net product remains in the countries/regions cultivating the soybeans in order to develop and back local processing industries. Regarding the requirement that *Danube Soya* must be derived from GM-free soybean varieties and -cultivation, it is important to note that although GM crops are becoming a progressively widespread feature of agricultural landscapes, there are significant disparities in their adoption rate between production regions worldwide. Contrary to the previously discussed expansion in South America, European acreages under GM cultivation are small and remain contentious. These disparities are in general attributed to both the complicated regulatory approval processes in Europe as well as political- and societal opposition toward agro-food biotechnology (Garcia &

[39] "Guaranteed non-GM status, traceability, regional cultivation and sustainable production are the Donau Soja core criteria" (cited from their brochure).

[40] The topic will be taken up again in more detail in chapter 7.3.

Altieri 2005: 335; Devos et al 2009: 12; Herring 2008: 458; Gomiero et al. 2011: 17). Serbia's law on GMO (as mentioned in the introduction, see also chapter 5.2.2) and Donau Soja are perfect examples of such opposition. Furthermore, intersecting with the wider debate on the role of GM crops in agriculture, there is also disagreement on the feasibility of coexistence[41]; with some authors claiming that "unless whole regions are declared GM agriculture free, the development of distinct systems of agriculture (GM and non-GM) will be impossible as GM agriculture emerges at the expense of all other forms of production" (Altieri 2005: 361), while others are more in favor: "The main conflict line is between those that promote agro-food biotechnology applications as a *safe and sustainable* alternative to current crops and agricultural management practices, and those that *defend* less-industrialised cropping systems - as a future *'alternative'* agricultural path - by preventively banning this *novel* agricultural technology" (Devos et al 2009: 26). Again, Serbia with its GMO law represents a textbook example of such a GM-crop free region. Živkov et al (2016: 11-12) concluded that from a market perspective, the most likely effect of a liberalization[42] of this law would be an increased interest of soybean producers to introduce quality labels (due to the GM competition) with the production under those labels increasing as well. What has already occurred in terms of production, is a structural shift of producers "toward enlarging family households at the expense of buying and especially renting land from old farms and the state" (Živkov et al 2016: 27). This alteration will be discussed in more detail against the background of my field research in chapters 5.2.1 and 5.3.1, but first, the following chapter expands the geographical scope again by examining some large-scale trends behind the production of soybeans.

3.4 Forms of production

Although there is a trend in literature to regard soybean cultivation as a homogenous production system, synonymous with large-scale, capitalist agriculture (see chapters 3.1 and 3.2), some authors such as Vennet et al. (2016: 396-397) assert that this monolithic perception can be challenged. For this purpose, they identify three distinct farming styles behind the soy production in the southern regions of Brazil: the dominant '*colonial*' farming style is characterized by cultivation of commodity pruducts (cattle, pigs, poultry, wheat and soya) based on "intensified mechanization, high external-input use and a high dependency on external knowledge" (ibid.: 406). The '*niche*' farmers

[41] "Coexistence in agriculture refers to a state where different primary production systems such as organic production, conventional agriculture, and genetically modified (GM) systems occur simultaneously or adjacent to one another, while each contributing in their own way to the overall benefit of a region or country, ensuring that their operations are managed so that they affect each other as little as possible" (Altieri 2005: 361).

[42] Allowing the import of the GM soybean meal into Serbia and its use in animal feeding due to harmonization with regulations of the WTO and EU.

differentiate through their diversity in strategies to increase income, either utilizing conventional or organic farming techniques and searching for new channels (e.g. farmers' market) to sell their products[43]. The farm scale is comparable to that of the colonial farmer (ibid.: 408-409). Lastly, the '*entrepreneurial*' farming style "consists of specialized (larger scale) soy producers, who are intensely interlinked with the market" and have a productivity-oriented approach to their farm and future. They produce similarly to the colonial farmers but with state-of-the-art technologies on much bigger cultivated surfaces (ibid.: 409). However, although Vennet et al. (2016: 412) distinguish between these three farming styles, they conclude that '*the practices of soy production itself*' are surprisingly homogenous[44], which is already represented in the brief overview above. What is different is not the production system itself but the *relationship and integration* of production with farmers' attitudes toward their ecological, social and economic environment; or in other words, differences refer to the level of farms on which soya is produced. Hence, what follows below is a short summary of some of the often-mentioned homogenization trends in soybean production.

3.4.1 Mechanization

The mechanization of production was one technology that expedited a shift toward large-scale monocultures (Altieri 2009: 242). Compared to smallholder agriculture, intensive mechanized soy production demands a different set of skills and requires access to large amounts of capital because the agricultural machinery utilized is expensive, thus entailing a higher level of financial risk (Garrett et al. 2013a: 265). As machines get bigger and more technologically advanced, they can cover bigger tracts of land in less time and often combine two or more process steps along the way. With no-till seeding for example, it is possible to simultaneously seed and fertilize around 50 hectares per day with a small machine and even between 80 and 100 hectares with a larger one. On the downside, this adoption and intensification of mechanization is very fuel and energy intensive. In consequence to the costliness of the agricultural machinery and because it is only used for a few days in each field, *rural contractors* as a type of service provider[45] have concurrently with the GM agrarian transformation grown in numbers: soy producers increasingly tend to hire such contractors to perform these tasks – mostly sowing, harvesting and pest control - as it is not 'efficient' for them to buy the machinery themselves. (Lódola 2008; Leguizamón 2014: 152-153).

[43] Because within this particular farming style, produce is often sold directly to the consumers, the soya varieties grown are fit for direct human consumption and in addition, besides processed products such as honey and cheese or fresh produce like vegetables and fruits, are only one component among a wide variety of sold goods.

[44] Thus, ultimately nonetheless agreeing with the current paradigm they sought to challenge.

[45] "Contractors typically have no control over the land; they only own the machinery and do the labor. Because the specialized agricultural machinery used to grow transgenic soy can be used with other crops, such as oats, wheat, ryegrass, and alfalfa, contractors are at work almost all year round, traveling with their tractors and combines from field to field, from province to province" (Leguizamón 2014: 153).

3.4.2 Labor

The integration of soya into an agro-industrial production system heavily dependent on machinery, chemicals and fossil fuels has drastically transformed the rural landscape: on-farm labor is less and less required, being displaced by petrochemicals and energy as main production inputs (McKay & Colque 2016: 583-584; Bustos et al. 2016: 1363; Leguizamón 2016b: 319-320; Garrett & Rausch 2016: 474; Vennet et al. 2016: 410).Besides the effect of replacing labor and reducing working time, another consequence of increased mechanization concerns the requirement of new skills and know-how of workers. "As machines get bigger and more technologically advanced, specialized knowledge is necessary to operate them. Moreover, production planning happens in advance and it also requires specialized skills. Rural skills and knowledge, traditionally transmitted within the family or community, are now transmitted through universities. Agronomists and engineers with Masters' Degrees in agribusiness now plan and follow production from afar, from the offices of the agribusinesses, with the aid of information technologies such as computers, cellphones, and satellites. Field visits are increasingly rare. One person can oversee several thousand hectares" (Leguizamón 2014: 152). Furthermore, this specialization and concentration of rural labor, in conjunction with the replacement of workers through the adoption of the new technologies inherent to the agro-industrialization can lead to rural depopulation and –displacement (McMichael 2012: 693; Leguizamón 2016b: 319-320).

3.4.3 Land

The above mentioned rural depopulation goes "hand in hand with a decrease in the number of farms as well as with increased farm size and concentration of landholdings" (Leguizamón 2014: 153). The soybean expansion is also attributed to be the source of socio-ecological trends regarding the aspect of land-use, such as deforestation, the emergence of vast monocultures, soil-degradation and endangered animal and plant biodiversity in terms of the ecological point of view (Fearnside 2001: 24; Altieri 2009: 239-241; Delvenne et al. 2013: 159), and from a socio-economic perspective tendencies of conflicts over land tenure[46] and subsequent loss of control and management over owned land or difficulties with farm succession (Gudynas 2008: 514; Vennet et al. 2016: 397). Ownership structures and regulations governing the leasing of land influence farmers' treatment of the land (exploitation vs long term investment) (Garrett 2013: 388). As an example, farmers rent extra land to optimize the capacity usage of purchased machinery, which is albeit often only regarded as a mere production factor used to maximize production. (Vennet et al. 2016: 405-406).

[46] "Displacement and conflicts over land tenure faced by small farmers, peasants and indigenous groups have been denounced in different zones of tropical Brazil, northern Argentina, and eastern Paraguay and Bolivia" (Gudynas 2008: 514).

4. Methods

This master's thesis methodological approach is rooted within the interpretive-understanding framework of qualitative social research which considers aspects of contextuality, subjectivity of respondents and subjectivity of the researcher himself. Integral features of qualitative research are the selection of appropriate methods and theories concerning the object of investigation, including reflection of the researcher thereover as part of the learning- and cognition process, consideration and analysis of different perspectives as well as the interpretive paradigm concept[47]. From an epistemological point of view, this approach is based on a constructivist ontology (Mattissek et al. 2013: 127-128; Flick 2007: 26). In the case of my master's thesis the empirical research was a twofold procedure, the first step consisting of the data assessment with the help of qualitative interviews, described in more detail in the next chapter, followed by a 'content-structuring' qualitative content analysis according to Kuckartz (2014: 77), further elaborated in chapter 4.2.

4.1 Data assessment

The data assessment was based on two types of qualitative interviews: 1) the *problem-centred interview* (PCI) following Witzel (2000) with producers from the Vojvodina and 2) the *expert interview* following Bogner & Menz (2002) with representatives from important institutions surrounding the Serbian soybean commodity chain. In total, 27 interviews were conducted (see *Table 2* for an overview), which can be considered a medium sized sample in qualitative research[48] (Helfferich 2011: 173). All interviews were semi-structured[49] in the sense that an interview guideline was utilized to help ensure that all relevant topics were discussed. The main topics of the guide were developed deductively, with regard to the pre-given knowledge that was acquired throughout the data assessment and the research question. The order and phrasing of the questions however was not firmly fixed which allowed for individual course of conversations and thus a relatively open interview structure (Gläser & Laudel 2010: 42; Mattissek et al. 2013: 166-168).

[47] The interpretive paradigm is based on the notion that social reality is a construction resulting from reciprocal interpretation of action and communication processes (Mattissek et al. 2013: 130).

[48] On average, the interviews lasted around 50 minutes.

[49] In qualitative research, many different forms of interviews exist, each with its own methodological emphasis. This diversity is impressive but at the same time confusing, because terms are used inconsistently and classification schemes are based on different criteria depending on the authors (Mattissek et al. 2013: 158; Helfferich 2011: 35-36). Gläser & Laudel (2010: 41-42) distinguish between three fundamental types of interviews based on the assessment method: structured, semi-structured and unstructured interviews. Structured interviews build upon a list of predetermined questions with no variation and no scope for follow-up questions to responses that warrant further elaboration; basically, they are verbally administered questionnaires. Unstructured interviews on the other side of the spectrum are performed with no organization and completely open questions, omitting any preconceived theories or ideas. Semi-structured interviews are located somewhere in between.

4.1.1 The problem-centered interview (PCI)

The aim of the PCI and the principles guiding it, are focused on the unbiased capture of evidence on human behavior as well as on subjective perceptions and ways of processing social reality (Witzel 2000: 1). From a methodological perspective, the PCI is largely based on the theory-generating approach of the *Grounded Theory*, developed by Strauss and Corbin (1990). The inevitable prior-knowledge of the researcher serves as a heuristic-analytical framework during the collection phase of the data, providing ideas for questions within the dialogue between scientist and interviewee. At the same time, through stimulation of the respondent's narration (what the observed subjects determine to be relevant), the interviewer's position of general openness in relation to the empirical observation is guaranteed. Thus, knowledge production in relation to the PCI must be organized as an inductive-deductive mutual relationship. "This flexible procedure should insure that the interviewer's/scientist's view of the problems being addressed does not simply overlap the respondent's and that the theory is not simply superimposed upon the collected data" (Witzel 2000: 3).

Against this background, three basic principles guiding a PCI can be identified: The *problem-centered orientation* describes the social relevance of the research topic and characterizes the organization of the learning- and cognition process; parallel to the production of broad and differentiated data, the researcher is already evaluating it, which allows for a more precise disquisition of the research problem. The principle of *object orientation* emphasizes the methodological flexibility towards different aspects of the research subject, which is why the PCI was developed to be embedded within a combination of methods, among which the interview is the most important instrument. *Process orientation* refers to the overall research procedure and in particular to 'pre-interpretation' (based on existing knowledge of the researcher): through the creation of a relationship of trust and a sensible communication process, the interviewees feel they are taken seriously and thus open up. This motivates self-reflection and facilitates their ability to remember things which in turn may, for example, lead to alternative aspects on the same topic from a different perspective or even corrections of earlier statements as well as redundancies and contradictions[50] (Witzel 2000: 4).

Four instruments enable and assist the implementation of a PCI: short questionnaire, interview guideline, tape recording of the interview, postscript (Witzel 2000: 5). For this thesis only interview guidelines and tape recordings were utilized. The proposed short questionnaire was omitted as not to impose a too formal character on the conversation and to keep time exposure for the

[50] "Redundancies are welcomed to the extent that they often contain new formulations which facilitate interpretation. Contradictions express individual ambivalences and indecision which should be addressed. These might be the result of misunderstandings on the part of the interviewer or an interviewee's error or lack of memory which can be clarified through repeated questioning. However they may also be a reflection of problems in orientation, contradicting interests, decision making dilemmas in the face of contradicting demands of action" (Witzel 2000: 4).

interviewees within a reasonable level; basic information of the interviewees was included at the beginning of each meeting. Because all interview-participants except one[51] gave me permission to record the conversation, the resulting interview transcripts made the utilization of postscripts redundant. "Compared to a protocol, the generally accepted tape recording of an interview allows for an authentic and precise record of the communication process (…). The interviewer is thus able to concentrate completely on the discussion and on observing situation-related conditions and nonverbal expressions" (Witzel 2000: 7).

4.1.2 The explorative and systemizing expert interview

Expert interviews are a popular data assessment in qualitative social science and an efficient way for researchers to collect insider knowledge about a specific field and gain initial insights for further steps in the early phase of a study-project. Furthermore, relying on experts can facilitate the understanding of a complex field that would otherwise require conducting a lot more interviews (Bogner & Menz 2002: 7). The advantage of the expert interview is its focus on the impulsively communicable experienced-based knowledge and practical know-how which represents an expert knowledge the researcher could otherwise not obtain (Bogner & Menz 2002: 37).

Bogner & Menz (2002: 37) distinguish between the '*explorative*', the '*systemizing*' and the '*theory-generating*' expert interview. Within the methodological framework of this thesis, the former two make for especially useful tools. *Explorative* expert interviews help to thematically structure the research area and subsequently to generate hypotheses. The experts themselves may be part of the targeted interview sample, although often they are used as a complementary source of information about the actual target group. In the latter case, they are the source of 'contextual knowledge'. Because the focus of the explorative interview is on thematic exploration, comparability, completeness and standardization of the data is not a primary goal. The *systemizing* expert interview aims at complete and systematic information procurement. The role of the expert in this context is that of an advisor, explaining facts and connections within a certain topic and presenting his point of view on the matter.

4.1.3 Fieldwork and empirical data overview

In a first step, I conducted four interviews with members of the management of Donau Soja at their headquarters in Vienna. This helped to give me an overview of the organization and provided me with new material besides the publicly available information on their website and downloadable

[51] In this particular case, I took notes along the interview which I later complemented from memory to the best of my ability.

documents (*Danube Soya Standard* regarding their standard and the *Guidelines* detailing requirements for a membership). As preparation, I utilized the *LexisNexis* and *Factavia* news databases to collect press articles on 'Donau Soja', which I then summarized, identifying congruent issues and broad trends within the coverage about the association. The thereby acquired 'prior'-knowledge was used to create and structure the interview guide. Nonetheless, because I was still in the exploration phase of my project at that point, the interviews fit very well into Bogner & Menz's (2002: 37) classification of explorative expert interviews[52] (see previous chapter). Based on the subsequent analysis of these preliminary interviews, in a meeting together with my supervisor Prof. Dr. Christian Berndt, Serbia as a significant producer within Europe and particularly the Vojvodina with its rich agricultural history were identified as a relevant study area against the background of my master's thesis.

The next step of my research therefore consisted of a literature review on the soybean cultivation in Serbia as well as a more general investigation on the Vojvodina, including the historical, socio-economic and political context of the province. Simultaneously I contacted the local field office of Donau Soja in *Novi Sad* (the capital of the Vojvodina province and second largest city in Serbia) as well as researchers from the local university, informing them of my intention to conduct interviews with soybean producers in the region and inquiring if they could assist in establishing contact with suitable farmers. In both cases I received positive feedback and my project was met with a lot of interest by members of these institutions. Again, pre-given knowledge, this time from the previously conducted interviews in Vienna and the literature review, was used for the creation of the interview guides. For the design of these guides I generally oriented myself towards the SPSS[53] (German for '*sammeln*', '*prüfen*', '*sortieren*', '*subsumieren*') principle proposed by Helfferich (2011: 182-185). One important side effect of this procedure is that the researcher becomes consciously aware of his or her own pre-existing (theoretical) knowledge as well as implicit expectations regarding the respondent's narration.

From mid-November to mid-December 2017 I spent almost a month in Novi Sad and from there travelled to several different locations within the Vojvodina (for a map of the study area see *Figure 9* in Appendix II) to conduct my interviews with various farmers, seed suppliers, extension services, one local agricultural trading company and university representatives. Since the contact

[52] I consider people who work directly within the 'Donau Soja' organization to be experts because of their large contextual knowledge surrounding the soybean production in Europe.

[53] In a first step, as many questions that are of interest in connection with the research topic as possible should be compiled ('*sammeln*'). The questions are then examined and revised until only the really important and suitable ones remain ('*prüfen*'). In a next step, these remaining questions are then sorted in such a way, that the result is between one and four thematic clusters of questions ('*sortieren*'). Finally, for each cluster a single, preferably simple question serving as a stimulus for narration is to be found, under which individual aspects and questions can be subsumed ('*subsumieren*') (see also Witzel 2000: 13) (Helfferich 2011: 182-185).

with these interview participants was predominantly established through agency of Donau Soja and the university, the strategy that best describes my sample selection process is that of a combination between *snowball or chain sampling* and *opportunistic sampling* according to Patton (1990: 176-179). The snowball or chain sampling approach begins by asking several well-situated people for potential interview partners which results in a growing number of informants. Opportunistic sampling permits the sample to emerge during the fieldwork by taking advantage of unforeseen opportunities: "Being open to following wherever the data lead is a primary strength of qualitative strategies in research" (Patton 1990: 179). A perfect example of this is that at first, I wanted to confine my sample only on producers that cultivate under the *Danube Soya Standard*, but when I realized that its influence was less pronounced than initially assumed and that the possibility for further interviews was decreasing towards the end of my fieldwork, I opened up the sample and was able to conduct five more interviews.

Although I was repeatedly warned from different sources that farmers in the Vojvodina might be suspicious to the idea of being interviewed and even associate me with the government or feel that it was my intention to 'spy' on them, that proved not to be true[54]. Much on the contrary, information was shared liberally, and the point in time within the year (months of November and December) the interviews were conducted, turned out to be very advantageous as the farmers were done with harvesting and had enough time to accommodate me. The main challenge and also limitation of my fieldwork however, was certainly the language aspect. Since I do not speak Serbian and rightfully anticipated that not all producers could speak English well enough for me to conduct an entire interview with them, I was completely dependent on the services of a translator. As presented in chapters 4.1 and 4.1.2, an important aspect of semi-structured interviews and the PCI in particular is the stimulation of the respondent's narration through re-questioning and the flexible application of communication techniques in order to allow for an individual course of conversation: "according to the requirements of developing a communication situation focused on the individual respondent, the interviewer can more frequently use, depending on the varying degree of the respondent's reflection and eloquence, narration or recurrent questioning in dialogue procedure" (Witzel 2000: 4). Consequently, in the absence of being able to communicate directly, I chose to have a translator accompany me to my interviews and translate both my questions and the respective answers of the interviewees, which allowed me to react to specific aspects and to a certain degree investigate them more closely. The recordings of these interviews were then given to an English professor at the University of Novi Sad, who transcribed and translated the given

[54] In this context, it is important to note that I always made sure to introduce myself before every interview, inform them of my objective and asked for consent to record the conversation as well as explaining that all information would be anonymized.

answers of the interviewees. Although this required an additional organizational effort, it guaranteed the extraction of as much information as possible under the given circumstances while at the same time reducing the amount 'lost' in translation. In five cases, it was possible to conduct the interview directly in either German or English and in two cases the wives of the respective farmers joined the meeting and acted as translators as well as including their own opinions regarding certain aspects. As mentioned previously, with producers I conducted problem centered interviews whereas the interviews with the local experts (researchers at the university, seed suppliers and representatives of an extension service and a trading company) best match the classification of the systemizing expert interview following Bogner & Menz (2002: 37-38), these were predominantly (except in two cases where a translator was used again) conducted in English.

Table 2: *Summary of conducted interviews arranged by classification of interviewees.*

Institution / Function	**N° of Interviews**	**Data Specification**
Soybean Production	15	- 18 interviewees - 10 separate locations - 10 'Donau Soja' certified producers - 9 conventional- and 6 organic producers - 5 ha to 5'000 ha
'Donau Soja'	5	- 4 Management Members at Vienna Headquarters - 1 Project Coordinator at Novi Sad Field Office
Research at University of Novi Sad	3	- 2 Professors at the Department of Agricultural Economics and Rural Sociology - 1 Assistant Professor at the Department of Field and Vegetable Crops
Seed Supplier & Distributor	2	- 1 Agronomist at Axéréal[55] - 1 Agronomist at Komercservis Agrovojvodina[56]
Agricultural Extension Service	1	- 2 Agronomists at PSS Sombor
Agricultural Trade	1	- 1 Agricultural Engineer at Agrogrnja[57]

[55] Axéréal is a grain cooperative based in France with 13'000 member farmers that covers the entire commodity chain for all kind of different crops (wheat, barley, corn, rapeseed, soya) from seed production to storage and transport, collecting and selling grain via its trading subsidiaries and exporting malt flour and animal feed refined by its processing subsidiaries. The company has been active in the Vojvodina for 15 years where they started with barley (supplier to distillers and brewers) for a few years. Regarding soya, Axéréal has two French seed varieties that in partnership with seed breeders are imported and multiplied. This process is state-controlled with 2-3 controls a year regarding quality, germination and properties of the seeds plus weed control. In cooperation with local distributors, that work with and can therefore better reach the smaller farmers, these seeds are then sold (AMP, Dr. SS: 90).

[56] Domestic seed company in Serbia and the main distributor of Euralis soybean seeds (BS: 26).

[57] The company was founded 1996 in Pivnice as a small family business in animal feed production. Today, the company expanded to 11 locations in the Vojvodina and its main activity is the trade with agricultural products through cooperation with around 2'000

All interviewees were anonymized through the assignment of an abbreviated pseudonym. When quoting or referring to interview transcripts I use these abbreviations, which are indicated in Appendix IV (*Table 9*), together with the corresponding paragraph number.

4.2 Qualitative content analysis

This master's thesis applied a qualitative content analysis according to Kuckartz (2014) with an inductive coding process based on the Grounded Theory developed by Strauss & Corbin (1990). The qualitative content analysis is a hermeneutic form of evaluation with a systematic '*interpretative – understanding*' approach, the basis of which is the subsumption and categorization of the material following a clearly defined rule system for individual steps along the procedure (Kuckartz 2014: 39; Gläser & Laudel 2010: 204). The Grounded Theory aims to identify abstract concepts and create new theories and hypotheses based directly on the material and is thus an example of completely open coding (Kuckartz 2014: 67; Gläser & Laudel 2010: 47). This thesis does neither intend to establish a new theory nor assume the feasibility of a *completely* open coding system[58], but nonetheless borrows from the Grounded Theory in order to interpret the material with as little bias as possible, coinciding with Kuckartz (2014: 77), who also noted that regarding the development of categories as an integral part of qualitative content analysis, a broad spectrum ranging from completely inductive formation of categories based directly on the material to largely deductive formation of categories - derived from a theory underlying the research or research question - can be observed. The qualitative data analysis (QDA) software *Atlas.ti* was utilized for this whole process.

Generally, there are five analytical steps during a qualitative content analysis: 1) literature review 2) establishing categories 3) coding 4) analysis and 5) presentation of the results. These steps are however not to be understood as a linear process but rather as a circular process of analyzing the data with feedback loops (Kuckartz 2014: 50). This master's thesis largely followed the above sequence with the main difference that due to the relatively inductive approach, *open coding* preceded the establishment of categories. Open coding is the process by which the data (interview transcripts) is successively 'broken down analytically' and conceptualized; this process can be done with varying accuracy (word by word, sentences, paragraphs or whole sections). The thereby coded text segment is considered an indicator of the investigated phenomenon (Boehm 1994: 127;

farmers. Agrogrnja provides producers with the necessary inputs such as seeds, fertilizers and plant protection products and in turn receives their harvest, which they store and trade with (BB: 28, 98, 102-103, 111).

[58] As seen in the previous chapter 4.1, prior-knowledge is inevitable and plays an important role within the overall research procedure. The openness of the coding system in the context of this thesis references to the effort to avoid imposing preconceived ideas (e.g. developments of soybean production in South America) on the study area.

Strauss & Corbin 1990: 12). In my case, the decision was to code mostly on the level of sentences, occasionally so called 'In-Vivo' codes were utilized for particularly expressive statements and to keep close with the text, whereas sometimes if an entire paragraph was less informative it was coded en bloc. The following *axial coding* constitutes "a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories" (Strauss & Corbin 1990a: 96). Finally, selective coding describes the final stage of the coding process where relevant categories are further elaborated, resulting in a core category which represents the central phenomenon of the study and around which other categories can be unified. Based on this core category the results are then formulated (Strauss & Corbin 1990b: 14; Boehm 1994: 134-137). These last two steps were primarily done within the *Network View* of *Atlas.ti*; the extensive list of codes (830) was loaded into a Network View, grouped and structured thematically, resulting in a hierarchical and interconnected network of categories and codes. *Table 10* (see Appendix VI) presents the resultant code system of this process with seven main categories and *Figure 6* depicts a small cut-out of this network, illustrating the complex ways in which these categories and codes correlate.

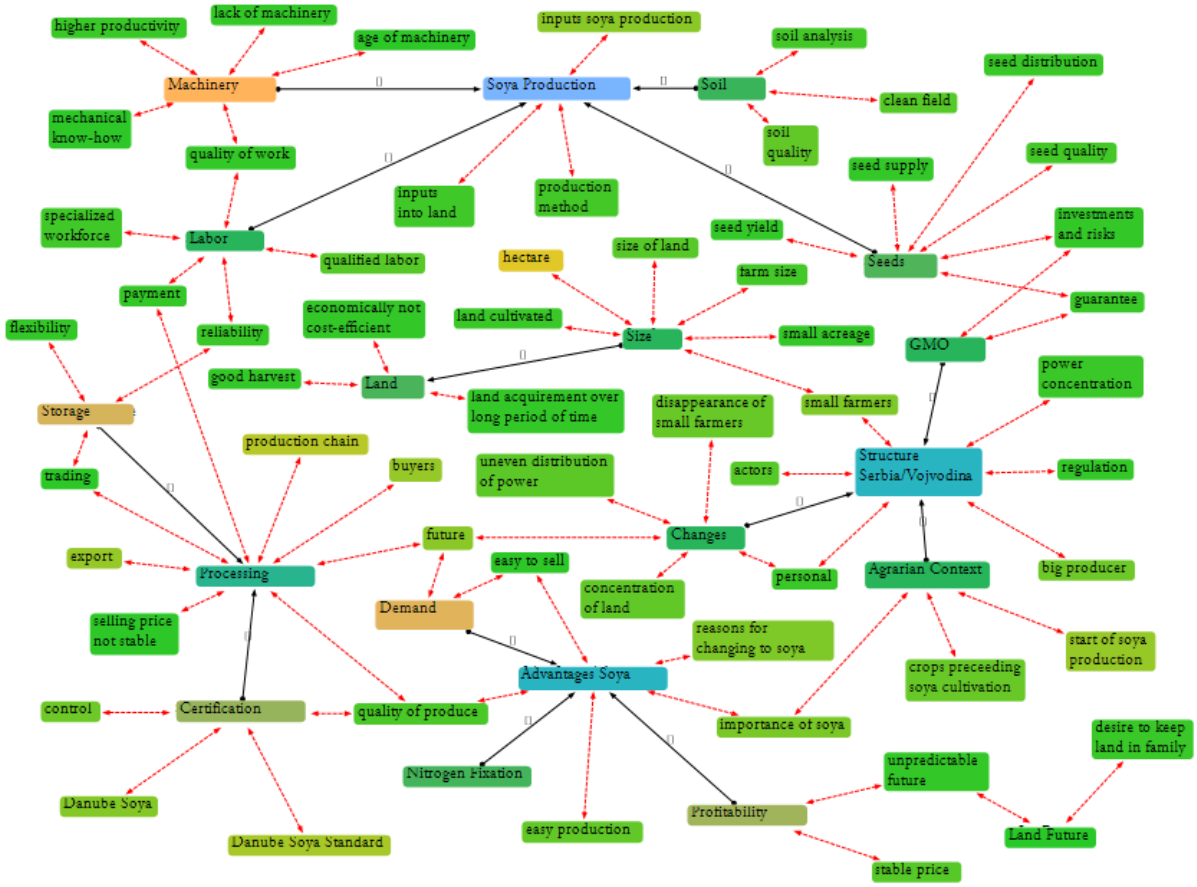

Figure 6: *Example of a category-code nexus within the Network View of Atlas.ti.*

5. Structural context of Serbian agriculture

5.1 Historical context of the Vojvodina

The term Vojvodina was first mentioned 1848 in the context of the declaration of the Serbian Vojvodina as a response to the Hungarian uprising against the Habsburgs in the same year. The name is derived from the Serbo-Croatian word *Vojvode* which signifies military leader. At the time the region was still part of the kingdom of Hungary (Winkler 2015: 169). Before that, the region was shaped by the Ottoman Wars and as a consequence thereof, settlement policies aiming at repopulating the area of the Danube River Valley (settlements of Danube Swabians) to cultivate the fertile and arable land (Schmidt 2011: 76). The Panonian Basin offers favorable natural production conditions for agriculture regarding soil conditions, climate and relief (Büschenfeld 1981: 113). This meant that the territories that would later become the Vojvodina province developed into a region characterized by agricultural exports already during the 18th century (Faragó 2002: 260).

Until 1918 at the end of World War I the region belonged to the Austro-Hungarian Empire, after which it became part of Yugoslavia, even gaining the status of an autonomous province during a brief period between the end of World War II and Slobodan Milošević's presidency of the Socialist Republic of Serbia in 1989. During that time, the Vojvodina (named Yugoslavia's breadbasket) developed into one of the most economically advanced regions of the country, oriented strongly towards agriculture with comparatively higher than average yields per hectare and a noticeable gain in efficiency (Filep 2011: 150; Winkler 2015: 182). After early failed attempts to collectivize large part of agriculture through land dispossession (without compensation) and economic coercion to join farming cooperatives, Yugoslavia's agricultural policy promoted a dual agrarian system with close cooperation between private and collective farming. As a flanking measure, private property was limited to 10 ha, the determinative deliberation behind such a maximum limit was that within this scope, cultivation as a family farm would still be possible without the need of utilizing wage labor. This omitted linkage between work and ownership relations allowed the ideological coexistence of the private and corporative sector and the collective usage of private land (Büschenfeld 1981: 116-118). In terms of the degree of 'socialized' land there were large regional differences, particularly the Vojvodina had a higher level of communization, mainly due to the presence of larger cooperatives and agro-industrial complexes (so called Agrokombinate) in the region, that owing to the state's planning were pre-eminently located in favorable agrarian areas (Winkler 2015: 183). Nevertheless, private smallholder farming, amounting to approximately 60%

of total agricultural production land in the Vojvodina, respectively 85% in Yugoslavia as a whole, always prevailed (Büschenfeld 1981: 117, Filep 2011: 151, Griffin et al. 2002: 298).

The commencing collapse of the Soviet Union and the end of the socialist system in 1989 was the beginning of a political, social and economic transformation for the countries of the former Eastern bloc. In the context of the economic sphere this meant the turning away from a centralized, planned economy and the start of transition towards an early market economy. Although a founding member of the Non-Aligned Movement (NAM), Yugoslavia nonetheless had adopted a socialist system and after its disintegration the territories of the former state faced similar challenges and structural problems as other former satellite states of the Soviet Union (Filep 2011: 147). Typical transformation measures during that time included privatizations, free pricing (or conversely phrased, the elimination of price control restrictions) and liberalization of foreign trade. Since a majority of agricultural production land in the Vojvodina was already privately owned, a transition hereof was not necessary. The percentage of personal property under cultivation by smallholders for example changed imperceptibly and still amounted to around 60% in 2004, which corresponds quite accurately to the 1970/80's value (Eger 1980). In terms of price agreements, a shift toward free pricing was not essential neither, since governance varied strongly across sectors and the (concerning the Vojvodina) important food industry was lightly regulated. Likewise regarding the liberalization of trade and business in general, the Vojvodina naturally had more sovereignty during its status as an autonomous province before 1989, after which it increasingly fell under the influence of Belgrade and reforms from the central government. In recent years though there have been efforts towards a more far-reaching autonomy again. Together with the approaching possibility of an EU accession this has put smallholders under considerable pressure to push for modernisation and competition which, coupled with rising land prices, is leading to a shift in ownership structure in the direction of bigger market participants (Filep 2011: 154).

5.2 Agriculture in Serbia and the expansion of soybean production in the Vojvodina

When looking at the agrarian context of Serbia, an important fact is that while Serbia is not part of the EU, it nevertheless is strongly linked and dependent on the EU market. Laws and regulations such as subsidies do not match European ones, which makes 'everything difficult' for the local farmers that produce according to Serbian laws, yet much of what they produce is exported to the EU (ML: 109-110). The difference in the support from the state in the form of subsidies illustrates this nicely, which range around 650 euros per hectare in Croatia[59] and are thus far higher than in

[59] Mentioned as a direct competitor of Serbian farmers.

Serbia, where they were reduced in 2016 from already low 100 to 120 euros per hectare to almost insignificant amounts of 17 to 35 euros per hectare or even nothing (Maslac 2016; ML: 111-112; VB: 132; MH: 142; VP: 102; Dr. SS: 48; JB: 78; DO: 112; SAB: 131). While the difference is huge and therefore accordingly often mentioned, the economic importance of these subsidies, compared to the achievable margin in soy cultivation, is small for the farmers[60]. Important for the agricultural context is, however, that despite not (yet) being a member of the EU, its regulations must be assured to be able to export (NB: 110). *Figure 7* illustrates this dependence nicely.

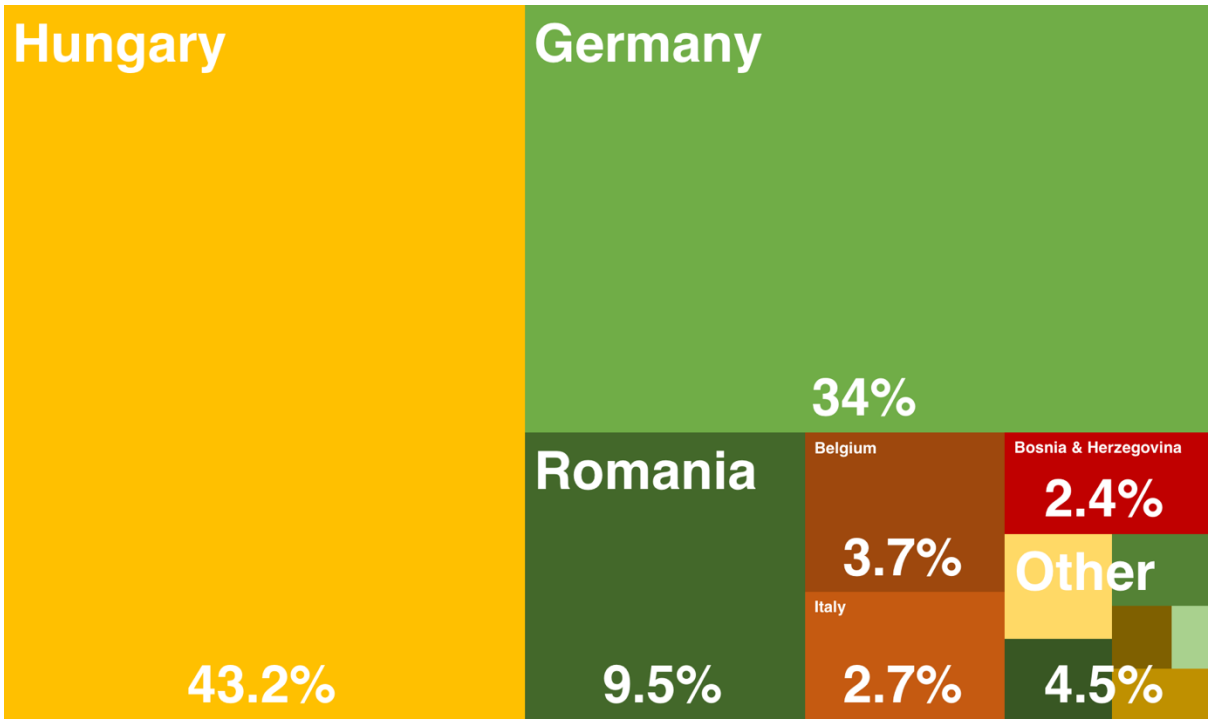

Figure 7: *Share of the main export destinations of soybeans from Serbia in 2016 (own representation, data from UN Comtrade 2016b).*

Another important aspect lies in the socialist history of the former Yugoslavia, which is one of the main reasons for the start of soy production in the 1970's in Serbia altogether. By using a top-down decision-making approach, the state instructed to try producing soya:

> *"That was the time, when we had a one-party society. It was unpolite to reject something which was somehow, you know, suggested by government. Some farmers felt that it was kind of polite to accept something. There were some early birds, people who are ready to start with something new, but some of them probably thought that it is politically smart to follow the direction which is so hardly suggested as something desirable. Don't underestimate the influence of such attitudes of some producers. It was*

[60] See chapter 7.4.1 regarding the economic context.

> *a time in Serbia, when a lot of money was pumped by the government from other sectors into the agriculture. And now, when we talk about agriculture, we always say it was the golden era or something during the seventies. That was the time and everything, you know, it was quite easy to get credit from government and it was really cheap credit compared to the credits from the banks etc. and the majority of big players, who are big players now, started then to buy some land. … And they followed the suggestions of the big boys and they accepted soya bean as something which is smart to accept" (Prof. VR: 26).*

Even today the careful, if somewhat sarcastic and direct way of describing the reason for soya becoming part of the sowing structure in Serbia by professors at the University in Novi Sad shows the power of a totalitarian regime in these kinds of decisions. In an agricultural context, it is therefore important to know that soya was not a traditional crop in Serbia and the Vojvodina and that the change in the sowing structure, making soya part of it, was based on a political decision by the government, actuated by noticeable financial support being pumped into agriculture and especially the private sector even in competition to the state-owned agro-industrial complexes (Prof. DB: 27; VP: 26; DM: 84; DR: 110; ZB: 32). The production structure at that time, still being dominated by family businesses[61] and the state-owned enterprises, left little choice to the farmers, being confronted by the overwhelming power of the government. This unequal distribution of power is still present today and farmers, rather than feeling as the indispensable start of the value chain, perceive themselves to be the least important. *"We are not protected at the national level, we are regarded as the third class of people" (SAB: 128).* Working in agriculture is a question of tradition, being passed from one generation to the next, farming being mainly a prime employment, but often also a secondary engagement, depending on the size of the farm. Two farmers in the interview sample have a prime employment outside of their farm. One farmer openly explained, that he only started in agriculture after having lost his job. Two family farmers see their farm as their prime employment, but they need an additional income to make a living (Prof. VR: 42; JB: 62, 66; VB: 138; DO: 116; MV: 52). The state-desired soy production however, proved to be a successful decision in the long run, as *Figure 8* shows. Over the past 50 years, soya has become a generally well-accepted, good and stable 'traditional' culture, its acreage increasing 88-fold, yield 2.6-fold and consequently total production increasing 230-fold (Bošnjak et al. 2012: 540). Today soya is so important that quite a few farms can make their living by cultivating this one crop (ZB: 32; MB: 30, 116; MP: 29, 131; GM 115; GS: 114; AK: 93; JB: 88; BB: 62).

[61] As seen in the previous chapter 5.1, Yugoslavia, unlike other socialist countries in eastern and central Europe or countries of the former Soviet Union, allowed the ownership of up to 10 hectares per privately owned farm (Büschenfeld 1981: 116-118; Griffin et al. 2002: 298).

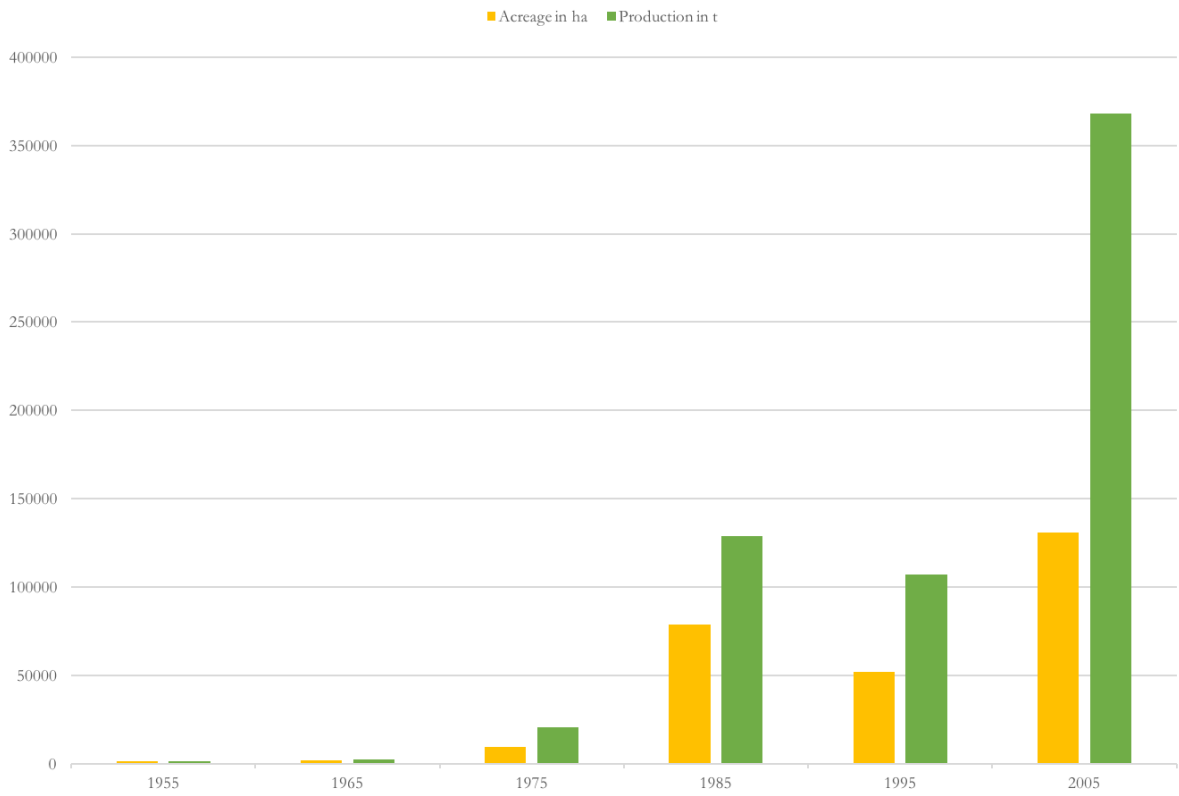

Figure 8: *Production/acreage quantity of soybeans in Serbia from 1955 to 2005 (own representation, adapted from Bošnjak et al. 2012: 540).*

5.2.1 Structural changes in the Vojvodina

Besides the already discussed change of the integration of soybeans into the sowing structure, the *migration* to cities is an important factor influencing the agriculture of Serbia and the Vojvodina, significantly increasing the average age of farmers[62] (MP: 107; JB 74; Dr. SS: 78). Winkler (2015: 105-107) similarly found that especially rural areas like the Vojvodina experienced the highest rates of internal migration between 2002 and 2011, this becoming problematic when local migration losses coincide with already negative natural population trends and critical age structures. The motivation for this continuing rural-to-urban migration is mainly due to poor local labor market situations or lack of training opportunities.

Not for the rural exodus alone, but enhanced by it, mechanization is progressing and again reinforcing the trend of the land flight (BB: 92; Dr. SS 70). A significant improvement in the state of the machinery enables a higher productivity and exercises pressure to move forward with an agrarian reform creating bigger plots to cultivate (DR: 104; BS: 80; KK 121). Large companies and farmers are thus getting bigger and bigger, either buying or renting land from smaller producers, even farmers with already 150 hectares of land see their future in expanding their acreage under

[62] According to one of the experts of the University of Novi Sad, the average age is already somewhere in the range of 55 years (Dr. SS: 78).

cultivation (AK: 65; JB 74; BB: 88; BS: 82; Prof. DB: 55; Prof. VR: 40; Dr. SS 78; NM 98-102). Understandably, this is seen by smaller farmers as a pressure and danger (NM: 134; GM: 101; MP: 109). In eight interviews the disappearance of smaller family farms with less than 20 hectares was explicitly brought-up. Other small farmers, however, saw this change and decided to switch, often together with their neighbors, to organic production, thereby making it possible to survive, despite less land, thanks to higher earnings achievable in organic farming (AK: 65).

One effect of the continuous concentration is the impact, that *professionalism* in agriculture is advancing rapidly with the growing farm size. Farmers are more concerned optimizing their production and trying new ways, thereby even attracting young people to work again in agriculture (MV: 60; KK: 121; VP: 144).

> *"The farmers get better and better. They get more knowledgeable, have better machinery, they use better chemistry. A lot of farmers are not faculty educated, but they are learning. We are going into a good direction. It is not the case in every part of the Vojvodina with all farmers, but generally most of big farmers and producers are going into that direction. That will change Serbia and that is good. The standard is going up" (BS: 80).*

But not only bigger farms get more professional, also small farms learn, are run by faculty educated owners, benefit from free support by the state extension services, for example in the form of soil fertility checks by experts and laboratory analysis (VP: 144; JI: 115).

One important change in the agricultural context lies in the discussed European protein *market* and its political dimension. The recognition of the protein deficit and the pressure from various stakeholders to do something against the dependency on production overseas and imports, combined with a wide dislike and thus the restriction of genetically modified organisms, has created a classic supplier market for non-GM soya. Demand is already over a long period higher than supply and Serbia became an important player with unchanged prospects for the future (Prof. DB: 69). Not once were difficulties to find buyers for the produce mentioned in the interviews. This of course was recognized by influencers such as Donau Soja and important players in the seed market such as Euralis[63] or Axéréal as well as investors from abroad (BS: 88; DO: 122). Interestingly, an unlimited soya expansion was only questioned by researchers from the University of Novi Sad during the interviews, raising classic dangers of monoculture production like diseases, insects and weed resistance to herbicide (Prof. VR: 32, Prof. DB: 73-75). One producer talked

[63] Euralis Group is an agricultural cooperative in the South West of France. Its seed division is a European leader in the non-GMO market (BS: 26).

about "diseases appearing recently". He did, however, not make a direct link to his predominant soya sowing structure. As will be shown[64], soy monoculture has been prevailing on several farms for many years, without having experienced any problem and in addition being cost-efficient (KK: 41; DO: 96; VP: 72; NM: 68; STB: 49; SAB 52).

A last aspect to be mentioned in this context is the climatic change noticed during the last years with many dry years and droughts (BB: 88), which are felt as a threat[65].

5.2.2 Serbian law on Genetically Modified Organisms (GMO)

In 2009, Serbia banned all commercial cultivation and the trade of GMO (Brankov et al. 2013: 8296; Smigic et al. 2015: 99). The question, if the GMO-ban is really observed and had an effect, has been answered somewhat controversial. Most farmers see an advantage in the ban, because it protects local non-GM soya production and helps to sustain the price. *"I think it helps us because we are more competent on the global market with this non-GMO, because there are not too many non-GM soybeans on the market" (Dr. SS: 52).* None of the interviewed conventional farmers ever grew genetically modified soya beans, some even stated, that they never even heard personally of anybody having tried it. Therefore, the ban did not make any difference to them in their production, it is rather regarded as a protection of their non-GM cultivation and positive for the demand of their produce. For organic producers, the ban it does not make a difference, because GMO is forbidden in the organic production (KK: 73; DO: 100; VB: 94; NB: 98; DR: 76; JB: 58; GM: 85; MB: 78).

The Ministry of Agriculture performs regular inspections during the vegetation period, visually checking the fields rather easily for entirely-missing weeds, taking crop samples if they have any suspicion and sending them to the laboratory to have them analyzed. All quantities sold by the producers are always checked at the storage reception, previously by state owned institutes and today by accredited companies like SGS, the Swiss leading inspection group, or Jugoinspect. Right after the ban in 2009, the state performed very thorough GMO checks. The few wrongdoers they convicted - officially Serbia was already GMO-free before the ban - were immediately punished and their whole crop burned. The state communicated each case widely in all papers. From the reaction and the attitude of the producers interviewed, it seems to have been a successful campaign (Prof. DB: 49; JI: 98-102; ZB: 103-106; BS: 78; BB: 66; ML: 89; NP: 86).

Today, when buying seeds from the Institute of Agriculture or other suppliers, the farmers receive a certificate confirming the genetically pure origin of the soya (GS: 116-118; DM: 49). One

[64] See chapter 6.4.

[65] This aspect and its implications, like the necessity for irrigation systems only large farms can afford (JI: 123), will be further discussed in chapter 6.3.2.

recognized and acknowledged advantage of non-GM soya is the fact, that the farmers can use seeds from their own harvest the following year for sowing their fields and therefore save a lot of money, as we will see, when discussing the advantages of soya in further detail. GM soya seeds must be bought every year from the seed supplier, which is more expensive than using own seeds. The cultivation of GM soya, however, is easier especially regarding the weeds control, because of the resistance of the genetically modified plants against herbicides which kill all weeds reliably. Additionally, new and more efficient herbicides are sometimes only developed for GM soya. From a market point of view, European non-GM-soya is a niche product, enjoys a high demand and therefore a higher price level than GM-soya (SAB: 163; NM: 42; ML: 89; UB: 33; 39).

The fact that genetically modified soya is banned, however, does not mean, that it is not imported in the form of processed goods such as soy meal, animal feed or finished product for human consumption. Imported GM-soy meal is feed in the livestock farming in Serbia. This is of course unknown by most of the local consumers when they eat meat or drink milk. Donau Soja took this issue up and certified the first guaranteed genetically pure milk, achieving thereby a higher price even in Serbia. According to one conventional soybean producer, at least 7 out of 10 soya products checked in Novi Sad in a health food shop were found containing GM-soya. That GM-containing processed products are imported - one interviewee even suggested that it is actively done by the state - is taken as an unwanted fact by most producers, which they have control over (VP: 44, 66; NM: 38-40; MB: 28; MH: 150; VB 98; BS: 68; SAB: 94-98; NP: 88).

In summary, the positive aspects regarding the ban for the non-GM soy production voiced in the interviews prevail. The cancellation of this law is a topic brought up, but mostly regarded as undesirable and unlikely to happen during the next few years. The final decision to allow genetically modified soya in Serbia, however, is recognized to be most probably not a decision to be taken by Serbia alone, but rather by 'some great powers' like the EU or WTO (MV: 34; MP: 83, 141; NM: 42; NP: 84).

5.3 Land tenure

5.3.1 Ownership structure of agricultural holdings in Serbia

The Vojvodina as a lowland rural area in the north of the country provides favourable soil- and climate conditions for a capital-intensive agricultural production and has both up- and downstream industries that are well-developed. The region is therefore characterized by a lower share (11.8%)

of the total utilized agricultural area (UAA) by small holdings[66] (up to 5 ha) and on the other hand has a majority of larger holdings (particularly these over 50 ha) which hold 41% of the total land used and account for approximately 3.5% of the total number agricultural family holdings (AFH), compared to other regions of the country where the presence of the largest holdings is significantly lower (Bogdanov et al. 2017: 322, Božić & Munćan 2015: 111). This concentration of agricultural land in large farms in the Vojvodina is one of the main features of farm restructuring in Serbia, "established mostly through the privatization process of the former combinats [Agrokombinate] and collective farms" (Bogdanov et al. 2017: 322). *Tables 3* and *4* summarize these findings.

Table 3: *Overview of the farm structure in Serbia 2012 (adapted from Bogdanov et al. 2017: 322; SORS).*

N° of agricultural family holdings (AFH)	**Average area of holdings (ha)**	**Utilized agricultural area - UAA (ha)**
631'600	5.4	3'437'000

Table 4: *Comparison of AFH and corresponding UAA in Serbia and the Vojvodina 2012 (adapted from Božić & Munćan 2015: 111; SORS).*

	Serbia total		**Vojvodina region**	
	% of AFH	% of UAA	% of AFH	% of UAA
up to 2 ha	48.1	9.3	50.2	4.0
between 2 and 5 ha	29.4	21.0	19.5	7.8
between 5 and 10 ha	14.3	21.9	12.9	11.3
between 10 and 50 ha	7.2	29.2	13.9	36.0
between 50 and 100 ha	0.7	10.6	2.6	23.1
over 100 ha	0.3	8.0	0.9	17.8

One first observation when looking at the ownership structure of the 15 interviewed producers plus the seed supplier (see *Table 5*) is the stronger representation of larger agricultural holdings in the interview sample.

[66] Interesting is that the share of the smallest agricultural holdings (up to 2 ha) is again higher in the Vojvodina than total Serbia but with significantly less utilized land, which could indicate a further reason for the disappearance of small family farms.

Table 5: *Land ownership structures of interviewed producers and seed supplier company.*

Interviewees		Hectares under cultivation			
		own	*rented*	*total*	*% own*
MH & KK	Company producer, conventional	550	450	1'000	55%
NP	Company producer, conventional	2'300	-	2'300	100%
MB	Company producer, conventional	5'000	-	5'000	100%
DM	Company producer, organic	1'200	600	1'800	67%
ML & NB	Company producer, organic	1'852	-	1'852	100%
DR	Family producer, conventional	18	2	20	90%
DO	Family producer, conventional	2	18	20	10%
SAB & STB	Family producer, conventional	50	30	80	63%
VP	Family producer, conventional	120	30	150	80%
NM	Family producer, conventional	120	30	150	80%
MP	Family producer, conventional	100	300	400	25%
GS	Family producer, organic	5	-	5	100%
JB	Family producer, organic	5	-	5	100%
AK	Family producer, organic & conventional	11	20	30	35%
VB	Family producer, organic	35	25	60	58%
BS	Seed supplier	4'500	-	4'500	100%

Both the smallest players, two organic family producers with only 5 hectares, and all the biggest company producers interviewed, own 100% of the land they cultivate. All other producers rent additional land to cultivate, either from the state or from private owners. Out of all the producers interviewed ten were family producers. Besides the two smallest family farms mentioned above who produce only on their own land, all other family farms rent 20% to 90% additional acreage to their own holdings. The smallest *conventional* family producers cultivate 20 hectares, which they

only partially own, while the smallest *organic* family producers only cultivate their own 5 hectares. The reason for this difference in size being, that very small farms can only provide a livelihood above self-subsistence if they produce organic, getting a better price for their produce (AK: 65; JB: 52; GS: 114). As soon as organic farms are getting larger, they rent additional land like the conventional producers. Looking at the five companies interviewed, the three biggest own 100% of their cultivated land, the two 'smaller' estates rent up to 45% additional land.

The tendency towards bigger farms has been repeatedly discussed in the interviews. Two decades ago, the average farm was as small as two to three hectares. Today, even one interviewed farmer cultivating as much as 80 hectares considered himself to be a small farmer, despite belonging to the 3.5% biggest farmers in the Vojvodina according to *Table 4*. A first reason making the continuous increase of the farm size over the last decades possible, was the abandonment of the 10-hectare maximum ownership per family dating back to the socialist period. Second, the government which is still the biggest landowner today, started to lease state-owned land and gave up the state-owned agricultural production. Today's situation is regarded as very dynamic, many producers are continuously buying or renting addition land to become bigger which also allows them to invest into further mechanization. (BB: 88; NM: 98; Dr. SS: 64, 76-78). The acquisition of land is described differently by companies and the interviewed family owners. Companies and very influential big families with the necessary funds were able to buy land on a large scale mainly over the last two decades directly from the state during the privatization in Serbia (MH: 82; NP: 98; MB: 86; GM: 91; SAB: 133). *"It's simple. 5'000-6'000 hectares of land are on sale as a whole, and only a couple of buyers have enough money to buy that" (NM: 102).* The family producers, on the other hand, continuously buy land from private owners when smaller parcels of land are on sale and their means allow them to do so. The land cultivated by small to mid-size family producers, has therefore been inherited and/or acquired over generations, often long before the privatization started in the 1990s (NM: 82; MP: 93; VB: 112-116; SAB: 111; DO: 106; DR: 90; GS: 86, 110; AK: 55; Prof. VR: 40).

> *"My father and my grandfather had 50 hectares. But it was nationalized and split among my father and his sisters when this land was restituted. I bought it from my aunts and other descendants, and we still keep buying land" (STB: 112).*

The approach to rented land versus the own land has been described very opposite. When asked, some interviewed farmers stated, that they treat the rented land like their own, which at least regarding the fertilization makes some sense, as the yield will depend on it. As the land is mostly

rented from people that have either given up farming or are not interested in it, a longer-term perspective of the rent also favors the equal treatment (SAB: 106; DR: 88; DO: 108). *"I fertilize the soil equally and make the same input in both the rented land and my own land" (VP: 86).* However, exactly the opposite treatment was stated as well, with an explanation that bears striking resemblance to the *Tragedy of the Commons* dilemma explored by Garrett Hardin (1968: 1244), proposing that common property resources such as land and water are threatened by the tendency of individuals to irresponsibly exploit them: *"In the rented land, on the other hand, we invest less, as we cannot be sure that we will have that land to farm in future, so we try to exploit it as much as possible" (NM: 84).*

One last, but not to be neglected observation regarding the ownership structure is the fact, that while the average farm got bigger overall during the past decades, the individual plots to cultivate are still small. If for example farmers used to own just 5 hectares ten years ago and were able to increase to 15 hectares, they are now simply cultivating 20 small plots versus 7 or 8 before. The Serbian government never started any process leading to a realignment of the boundaries for the last decades and this represents a constraint mainly in the mechanization and efficiency improvement of the family agriculture (Prof. VR: 46).

5.3.2 Significance of land control

For family owners, land control means literally 'everything' to them. Land ownership is the foundation of their lives, families and their job. As often a first part of the own land was inherited, the ownership of the land also means an obligation towards their ancestors. Land ownership provides safety. More than once it was mentioned, that they will 'never be hungry' and that it represents a last resort to guarantee a minimal securing of one's livelihood if other options, like an employment, fail[67] (VP: 94; NM: 88; MP: 99; DR: 96, 100; VB: 112, 136; GS: 92; AK: 59; JB: 68; BB:82). In cases where the family does not depend on the income from agriculture because they have a second job, the land means 'extra money' and a 'security-net', to some degree also distraction (DO: 116; DR 96, 130).

> *"I am like a Queen of my land. This is my land, every single square meter, it's mine. You know, this is the feeling, if you love your land (VB: 122).*

[67] See also Fuster (2011: 29): "For many Serbians, agriculture remains a retreat, guaranteeing at least minimal livelihood in times of uncertainty."

> *"The land is of greatest importance to us. … It is the greatest security. You need to have your land and have it recorded in the books. Every bank asks for that if you need some funding" (STB & SAB 119, 160-161).*

When asked what they want to happen to their land in the future, the family farmers stated that firstly, they want to continue to work on their land and increase its fertility. Some would like to enlarge it by buying more land. Nobody wants to sell it for the mentioned safety reasons. The organic producers want to keep their land organic. Finally, they would prefer to hand down the land to their offspring, or, in case they are not interested in cultivating the land themselves, lease it to someone, who will take good care of their land (DO: 118; VB: 124; AK: 61; JB: 70; NM: 90; MP: 101). The power of the continuously growing tycoons[68] in agriculture such as Matijević, MK Commerce, Delta Agrar and Agrokor from Croatia with their hunger for more land is regarded as a threat by the family owners (NM: 98; SAB: 133; MP: 109; DM: 101).
In general, a very similar reaction regarding the importance of land was stated by the interviewed employees of the company producers. The land is the primary resource necessary for the company and therefore is of pivotal importance.

> *"Would we not have this land, we would have nothing. This is primary, of outmost importance. … Fact is, that nobody can take the land away. We want to ensure that whoever comes here will treat the land just as good as we did and maybe even better. That is our goal" (DM: 95, 193).*

Without land, the company would not exist and the employees would not have a job. The landownership of the company is therefore almost equally important to their management as for family producers. However, land does not provide the management with the same degree of long term security, as they can be dismissed (NB: 184; MH: 112, DM: 95; MB: 90). When asked what they want to happen to the land of the company in the future, the answer was that most importantly the land will not be sold in order not to lose all the knowledge acquired about it and all the effort they put into it over the past years; additionally, to increase its size by acquiring additional hectares, that the land will be treated well and not be polluted by pesticides, the organic status kept, or to cultivate it more intensively while at the same time preserving the fertility of the soil (MB: 92; KK: 114, 117; NB: 191; BB: 86; NP: 108).

[68] Matijević (33'000 hectares of agriculture land under cultivation, 23'500 thereof in its ownership), MK Commerce (more than 19'000 hectares under cultivation in Serbia alone), Delta Agrar (16'000 hectares under cultivation), together close to 70'000 hectares (for comparison, total land under cultivation by all interview partners amounts to only 17'000 hectares).

6. Soybean production in the Vojvodina

Soya is currently produced in the Vojvodina, according to this field research, mainly for two reasons, the most important one being its profitability. The second reason is the soil improvement and linked to this is the crop rotation, a very highly appreciated necessity in the organic production. Both aspects will be further discussed when assessing the advantages of soybean cultivation in the Vojvodina in detail. Soya is generally regarded as easy to grow, needing few inputs and not labor intensive. In the following four chapters the focus will be mainly on conventional soy production, including however the organic production, where there are little or no differences[69].

6.1 Field production

According to experts from the University of Novi Sad, soya in the Vojvodina is mainly produced on family farms. Even during the existence of large state-owned agricultural companies when soya cultivation started in the 1970s, soya was not grown there but on family farms, with no significant change since then (Prof. DB: 59, Dr. SS: 48). As shown in chapter 5.3.1, the 15 interviewed producers consist of six company- and ten family producers. Therefore, an almost equal importance is granted to company producers in this empirical research, not reflecting the above statement of the predominant soybean production by family farms.

6.1.1 Inputs and cultivation

The main inputs needed to grow soya are seeds, agricultural chemicals such as fertilizer and herbicide against weeds, machinery for the soil preparation and cultivation including the necessary fuel to operate them, irrigation systems (increasingly often) and to a lesser degree labor. Soy seeds are either bought from seed houses or taken from the own harvest of the previous year. If farmers do not have the financial capability to finance the seeds and chemicals upfront themselves, traders offer an alternative scheme. They provide the certified seeds, fertilizer and herbicide together with instructions and recommendations to the farmers. In return, the farmers sell their produce after harvest at market prices to the respective trader. The farmers are paid for their labor, land and the use of their machinery, limiting their risk and their financial exposure thanks to the prior agreed contractual production. None of the farmers interviewed was working under such a regime. The following analysis covers therefore only farmers buying the necessary inputs and carrying all risks

[69] The main differences of organic production will be discussed in chapter 6.5 in further detail.

themselves. Irrigation or 'water' as an important input for the cultivation, will be discussed separately in chapter 6.3.2 regarding the challenges of the soy production (BB: 28, 102-103; NP: 44; MV: 49).

Seeds

The first input to be discussed are the 90-100 kg needed soy seeds per hectare for production (Dr. SS: 88; NP: 44). Unlike for corn and sunflower, soy seeds can either be bought each year from seed distributors or alternatively own seeds from last year's harvest can be used.

In Serbia, a seed producer needs to register its varieties in the state register, having been able to prove good results of the seed variety over a test period of two years (BS: 26; AMP). The subsequent seed production itself is again controlled by the state. Certain weeds are not allowed in the seed production and the quality of the seeds and the germination is checked. Based on these examinations, given that all results are satisfactory, the producer is allowed to sell certified soy seeds with a declaration. There are only four seed producers with registered soybean cultivars in Serbia at the moment. Two of them are semi-state-owned institutes, the Institute for Field and Vegetable Crops of Novi Sad (NS Seme) and the Maize Research Institute of Zemun Polje (ZP Hybrids). The two other seed producers are Raiffeisen and Komercservis Agrovojvodina (BS: 42; Maslac 2018). The Institute NS Seme was the most often mentioned seed producer in the interviews (DM:49; GS: 42; MB: 44; JB: 46; DO: 46). The newest seed producer in the business is the interviewed Komercservis Agrovojvodina. This company also acts as the main distributer of Euralis and belongs to the Serbian Mirotin Group, who manufactures and trades agricultural commodities and raw materials for farms and for the food industry. Komercservis Agrovojvodina, as of 2018 allowed to sell locally produced soy seeds, grows the seeds partially on their own land and partially has them grown by contracted larger farms. Agri Business Partner for example, the biggest of the interviewed companies with 5'000 hectares of land, sell 50% of their soy production to seed companies. Komercservis Agrovojvodina itself owns a 4'500 hectares big farm in central Vovodina where they grow one part of their seeds. Seed distributors and their sub-distributors buy the seeds from these four companies, who act as distributers themselves too. Additionally, distributors import soy seeds, like Komercservis Agrovojvodina itself, from the big European players such as the French cooperatives Axéréal, Euralis and Limagrain (Dr. SS: 88-90; BS: 28, 72; MB: 62).

One of the advantages in the soy production is the ability to use own seeds from the previous harvest. This is not possible for other crops such as sunflower or corn. An estimated 50-60% of the soy seeds used in the total production are own seeds. In contrast to the seeds bought from

distributors, these seeds are not certified. Own seeds are mainly used by family producers but to a certain degree as well by company producers (BB: 41; Dr. SS: 84; KK 45; SAB: 42). One of the main reasons mentioned is the economic benefit:

> *"If we grow corn, we need to pay for the seed 160 euros per hectare. With soya, when we buy it once, we can process the seed for three or four or five reproductions. When the seed germination drops, we change the seed. So, it is cheaper" (SAB: 56).*

At an estimated market price of 70-100 dinars per kg soy seed, a farmer needs to invest approximately 85 euros every three to five years per hectare in soy seeds, compared with the mentioned yearly investment of 160 euros for corn, which presents a convincing argument for the farmers to switch to soy and use their own seeds (MP: 59; DR: 78; JB: 40, 46, 54; JI: 53; SAB: 38-40). Additionally, it should be noted that in comparison with other crops, soya is easier to store. A few farmers stated that they already used own soy seeds exclusively over longer periods, for economic reasons, but also because they deem the quality and pureness of own seeds higher than the seeds they can buy from distributors (VP: 60; VB: 51). One farmer explicitly stated that "*the available seed on the market are often of lower quality and not genetically pure" (NM: 56)*; if just used as a justification or if he is convinced, was not clear. Extension services do not recommend the use of own seeds. According to them, soybeans lose their potential in the reproduction, subsequently the yield may decrease up to as much as one ton per hectare, diseases are also carried over easier and there are more weeds in the field. Furthermore, the seeds are not checked and certified to guarantee GM-free status and good quality (JI: 55; Dr. SS: 90).

The seeds, own or bought, are often inoculated, for example with Nitragin pre-inoculant fertilizer, before sowing, especially on a field without previous soy cultivation. In this process, the beans are coated with the Rhizobium bacteria. These bacteria lead to root nodules which fix additional nitrogen required by the plant (MB: 70; VB: 59, 76; KK: 45; DM: 79; ML: 68, NP: 44). Different seed varieties exist for different soils. The Institute for Field and Vegetable Crops initially started with foreign soy seeds but quickly managed to produce new adequate local varieties, like the 'Ruby of Serbia' or the 'Balkan', specifically adapted to the prevailing soil in the Vojvodina. Some of the newer varieties can be given to the animals to eat raw and do not need any prior processing like heating. The varieties developed over the last years also have a shorter and earlier vegetation period and it is expected to have more varieties for different purposes, like human consumption, in the future (Prof. VR: 30; Dr. SS: 58, 64, 82; VB: 27; ZB: 32).

Soil preparation and sowing

In case a field is not used for winter wheat, the soy production starts in fall, fertilizing the soil with phosphorus and, in case the previously performed soil analysis requires it, potassium. The representative from the state extension services explained: *"We recommend fertilization according to soil analysis. In our institution they [the farmers] can, without paying, get a soil analysis with recommendation. Not only for soya, for all main crops" (JI: 49).* Soil samples are taken and the fertility checked in the laboratories. Based on this analysis, soil specific fertilization advice is provided to the farmers entirely free of charge. This should be performed every four years (Dr. SS: 70; ZB: 59; DR: 50). The fertilizer is ploughed-in at a depth of 30cm. If no fertilizer is needed at this point of time, the field is normally ploughed a first time. After this, the farmer waits until the new year. When the conditions are suitable during the first quarter of the year, the land is normally worked on twice to prepare the soil for sowing with a seedbed conditioner or a disc harrow. Sometimes, the soil is fertilized in spring instead of the fall fertilization, for example if winter wheat was cultivated. The described preparation in fall and spring are additionally important to level the ground, to make the cultivated parcels as flat as possible for the harvest. If the land is not flat, an important part of the yield is likely not to be picked up in fall by the combine harvester (VP: 48; KK: 45; SAB: 58; DR: 50; GS: 42; JB: 42; BB: 43; NM: 46; DM: 43; ML: 68).

After the soil preparation, sowing is normally done during the month of April depending on the weather conditions. In case an irrigation system is available, a soy variety with a short vegetation can also be sown as late as June, after having used the respective field before to grow and harvest barley for example (MB: 72). Generally, one hectare will grow 350-450'000 plants (NP: 44; VP: 142).

Cultivation during the vegetation period

In case the weather is fine, soya starts sprouting five to six days after sowing. Roughly another week later, weed removal starts (VB: 76). Weed control is the most mentioned challenge in cultivating soya, both in the conventional and even more so in the organic production[70]. The cultivation during the vegetation period is preferably done mechanically, combined with chemical weed reduction in the conventional production while in the organic production often manual season labor is needed to hand-weed. The main input needed is 'good machinery' (DO: 46).

The distance between the rows of soy plants, decided by the farmers in April when the sowing is done, is one aspect which was always brought-up in the interviews. The applied distance depends predominantly on the machines later used for the inter-row cultivation and is either 50 or 70cm.

[70] See chapter 6.3.1 and 6.5 for more details.

Mechanical inter-row cultivation is done up to three times per season chopping out weeds and providing the soil with additional air (VP: 142; MP: 41; MB: 46). While at the University of Novi Sad 50cm are taught, in the sample of interviewed farmers more than 2/3rd use 70cm. The yield and profit in the end are judged equal (DR: 68; MP: 49). The advantage mentioned of a 50cm row-spacing is the ability of the plants to close the space between the rows quicker, preventing weeds from growing, not having enough light (MB: 52). On the other hand, the 70cm distance allows an easier inter-row cultivation. The same machinery can then be used for both corn and soy cultivation without any changes, as corn is grown with a 70cm distance. Since the vegetation periods of corn and soya are similar, this makes life easier for the farmers. Farmers having chosen 70cm judge 50cm too dense and the danger of damaging the plants too big when passing between the rows with the harroweeder or similar machines (Dr. SS: 42; DM: 43; JB: 42; KK: 54; SAB: 74). One farmer summarized this discussion as follows:

> *"They [50cm] have more plants per hectare, but my plants are more spacious. Maybe it is better for 50cm, maybe it is not. The truth is out there. Nobody knows that. Everybody has his own philosophy, there is not correct answer" (MP: 51).*

While the cultivation between the rows can be done mechanically, the cultivation into the rows is, especially in the organic production, mostly done manually employing season labor. While a new harroweeder is able to work the field both between and into the rows, older machines are only able to do the job between the rows[71] (ML: 68; DM: 59; MB: 46-48).

Fertilization

As mentioned previously, fertilization is applied both during the soil preparation in fall and spring as well as during the vegetation period. Different sorts of fertilizers are employed during the vegetation phase. Characteristically for the cost-effective soy production in the Vojvodina is the very low input requirement regarding fertilizers[72]. Necessary is phosphorus and potassium in fall, based on the recommendations by the soil analysis performed by extension services as already indicated. Even though not considered to be necessary by the University staff, some farmers apply small amounts of nitrogen fertilizer in spring to boost their yield (Dr. SS: 40, 48; DR: 50; NM: 46;

[71] A modern harroweeder was for example presented during field days in 2017 organized by Donau Soja and one of the big company farms now plans to buy one, see chapter 7.3 for further detail.

[72] In the wheat production, Serbian farmers apply less than half the amount of chemical fertilizers used in the EU, mainly due to lack of financing, resulting in much lower yield (Maslac 2018). The low fertilizer input requirement of soya is therefore important from the financial point of view.

VP: 48, 86; KK: 43; NP: 44). *"It is all relative, but soya uses up around 100 kg of nitrogen, around 25 kg of phosphorus and around 60 kg of potassium per 1 ton of yield" (VP: 48).* The lower amount of fertilizer needed in the soy cultivation is one of the clear distinction factors versus the much bigger corn and wheat cultivation in Serbia (NM: 64; KK: 30; SAB: 86). However, not only is the fertilizer-need lower by growing soya, one of the often-mentioned advantages of soya is nitrogen-fixation in the soil. Soya is therefore regarded as an excellent preceding crop enabling the farmers to save additionally on fertilization during the vegetation period following soya in the crop rotation (Prof. VR: 28; VB: 51; DR: 30; DM: 41; ML: 89; MK: 31; UB: 41). If felt necessary, the soy plants are additionally nourished during the vegetation period by applying liquid fertilizer directly on the leaves, a so called foliar feeding (BB: 43; NM: 46; MP: 67).

Despite available free advice to farmers by the state operated extension services, their representatives consider the knowledge regarding fertilization specifically in the soy cultivation as insufficient, but getting better. As mentioned, nitrogen application for example is not recommended out of economic reasons, the additional cost for nitrogen not justifying the additional yield achieved by it, but all the same done by farmers as the interviews showed as well (Dr. SS: 26, 58; ZB: 46, 48; JI 115, 117).

Harvest and yield

Harvest of soya normally starts during September and lasts for one month. This leaves enough time for farmers to cultivate winter cereals on their fields after the soy cultivation, which is important to small organic farmers (BB: 43; GS: 40). Harvesting is done mechanically, using a combine harvester. Important for this is the already mentioned soil preparation to have a flat field as well as the correct usage of the combine in order not to leave too much yield on the field (JI: 118). Although dependent on the climatic conditions, the yield and expected profitability in the soy cultivation is high and stable, especially if compared with other crops such as corn or wheat. Also, the yield influence of the seeds - if own seeds are used or seeds bought from the institute or other suppliers - is not judged as very significant (Prof. DB: 35, 37; NM: 30; DR. 82; STB: 43; MB: 30, 98).

According to the statistics from the advisory services, the soya yield is on average above 3 tons per hectare. If the fields are irrigated, this increases by one ton to above 4 tons. The best farmers even achieve a yield of more than 5 tons (ZB: 116; JI: 123). The lowest yield mentioned in the interviews was 2 tons, on land not considered to be good for soy cultivation. The other farmers mentioned yields in the range between 2.8 to 4.4 tons, both in conventional as well as in organic production (ML: 93; STB: 164; SAB: 33; GS: 30).

6.1.2 Mechanization

Soy cultivation fits a high degree of mechanization very well and is therefore not labor intensive (see previous chapters 6.1.1 and 3.4.1). As soya started to be grown in Serbia only in the 1970s, the production was mechanized from the very beginning and further rationalized and improved over the past decades. Thanks to the mechanization, one producer (DR: 86, 116) is now able to cultivate a sizable farm of 20 hectares, growing soya and corn almost entirely on his own, even though farming is only a secondary 'employment' for him. One father and son (SAB & STB: 100, 142) cultivate 80 hectares together and two family owned farms, each with 150 hectares, manage the whole work basically together with their fathers (VP: 80, 92; NM: 78) and in one case with the additional help of an uncle (NM: 106). That means two, respectively three people with only minor employment of season labor manage to run the 150 hectares big farm because everything is mechanized. The necessary machines are normally already in use on the farms, sometimes having been inherited from the father or grandfather, since the same machines are needed for other cultures like corn or sunflowers as well. Therefore, with small additional investments, the soy production can be started and then further upgraded and refined every year (Prof. VR: 32; Prof. DB: 65; Dr. SS: 42; ZB: 91; NM: 36, 120; VP: 52; DR: 30, 116; JB: 44).

> *"Our machines are not cutting-edge machines, but they are certainly modern. It has not been like this before. After privatization, the new owner brought with him also new machines, he invested in these new machines. That was in 2003 or 2004, so for the last 15 years the company has had a good and modern mechanization" (NP: 58).*

The various machine types in use are the tractor and trailer, plough, seedbed conditioner, harrow, seeder, sprayer, harroweeder and combine harvester. New machines like the germinator combine the functions of two or three other machines, in this case the seedbed conditioner and the harrow, and can therefore perform more than one operation in one go and thus being more efficient. Some modern machine types like the harroweeder or the combine are additionally equipped with camera and GPS navigation system. Two, three decades ago, the machines used were produced locally in Serbia. Nowadays, the new machines are either coming from Western Europe or the United States such as John Deere or Lemken, all their representatives being well established in Serbia. The local farm machinery industry on the other hand has disappeared almost completely (VP: 48; NM: 48; DM: 51, AK: 39; GS: 36; BB: 45; KK: 49; MH: 50, 52; NP: 50; Dr. SS: 70).

Most small farmers do not own all machines necessary for the whole production process. Organic family farmers for example use season workers, because investing in a harroweeder does not make

sense for the parcel size of soya they cultivate each year (VB: 45). In these cases, now quite common and increasingly used are the so-called service providers. These individuals or companies move with their machine, for example with a combine harvester, from farm to farm and get paid for the service they provide, in this example harvesting. This is considered a good business and in every village in the Vojvodina, there are younger people who decide to lease machinery and to live on this service business instead of cultivating their own land. In the organic cooperative interviewed, for example, one service provider does both the sowing and the harvesting for all affiliated famers (Prof. DB: 63; Prof. VR: 50, 52; VB: 64; AK: 45; DR: 52). Machine cooperatives, however, well developed in Western Europe, are not known in the Vojvodina. Shared machinery is therefore only a topic amongst befriended farmers, who cultivate their land together. The biggest family producer interviewed lets the small farmers with 2-4 hectares use his machinery for free (Dr. SS: 74; VP: 56; NM: 52; MP: 55, 57, 129; DO: 50; NB: 73, AK: 41, DR: 56; AK: 43; MV: 38).

> *"Sharing is not common here. Very few farmers are willing to buy common machines and then share it. We have something in our mentality. … time sharing is absolutely not here" (Prof. VR: 48)*

From an economic point of view, further mechanization or the investment into modern machinery does only make sense for an individual farm if big enough acreages can be worked upon efficiently. This is a constraint in the Vojvodina, as the average plots are small, as shown in chapter 5.3.1. Therefore, the goal for many producers is clear: *"We will try to be in the race with other competitors. Our mission is to buy more land and to have it completely mechanized" (MH: 115).* The advantages of this mechanization are less labor, a greater precision when applying the inputs, efficiency gains and a higher productivity. The disadvantages are that the maintenance of the machines is more expensive and the workers operating the machines must have the required skills and are therefore more difficult to find (Prof. VR: 44-46; NP: 56, 60, 62, 119-122; 119-122; DR: 104; MH: 96; NM: 121-122).

6.1.3 Labor

As just shown, soy production is not labor intensive due to mechanization. The labor demand is often covered by the family members of the farms (Prof. DB: 61; Dr. SS: 46). In the following overview (*Table 6*), the approximate workforce headcount being employed full-time can be seen. None of the farmers produces only soya. The number of employees indicated is therefore always to be understood for the whole farm and not for the soy cultivation only. Additionally, the interviewed company producers - depending on each case - produce not only agricultural crops

but breed cattle, operate silos or have their own retail stores for selling their final produce to consumers. The workforce number for these four companies is included as a reference point in italic characters, as no indication was provided regarding the workforce being operative only in the agricultural production. The employment of labor, both full time and seasonal, depends on various factors, like the degree of mechanization, the sowing structure, other undertakings and of course land-size under cultivation as well. A direct correlation of only land-size and the labor headcount is not meaningful however and could not be detected, the hectares in *Table 6* are therefore only included for reference purposes and in support of the statements made in chapter 6.2 regarding the low labor input needed to run a farm of considerable size thanks to mechanization.

Table 6: *Labor structure of interviewed producers.*

Interviewees		**Hectares**	**Labor**	
		total	*full time*	*seasonal*
MH & KK	Company producer, conventional	1'000	*45*	10-15
NP	Company producer, conventional	2'300	*80*	yes
MB	Company producer, conventional	5'000	*200*	no
DM	Company producer, organic	1'800	24	50-60
ML & NB	Company producer, organic	1'852	*48*	200
DR	Family producer, conventional	20	1	yes
DO	Family producer, conventional	20	1	yes
SAB & STB	Family producer, conventional	80	2	1-4
VP	Family producer, conventional	150	2	yes
NM	Family producer, conventional	150	3	3-5
MP	Family producer, conventional	400	5	0-1
GS	Family producer, organic	5	1	up to 6
JB	Family producer, organic	5	1 +	3-4
AK	Family producer, organic & conventional	30	1 +	10
VB	Family producer, organic	60	3	20

All farms, company and family holdings, conventional and organic, employ seasonal labor on a need basis. Organic production is much more dependent on manual labor and especially seasonal labor to weed the fields. In one organic company interviewed, up to 200 seasonal workers are employed each year for 35 to 40 days for "manual digging" as they termed it, meaning weed control. Bigger groups of seasonal workers are recruited from an area up to 70 km surrounding the farm, the workers being brought to the field in the morning and taken back home in the evening by own busses. The same company additionally employs approximately 10 people from April till October to support the cultivation. The other organic company employs much less seasonal workers, only 50 to 60 during the months of June and July for roughly the same total acreage of the farm. To find these seasonal workers it considered rather easy by these companies. Seasonal workers are organized in groups and approach the bigger farms to ask for work (ML: 61, 139, 153, NB 137, 166; DM: 59, 61, 110-113). One company farm explicitly stated that they do not have to employ any seasonal workers for the soy cultivation, only for the other cultures like corn, because everything in soya is mechanized and this work is handled by the qualified full-time workforce (MB: 54, 106).

The number of seasonal labor employed on the family farms, again mainly to weed the fields, ranges from 3 to 20 people on the farms interviewed. While season labor in companies is sometimes employed for longer periods like two to three months starting as early as April and lasting till October, family companies often employ additional help for only a very short time, as little as a day or even one to two afternoons. Neighbors or local people from the same village usually offer their help, being paid an hourly rate. *"Mainly people from the village, people who are reliable, who will not damage the machinery or steal the fuel. These are mainly our neighbors" (NM: 116).* The price paid for this wage labor is 150-200 dinars per hour, that is 1.3 to 1.7 euros per hour, or roughly 15 euros per day. The price has especially increased over the last years. By some farmers, the price for season labor is felt to be cheap, by others to be costly. The availability of people for such short assignments by family producers is low and therefore the owners treat them well, for example bringing refreshments to the field, as they find it difficult to get good people for a few hours or a few days once a year (NM: 112; VP: 122, 130; VB: 45; JB: 38; SAB 148, 150, DO: 68, 72, DR: 120-124, GS: 38, 60, 78, 80; AK: 83).

> *"We have a labor deficit. ... Nobody wants to work in agriculture, nobody wants to be paid for agriculture work. So, you cannot find these kinds of persons anymore. Even if you offer them lunch or a s stay overnight and good salary, no one wants to work in the field to weed. Nobody wants to work in agriculture anymore. The people who did that left Serbia to West Europe" (Dr. SS: 66).*

6.1.4 Professionalization in agricultural production

As already mentioned in chapter 5.2.1 regarding the structural changes in the Vojvodina, the know-how in agriculture has improved over the last decades, partially as an effect of the land ownership concentration with bigger and more professional farms emerging in this process; or, as one could put it, the survival of the fittest with the weaker players being put out of the business. Agricultural extension and advisory services (AEAS) were established in Serbia by the state as early as the 1950s, setting-up a network of agricultural stations, today under the auspices of the Ministry of Science. Having started with so-called winter schools, sharing knowledge about processes and technologies, AEAS now offers free advice to farmers and collect large amounts of data (Prof. VR: 28; Jankovic et al. 2013: 143).

> *"We collect data about agriculture for the society and for organizations. Not small farmers, I know how they produce because we are in close contact and I keep records about the technology for small farmers, this is one part of my job. Bot from big players we collect every year data about varieties, about everything. Varieties, previous crop, the dates for setting up their fields, about what they use in chemistry, yields and everything. We have in the computer system a database about all main crops for I think 30 years" (JI: 117).*

Besides keeping all the data, giving free advisory support to the farmers including soil analysis in their laboratories, extension services also perform all kinds of field crop trials for the ministry and for companies and organize field days, during which farmers can inform themselves. They prepare annual reports about these trials and distribute them. Alone in the Vojvodina, there are 12 offices. Additional to the support from AEAS, farms are also maintained with know-how from the various suppliers, provided together with inputs such as seeds, fertilizer or herbicide. Trading companies offer within their contractual production, a complete 'carefree' package with all the necessary inputs together with recommendations and suggestions. Additionally, they provide free advice services and support during the whole vegetation period. Donau Soja with its '*Innovation and Research*' department strives to increase the knowledge of the farmers as well. They work together with farmers, find out how they produce, identify opportunities for improvement, provide training and organize demonstration fields. They issued a best practice manual for farmers with each agro-technical measure explained, offering producers qualified advice how to grow, store, and transport soya, how to optimize their production in terms of cost reduction, the use of pesticides and much more. Finally, regarding the professionalization in agriculture, the comprehensive education system with a number of agricultural schools and university faculties has been very helpful in

expediting the professionalization process in agriculture. As expected, this is very well, even over proportionally reflected in the selection of interview partners for this field research: 100% of the non-producers and many producers as well have been university educated (JI: 29, 66; ZB: 59, 67; MH: 28; BB: 103; UB: 53; MV: 32, 36, 44; MP: 139; GS: 28; Jankovic et al. 2013: 142-143)

> *"My father doesn't have a university degree, so he hasn't been much in touch with science. We have started doing analysis, we change and improve the production. On the whole, it's better" (VP: 144)*

The University faculty of Novi Sad proudly pointed out that many of the students return home after their studies and implement the latest knowledge on their farms. Others improve their know-how by reading, watching TV, internet research or by working together with a bigger company in the region. However, amongst the estimated 50'000 producers, there are still a lot of small farmers with little knowledge, leaving still a big potential for further improvement, in addition to areas not covered well by extension services yet, such as non-farm income-generating activities and farming system management skills (Dr. SS: 60, 70; BB: 105-107; Jankovic et al. 2013: 144-145).

6.2 Advantages of soybean production in the Vojvodina

> *"We have mastered the production technology of soya, it is a very good preceding crop, we have all the machinery which is used for both soya and corn production, we can use the same machinery for them. We simply realized that we had good results with soya, the profit is good with relatively small investments" (NM: 36)*

The above-mentioned advantages of the local soy cultivation by a producer are shared entirely by one interviewed representative of agricultural science, adding in his explanation only the aspect of the suitability of the Vojvodina region to cultivate soya:

> *"From the economical point of view, people are using soybean to separate winter wheat and maize, so it also helps increase soil fertility. But, I think the price of the soybean is something which is very important for farmers. They want to produce soybean because of the high price. Another important thing is it's not very complicated growing soybean. It's not as complicated as sugar beet, and usually production is not so risky, and our agro-ecological conditions are very good regarding the climate. The precipitation and the temperature are good for the production of soybean (Dr. SS: 38).*

The topic of soya's introduction into the sowing structure of the Vojvodina on demand of the government in the 1970s and its acceptance on small and large farms 40 years later despite not being a traditional crop, has been discussed extensively in chapter 5.2. The area under cultivation grew from 2'000 hectares to 200'000 hectares (see also *Figure 8*), therefore averaging around 5'000 hectares every single year. This is equivalent to the biggest company farm interviewed in this research. This growth tendency is expected to continue (Bošnjak et al 2012: 540; Prof. DB: 33). Thus, the question that arises is why soya was able to convince farmers to dedicate their limited acreage to soya, rather than corn, wheat, sunflowers, sugar beet or other crops. The reasons can be found in the quotations above: 1) *profitability*, 2) *soil improvement* and 3) *ease of production*. These three main advantages of soya are interdependent, both ease of production as well as soil improvement influence the profitability positively.

Before going into the detailed discussion, however, I would like to provide a more general statement, summarizing the 'multi-dimensional usefulness of the soybean' (Dr. SS: 26) in an easy to understand line of argument and putting the advantages into the local perspective of the Vojvodina: In the beginning, the very first advantage of the soy cultivation was the political correctness at that time, demonstrated by following the recommendation of the government to cultivate soybean. The inexistence of necessary investments into machinery to start the soy cultivation, made it easy for farmers to give it a try. The easy production, the stable yield and the good price paid for soya on the market were very convincing experiences made by the political correct farmers right from the start and not only achieved after years of trial and error. Success was there immediately, while still leaving room for further improvement. The good price achieved was due to the fact, that the market, mainly the demand for animal feed, was already there right from the start without having to invest lots of money into advertising and creating demand.

6.2.1 Crop management and growth conditions

The predominant growth conditions in the Vojvodina, the soil quality and the climatic conditions of the Panonian Basin - the closer to the Danube river the better - match the specific requirements of the soybean very well, as expressed by Dr. SS before. Over the years, the best matching varieties were identified. The main challenge remaining is the necessary precipitation[73]. Nevertheless, the favorable soil quality and the loess-layer, holding moisture near the roots of the plants, allow comparatively good soya yields even in dry years in most areas (GS: 30; DO: 32; ML: 43, 93; JI: 42, 135; BS 44; MV: 36; MB: 40, 96; VP: 28; SAB: 33; NM: 30; MP: 29, 151; VB: 27). Consequently, although the yield of the soy cultivation depends on the precipitation or an irrigation system, as

[73] See chapter 6.3.2 for more details.

will be shown in detail in chapter 6.3.2, dry years are perceived by the producers to influence the yield of soya less than other cultures. Naturally, when the quantity harvested is lower, the higher price achievable on the local market is able to compensate the lower yield, thus the *profit* variation from one year to another is lower than in other crops and soya regarded as 'stable'. (Prof. DB: 35, 37; BS: 32; JB: 54; JI 135; MB: 30, 98; VB: 29, 86; STB 43, 89; NM: 66, 72). Another important aspect of the crop management is the fact, that own seeds can be used for sowing[74] which in turn is an important reason for the comparatively higher profitability achievable in the soy cultivation (Dr. SS: 84; VB: 51; BB: 39, 41; KK 45; SAB: 42; MP: 77; JB: 54).

After leaving the field, the positive influence of soya continues, as it is the best preceding crop for the next season by increasing the *soil fertility*. Soya is therefore very important in the crop rotation and in the organic production almost a must (Prof. DB: 81, 84; Dr. SS: 30; ML: 54, 65, 89; 93; DR: 30; NM: 36; DM: 41). The culture following soya requires little to no fertilizer. This once more strongly influences the profitability of the farm. The well-known and mentioned reason for the soil enrichment of soya is its nitrogen fixation in the field. Soya is estimated to provide up to 75% of its needed nitrogen itself and leaves the field behind enriched (Prof. DB: 35, 37; Prof. VR: 28; Dr. SS: 26, 54; MB: 70, 72; VB: 27-29, 33, 51; AK: 33; JB: 30, 54; UB: 51; GS: 40; MK: 31). Being a very important culture of the crop rotation, the possibility to grow soya in monoculture very efficiently over a long period of time without encountering any bigger disadvantages, has also been experienced in the Vojvodina (STB: 49; VP 72; NM: 68).

Soybean production is not labor intensive and the cultivation fits mechanization[75], making it a relatively *easy crop to cultivate*. One person can cultivate quite a big acreage alone. The equipment necessary to do so is normally already there, having been used for other crops such as corn. Therefore, both from a labor and investment point of view, it is not complicated to start with soy cultivation and continue it. In addition, no serious diseases nor issues with insects have been experienced over the last forty years[76] (Prof. DB: 31, 84; Dr. SS: 42; DR: 30; DO: 38; JB: 54; VB: 51, 53). Soya has the advantage in the crop management of having a rather short vegetation period. Harvest is early in fall, starting in the beginning of September. This gives enough time to either cultivate another crop such as winter wheat or to already prepare the fields again for the following year, reducing the time pressure existing in other crops (Prof. DB: 35, 37; Dr. SS: 58; MB: 72; GS: 40; DO: 88). Furthermore, soya is not only easy to produce, but also easy to store even for two to three years. This is not possible with corn which may go moldy or bad. Soya is regarded as the

[74] As previously discussed in chapter 6.1.1 under section '*Seeds*.'

[75] See previous chapters 6.1.2 and 6.1.3.

[76] One professor indicated however, that due to the increasing share of soya in the sowing structure, such issues are starting to appear (Prof. VR: 32).

easiest legume in respect to storage. This again influences the profitability in two ways. The easier storage is comparatively cheap and the beans can be sold when prices are good (BB: 39; ZB: 39; SAB: 90, VP: 36; NM: 30; MP: 77).

6.2.2 Profitability and demand

The relatively easy production of soya with little additional investments necessary and lower risks, make soya in comparison 'the most profitable crop in production' (VP: 34; MV: 44; BS: 44; Dr. SS: 32, 38; NP: 40; DM: 81; GS: 30, 58; NM: 30; MP: 37; DO: 88; ML: 65; MB: 40; KK: 71). *"From an economical point of view, it is very good for farmers to grow soya. It is growing and growing, it is a strategic crop" (BS: 32).* The price achieved on the market for soya is very good, perceived as stable for as much as the last 10 years and higher than in other crops, as can be seen in the following *Table 7*.

Table 7: *Earnings per hectare of soya compared to other crops (source BB: 31).*

	Yield (t per ha)	Price (RSD per kg)	Earnings (RSD per ha)	% of Soya
Soya	3.5	50	175'000	100%
Corn	10	16	160'000	91%
Sunflower	3	37	111'000	63%
Rapeseed	3	30	90'000	51%

Soya can be sold 'rather easily'. The demand is bigger - and continues to grow faster - than production, therefore farmers 'can sell their soybean any time'. Over the last 15 years, demand was always there despite the significantly grown acreages under soy cultivation (NB: 53; ML: 89; DR: 125; DO: 32; DM: 41; NP: 74; MP: 37, 77; VB: 29, 86; VP: 74; NM: 74; MB: 72; AK: 33, 47; KK: 69, 73; JB: 54; BB: 30, 59; JI: 44, 53; ZB: 93; Dr. SS: 32; UB: 51; MV: 32). *"During the whole period demand for soybean was here, so it was never a problem to sell" (DR: 46).* Despite the often-mentioned stability, not only of the yield, but also of the price, many farmers do not sell their harvest immediately, but store it for a period as prices in spring or early summer are often higher than in fall right after the harvest. *"Soya has the most stable price – it is the basis and the backbone of our production" (NM: 30).* As seen above, soya can be stored easily and therefore is a suitable crop for this kind of revenue optimization, which is often used (KK: 56; ZB: 39; BB: 103; SAB: 158; VP: 62; NM: 30, 60, 76; MP: 71, 73; NP: 74; JI: 53).

Important for the demand is the fact, that the cooperation between the processing industry and the producers is well developed and established. Large processing companies such as Sojaprotein and Victoria Oil are established in the Vojvodina and they have enough storage and processing capacity. This alone already secures the sale of the produce, as soya is the main ingredient of animal feed. The recipes for feeding have changed over the last decades and the share of soybeans in the feed for animals has even increased (Prof. DB: 37, 39, 41, 45; Prof. VR: 38; MV: 42; ZB: 93; JI: 53). If a farmer breeds livestock, the soybeans grown are directly used in the own feeding. The soy cultivation is regarded as the 'foundation for animal production' by a large company farm cultivating each year roughly 500 hectares of soya only for their own need. In case the animal feed would have to be bought on the market, the economics of the livestock breeding would be put into question (NP: 36, 72).

While all soya on the world market is recognized for its high protein content, the soybeans from the Vojvodina are guaranteed non-GMO. This is a distinguishing factor and subsequently an advantage in the sales process. It keeps both price and demand up providing an overall secure sales market. Any surplus in the local quantity produced can always be exported to the European market, which is not able to satisfy its protein demand on its own. In the EU, GMO-free soy from the Vojvodina is in demand in a very wide area of applications besides feed, like in the human food consumption such as tofu or oil, in the chocolate industry by large corporations such as Nestlé in the form of lecithin made of soya and in the pharmaceutical industry (DM: 33; MV: 42; MK: 31; BB: 30; JI: 35; BM: 30; ZB: 136; GS: 32; KK: 73; BS: 86; Prof. VR: 54; Dr. SS: 82). *"The price is good, the world market demand is growing. It's very interesting" (BS: 88).* This opinion is shared by Prof. DB who believes that the growth tendency will continue at least for another decade, depending on other crops and their prospects, the industry and the politics involved (Prof. DB: 69).

6.3 Challenges of soybean production in the Vojvodina

"It is hard to talk about constraints and problems. … Other crops have even bigger problems. So, soya bean is in a relaxed position" (Prof. DB: 33). But even in a 'relaxed position' and outweighed by its advantages, an attitude shared by many farmers (GS: 38; MB: 40; JB: 38; BB: 39), there are two serious challenges the soy cultivators must put up with. These are weeds control and water requirement, as outlined in the following chapters.

6.3.1 Weed control

Weed control is in the eyes of many farmers the most difficult challenge, or at least equivalent to the water requirement challenge. *"The biggest problem in the soybean production is that war we have each year with the weeds" (DR: 34).* In difference to certain other crops, 'there is no soy cultivation without weeds' and weeding is necessary over a prolonged period, at least until the end of the irrigation (DM: 35, 39; KK: 39; NP: 38; NB: 60; MP: 35; MV: 36; Dr. SS: 36, ML: 63). To tackle this, the farmers have three options which they often apply in combination: 1) *mechanical* weed control (with a harroweeder or other machinery), 2) *chemical* weed control (herbicide treatment) and 3) *manual* weeding. Before these three methods are discussed separately below, let me make two points. First, the row distance between the plants has an impact on weeds[77]. If the row distance is 50cm, the leaves of the plants close the distance between the rows faster, leaving less lights for weeds to sprout (MB: 50). A similar effect is seen in the sunflower cultivation, where the bigger leaves of the plants leave less light for weeds to grow. Second, in the seed production certain weeds are not allowed and this aspect is controlled by the state for reasons becoming clear when going into more detail below (Dr. SS: 90; BS: 62).

1) Mechanical weed control starts a few days before sowing and continues during the vegetation period as long as the plants are not too big, normally in two to five rounds. Machines like a disc harrow or a finger weeder rip out weed growing in the space between the rows of soy plants. This is called inter-row cultivation. Modern machines, like the harroweeder, are able to additionally weed in the much smaller space between the individual plants of a row, often described by farmers as 'into the row' weeding, again, only as long as the plants are not too big. Instead of using the mentioned machines, yet another mechanical solution, albeit with a high labor input, is to kill the individual weeds with a burner, a procedure only justifiable for small plots. Mechanical weeding with harrow-like machinery, besides the primarily intended weed elimination, has an additional benefit: the soil is aired by harrowing it and if done carefully while the plants are still small, the crop then 'simply grows better'. Thanks to mechanical weed control, however, farmers can avoid using herbicide, or at least avoid using it excessively. Most farmers apply a combination of mechanical and chemical weed control plus sometimes manual weeding between the rows whenever necessary (VP: 48, 50; NM: 46; ML: 61; DR: 36; 40; DO: 48; GS: 48; DM: 39; MV: 38; SAB: 58; MB: 42, 54; JI: 83).

2) Chemical weed control consists of herbicide treatments, which are applied up to three times per vegetation period depending upon the necessity. The farmers either wait with the first application until the first trifoliate leaves have sprouted before spraying the entire field, or alternatively they bring out a soil herbicide right after sowing, killing certain weed already at the phase of emergence

[77] See previous chapter 6.1.1 under section '*Cultivation during the vegetation period.*'

(MP: 39; DR: 42; KK: 45). Important in the chemical weed control are the early and precise timing of the herbicide application and the use of allowed herbicides from recognized companies such as Sencor Plus from Bayer, Corum from BASF, Harmony from DuPont and Fusilade from Syngenta. The laws of Serbia and the EU, and in line with them also the *Danube Soya Standard*, only allow tested and well-known listed herbicides as the ones mentioned above. The application must be documented in electronic diaries for Donau Soja, to allow the produce or the end products made from it are to carry their quality label. Glyphosate for example is allowed by Donau Soja, but only during the early vegetation phase and not anymore as harvest approaches, in order to have less remains of it in the end product; crop desiccation is therefore entirely forbidden under the *Danube Soya Standard*. Certain chemical plant control products which are not on the list of lawfully permitted herbicides but all the same available - often from China and thus much cheaper – are likewise prohibited (DR: 42, 72; NP: 38, 44; MB: 122; MK: 47; UB: 67; LR). The different allowed herbicides listed above are sprayed against different weeds. Chemical weed control, though, is getting more challenging as certain weeds, above all ragweed, have become resistant to herbicides, especially when soya is cultivated as a monoculture over a certain period of time. The effectiveness of herbicides anyhow not being 100%, it is from time to time necessary to take corrective measures to clean the fields properly. In this case often manual weeding is applied (KK: 39; MV: 36; DR: 40, 60; BB: 88; SAB: 45; DO: 60).

The interview partner from the agricultural trade (BB: 39, 86) pointed out the necessity of a careful and controlled application of herbicides, especially when containing glyphosate, in order not to pollute the soil. In addition, uncontrolled glyphosate application for example sprayed too late in the vegetation phase, not only leaves traces in the beans but can lead to soya being diagnosed as genetically modified in the compulsory control performed when brought to a storage house or when sold, and then being rejected. The possible health dangers of herbicide-usage not only for the later consumers, but also for people living in the neighborhood of treated fields, are known and were mentioned as one of the reasons for having changed to organic production, thereby completely abstaining from the use of herbicides (JB: 52; DR: 66) (see also Leguizamón 2014: 155).

3) Manual weeding: If appropriate weeding machinery is not available, chemical weeding either not allowed like in the organic production or not completely effective as just described, manual weeding is used. Because in conventional cultivation this is only applied as a last resort corrective measure (SAB: 150; DR: 60), the following outline (as an exception) only concerns organic cultivation. *"We have to weed three times before harvest, with our hands we have to rip out the weeds. Then everything is 100% clean" (VB: 35).* Thanks to the manual weeding, the organic fields are very clean without any perennial weeds at all. The weeds growing, all come from the seeding material. As

soon as soya starts growing, weeding is taken up, a first round preferably mechanically and then manually. The last manual weeding round takes place right before harvest, when everything is already dry, ripping out all remaining weeds. As explained in detail during the interview, one round of weeding could recently be saved, by following the recommendation of Danube Soya to sow only after April 20th, having given the field a proper mechanical treatment a few days before, versus sowing up to three weeks earlier as normally done (VB: 45, 55). Manual weeding is mostly done hiring wage labor for a limited period of time, as discussed in the labor input chapter (6.1.3). Not only smaller family producers weed manually and employ wage labor to do so, also the largest interviewed organic company producer hires each year up to 200 seasonal employees to perform two to three rounds of manual 'into the row weeding' (ML: 61, 68). The difficulty to find season labor and the comparatively high cost for manual weeding are for smaller organic farms an important challenge they have to put up with year after year, however, normally with very good results, such as a better harvest and cleaner fields than the farms who apply mechanical and chemical weed control (GS: 38; JB: 28, 38, 42, 50, 54; VB: 76, 78; ML: 61, 68, AK: 35; JI: 83).

6.3.2 Climate condition and water management

While the overall climatic conditions are regarded as good for growing soya in the Vojvodina (NM: 30; VP: 28; VB: 27; GS: 30; MB: 40; 96; JI: 42; Dr. SS: 38), the issue of the water requirement of soya poses a serious challenge. *"During the last decade or so, there have been a lot of droughts" (VP: 100).* Stricevic et al. (2011: 60) also assessed aridity as very challenging for the soy production in the Vojvodina. Only about 5% of the crop fields in total are covered by irrigation systems. The soy cultivation therefore heavily depends on sufficient precipitation, which, however, lacks more and more:

> *"Vojvodina is a region in the northern part of Serbia and the southern part of the Pannonian Plain. Due to its topographic characteristics, the region is prone to waterlogging by runoff from the Alps and the Carpathian Mountains. However, the increasing frequency of drought events over the past few decades is causing a reduction in agricultural yield, especially in crop production which is traditionally rain-fed" (Stricevic et al. 2011: 60).*

The water requirement of soya is not as important during the initial stages of growth, compared to June and July during pollination (Dr. SS: 58) where it is highest until the end of seed filling in August (Dragović 2012: 33). There are areas in the Vojvodina with a lot of dew and air moisture where soya still provides good yields while other crops dry out and die or at least give even far

inferior yields in drier years with difficult climatic conditions. However, the very recent severe drought in 2017 has influenced the yield of soya significantly in most places as well. The year 2017 was therefore generally judged 'very bad' both in terms of yield and quality. More than one organic producer even came to the conclusion, that their specific region is not suitable for soy production any longer, but because of the crop rotation, they have to continue and irrigate more (AK: 31; NB: 39, 60; ML: 42; MP: 35, 63; DO: 40; 128; ZB: 50, 110; JI: 42, 51, 117; BS: 38; NM: 38, 66; MB: 98; VB: 29; DR: 130; GS: 30; JB: 28, 92, 96; BB: 88; BS: 38; MV: 44; Dr. SS: 88).

Company producers interviewed have the land under soya at least partially irrigated (NP: 38; MB: 44; DM: 43; BS: 28). The biggest organic company producer has around 400 hectares covered by an irrigation system, roughly 20% of its land, and tries to grow at least one part of the soya each year in this area. This is not always possible, however, because of the strict crop rotation (ML: 42-43; NB: 60). A recent study by Kresović et al. (2017: 36) conducted on an irrigated field consisting of acalcic chernozem soil in the Vojvodina and covering the three years 2012 to 2014 showed significantly higher yields of soybean under irrigation, ranging from additional 25% in 2014 to 97% in 2012. Similarly, Dragović (2012: 33) in an even longer study covering seven years between 1990 and 2003 on loamy soil found "that the average effect of irrigation was 2.2 t/ha or 113% [sic, read 84%]" additional yield (4.8 tons per hectare under irrigation versus non-irrigated 2.6 tons per hectare) and even an additional 366% in the very dry year 1990 with a yield of 4.2 tons per hectare achieved under irrigation versus the rain-fed cultivation yield of only 0.95 tons per hectare. This significant yield variance in a dry year may somewhat justify the often expressed feeling of 2017 having been 'very bad' for most farmers. The results of these studies also confirm the statement of the extension services representatives that 'the big players' with irrigation systems have a yield of 4 tons per hectare every year (JI: 123). Kresović et al. (2017: 36) also showed, however, that too much irrigation reduces the additional yield and has a negative effect on the protein content of the beans. Another danger for cultures under irrigation are fungal diseases, which are otherwise not observed in the soy cultivation. Out of this reason, one interviewed organic producer refrains from irrigation (NP: 38; KK: 63; VB: 29).

Besides the above discussed weed control and water management challenges, the following issues were mentioned: Recently appeared diseases such as bacterial leaf spot or insects, the import of GMO soy products, the high price of fuel necessary in the predominantly mechanized production and the monopolistic structure of the processing industry with only Sojaprotein as a buyer in the first decades of the soy cultivation in the Vojvodina. This last challenge, however, has been resolved as more processing companies entered the market in the meantime (VP: 72; NM: 38; MP: 71; STB: 131; Prof. VR: 30, 32).

6.4 Comparison of soya and other cultivated crops

On average, the producers interviewed cultivated almost 30% of their acreage under soya. The percentage varies heavily, from a low 7% share of soya all the way up to 90% (see *Table 8*).

Table 8: *Share of soya compared to total area under production of interviewed producers and seed supplier company.*

Interviewees		Hectares		
		total	*soya*	*percentage*
MH & KK	Company producer, conventional	1'000	370	37%
NP	Company producer, conventional	2'300	500	22%
MB	Company producer, conventional	5'000	1'500	30%
DM	Company producer, organic	1'800	300	17%
ML & NB	Company producer, organic	1'852	130	7%
DR	Family producer, conventional	20	10	50%
DO	Family producer, conventional	20	14	70%
SAB & STB	Family producer, conventional	80	72	90%
VP	Family producer, conventional	150	120	80%
NM	Family producer, conventional	150	120	80%
MP	Family producer, conventional	400	340	85%
GS	Family producer, organic	5	n/a	n/a
JB	Family producer, organic	5	n/a	n/a
AK	Family producer, organic & conventional	30	6	20%
VB	Family producer, organic	60	12	20%
BS	Seed supplier	4'500	1'575	35%

The most important crops cultivated besides soya are: corn, wheat, sunflower and sugar beet. Together with soya, they cover 85% of the arable land in the Vojvodina (Prof. DB: 82; Dr. SS: 34) Additionally, the following other crops for the remaining 15% of land were mentioned in the interviews: barley, spelt, rye, oat, triticale, oilseed rape, alfalfa, poppies, paprika (most important crop for the organic family producers), coriander, fennel, buckwheat, millet, flaxseed, sorghum,

popcorn and peas. One of the organic companies cultivates as much as 15 different crops, soya only having an average share of 7% (ML: 51). Two organic family producers working together in the same cooperative grow 12 different cultures with soya having a share of 20% (VB: 45).

Measured in hectares, corn is the biggest crop cultivated in the Vojvodina in 2017, planted on one million hectares, followed by wheat (540'000 hectares), sunflowers (220'000 hectares), soya (200'000 hectares) and barley (95'000 hectares) (Maslac 2018). The agronomic opinion of researcher from the University of Novi Sad is, that soya still has room to grow in the Vojvodina by another 50%. Being currently around 11-12% of the sowing structure, it should not exceed 17-18%. If this limit is exceeded, new difficulties are expected in the crop rotation as well as diseases and insects. All this said, this leaves still room for roughly another 100'000 hectares or in other words an additional 50% of today's acreage to cultivate under soya during the coming decades in the region (Prof. DB: 73, 75; Dr. SS: 30).

Soya is often described as more important and helpful than any other crop, regarded as a 'must' in the crop rotation and leaving the field with a higher nitrogen content after harvest, in detail already described as one of the main advantages. Within the rotation, soya is generally grown between winter wheat and alternating with corn in the conventional production, while it is always used before growing paprika on the two bigger organic family farms interviewed (Prof. DB: 81; Dr. SS: 38; 54; MB: 40; DM: 41; NB: 37, 53; DO32; GS: 30; AK: 27; VB: 29). The four biggest conventional family producers interviewed all grow and live from their soya monoculture with a share of soya of at least 80% for already more than a decade and have not encountered any risks (SAB: 52; VP: 72; NM: 69; MP: 31; BB: 60). Mostly though and very common on most farms in the Vojvodina, soya is included in a crop rotation sowing structure. However, in line with the assessment of the four producers just mentioned above, if a rotation of the field under soya is not possible because of its high share in the sowing structure, this is basically no problem and even cost-effective (Prof. DB: 84; KK: 39, 41; DO: 96). Besides the above differences between soya and other crops in size and sowing structure, alterations are the different and higher input of chemicals used for plant protection for soybean, the non-necessity of fungicide in the soy cultivation and the inoculation of soya seeds. Regarding the other crops, the alterations are higher input such as fertilizer demand and the necessity of purchasing seeds such as corn and sunflowers as well as less weeding being necessary for wheat and coriander for example (KK: 63; MB: 66; VP: 70; NM: 64; DM: 79; SAB: 42; GS: 56; VB: 88). The main reason for switching to soya, besides the soil-improvement achieved thanks to the soy cultivation, however, is not one of the just mentioned differences, but one I have already discussed in detail: *"We stopped producing wheat. It is very simple, it is calculation – how to make minimal investments while achieving as high profit as possible" (KK: 71).*

6.5 Organic production

Based on the interviews performed with six organic producers, there were two main differences mentioned between conventional and organic cultivation, both not being solely specific for the soy cultivation: First, chemistry is forbidden both in plant protection as well as in fertilization. Second, the export demand is better for organic products. Demand increases in Western Europe, but there is not yet enough land under organic cultivation to satisfy this demand. The future potential is consequently assessed to be very big (ML: 119, NB: 37; VB: 33). The demand for organic products is driven by the export market. In Serbia itself, the organic demand is underdeveloped due to the weaker local purchasing power (BS: 76; VB: 33). The prices payed for organic produce by Western European partners or export companies are very good, justifying the organic production especially on small plots of land (JB: 52, GS: 28, 36). To have an organic company production of close to 2'000 hectares in Serbia though, is judged by the interviewed representatives of its own management to be 'like suicide'. Organic production, however, is an explicit request of the foreign investor for the above-mentioned reason: the fast-growing European demand and having a long-term perspective in mind (ML: 93, 106-107, 119, NB: 108).

Regarding the interdiction of chemical use, there is a clear reason to grow soya in the organic production: *"Soya is the best preceding drop for the next season" (ML: 54)*. Because chemical fertilizers are not allowed in the organic production, liquid manure or other organic fertilizers are used. The price for organic fertilizers, however, is very high and liquid manure not available in sufficient quantity especially for big farms as animal breeding decreases. Therefore, one in detail discussed advantage of soya is highly appreciated in the organic production: after having grown soya, no fertilizer is needed the following year (DM: 45; AK: 35; ML 116; NB: 115; Dr. SS: 48). Additionally, the organic standard requests about 20-25% legumes share of the total area in the crop rotation (NB: 39). Almost all organic producers achieve this requirement already by growing soya, not needing any other legumes to reach the 20%. Chemical weed control is forbidden as well. Weed control in organic production is therefore done mechanically and by manual weeding as described in detail in the previous chapter. As shown, organic production requires to weed at least three times to keep the field clean and is therefore more labor-intensive than conventional agriculture. As one producer experienced after having changed to organic production, this might be economically compensated by a better profitability (VB: 35, 45; JB: 38. 50).

7. Socio-economic embeddedness of soybean production in the Vojvodina

7.1 Processing chain

The current chapter will concentrate on the perception and knowledge of the farmers regarding the last part of the value chain: what happens with soya after being harvested? Many of its aspects like storage, own use, demand and the wide range of usage etc. have already been mentioned. In the following discussion, I will focus on storage, buyers and the processing industry. As the own use of the harvest, the demand and the wide application of soybean have already been discussed in detail, this will not be repeated here again.

While not many farmers seem too concerned with what happens to their produce after they sell it, one farmer interviewed was very consciously concerned about the further development of the local soy processing chain. This producer is well aware of the high additional margin both processing as well as the distribution and the export of the final product can provide, besides the jobs being kept in the country and region. Therefore, he does not want the Vojvodina to become an area of 'raw materials' only, meaning just a production area of agricultural crops. His views and concerns are entirely shared by the chairman of Donau Soja, who sees for his non-profit association also the role to foster developmental cooperation with the eastern neighbors, where farmers normally earn little and high unemployment rates are observed. He sees an opportunity thanks to soya that processing chains can be established locally to manufacture final products which in turn can be exported to Austria, Germany or Switzerland. The agricultural production will profit from this as well, he believes very strongly, because the necessary markets for the farmers produce rise and in reciprocity grant a sustainable cultivation of soya and other legumes[78] (DR: 114, MK: 31, 33, 43).

7.1.1 Storage

After harvest, soy beans are cleaned and, if necessary, dried and then go to storage. Storage is regarded as rather undemanding. Corn on the contrary can go moldy or bad if stored like soya. For soya, being kept at an appropriate low enough moisture level in a covered area or in silos, there is no such danger. It can be easily stored for 2 to 3 years without problems, until the seeds are either used again in the own sowing structure, the soybeans are fed to animals or animal feed is produced thereof, or until the crop is sold at a price the producers 'feel right with' (KK: 43; NB: 82; DR: 132; VP: 36; NM: 30, 60; MP: 71; JB: 48; BB: 39; ZB: 39; SAB 158).

[78] See chapter 8.1 where this argument is further discussed.

Soya is preferably kept in own storage facilities for economic reasons. Storage is felt to be rather expensive. Company producers normally have their own silos and floor storage space. Family farms store soya in so-called flat storage, that means in big white jumbo bags or piles, in a hall or just in a covered place, sometimes open on one or two sides (see *Figure 19* in Appendix III). If own storage is not available or if there is not enough space for the entire harvest, soya is brought to commercially operated storehouses, sometimes organized as cooperatives, sometimes belonging to a company. The storehouses offer storage capacity both in silos and in storage halls. The ownership of the soybeans and its risks remain entirely with the producer while the crop is in storage (MH: 28; KK: 56; NP: 64; DM: 73; ML: 76; NB: 84; DR: 132; DO: 82; STB: 79; SAB: 76; VP: 34, 62; NM: 60; MP: 69, 79; JB: 48; VP: 76).

Only one of the interviewed farmers immediately sells his whole yield right after harvest to save the storage cost (DO: 86). The interviewed trading company stores the bought soybeans either in the company storehouse on the ground or in their own silos (BB: 53).

7.1.2 Buyers

Farmers often sell their soybeans to *local traders*, asking several for offers and selling to the one offering the best price. Some farmers already sign contracts as early as spring or during summer, others sell immediately after harvest, and some store their beans as just described above and sell them later, hoping to achieve a better price and realizing an additional profit (NB: 84; DR: 48; DO: 84; VP: 62, 76; MP: 69). Local traders in turn sell the merchandise to the local processing industry or export it mainly to the EU. Only farmer working together with certification bodies have the possibility to export directly as well, while the others must export via a trader (GS: 130; KK: 61; MP: 69; SAB: 78). In the case of the interviewed representative of the trading company, they buy soybeans from their *cooperators*, as he calls his roughly 2'000 farmer-customers. The contracts are always agreed on in spring before the trading company supplies the inputs. The company has both local and foreign clients to sell their produce to (BB: 53, 55, 98; VP: 62; MV: 49).

The possibility to sell part or most of the produce directly to *local processors* like oil factories or the feed industry was mentioned as well, both by companies with big quantities to sell, but also by one of the smallest organic producers, selling his soya to the same local processor for the last eight or nine years. The biggest company producer in the interview sample has 50% of its soya cultivation under contractual production for seed houses and processes the other 50% itself (Prof. DB: 45; KK: 61; MB: 60-64; MP: 69; GS: 52; ZB: 41).

Three organic family producers sell part or the whole soya harvest to Germany, selecting the most beautiful beans. One of them explicitly stated not being aware what it is used for there, but pointing

out that soya is an important culture these days and that some people eat soya instead of meat, assuming the exported soya is processed into tofu in Germany. Thereby the assessment of one of the university professors was confirmed, namely that soya in Serbia plays almost no role in direct human consumption yet. The remaining crop quantity of the mentioned organic producers is sold locally, mainly to an organic cattle breeder in Čuruk with over 1'000 cows, from whom they buy manure in return to fertilize their fields. They are very proud that their produce is both in demand in Germany as well as in Serbia (JB: 48; AK: 103; VB: 33, 80; Prof. DB: 71).

The largest organic company producer usually signs contracts in spring with only two main buyers, one from the EU and one from Switzerland, working with them for already five years. The producer has the advantage of being able to offer a number of different products besides soya, and all of them in significant quantities, which is described as very important to these two buyers. Both buyers visit the production site and inspect fields and silos. Before they request delivery, samples of the harvest are sent to them for tests to be done in Hamburg, for example checking GMO content and residues of pesticides. If the results are satisfactory, delivery is organized by the respective buyer (ML: 85, 87, 123; NB: 84, 88, 120). The other organic company producer interviewed also exports his produce mainly to traders in Austria and Germany (DM: 75). Also local traders check regarding GMO content before buying; other checks are performed by certification bodies, to be further discussed in chapter 7.2 (DR: 136).

As discussed in chapter 6.3 regarding the challenges of soya, the various sales possibilities for the producers indicated above were not always available. For quite a long time in the past, there was basically only one buyer for soybean in the Vojvodina, the processing company Sojaprotein (see below). Today, the situation is 'relaxed' with many options and "*even from Croatia some buyers come in the fall and they will give you a better price. You can decide here and there*" (Prof. VR: 30).

7.1.3 Local processing industry

The local processing industry for soybeans in the Vojvodina is still concentrated and dominated by Victoria Group with the largest soybean processing factory in Serbia, Sojaprotein A.D. in Bečaj[79], and Victoria Oil. Both companies supply the local market and are important exporters of processed soy products. However, there is a growing number of manufacturers which process soybean, making oil and other products mostly for the animal feed market, in addition to

[79] Sojaprotein was founded in 1977 and started their operation five years later. In 2002, Sojaprotein became a member of the Victoria Group and ranks now among the most important soybean processors in Europe with a yearly capacity of 250'000 tons per year. Victoria Oil, also mentioned by the interview partners, belongs to the same Group and processes over 85'000 tons of soybean annually.

specialized animal feed companies like Gebi d.o.o. (Prof. DB: 45; Prof. VR: 30, 36, 54; KK: 58-61; MB: 30; DR: 114; VP: 46; MP: 69; BB:53; MV: 42; ZB: 93).

Company producers often process at least a part, or in one case even all of their soya, themselves. They make oil, soy cake, soy meal and soy grits which they mix afterwards and often feed it to their own cattle (NP: 64; MB: 56, 64; DM: 73).

For Donau Soja it is a goal to foster the processing industry as much as possible in the country of production, to put focus on the whole value chain, to protect the local value added and to create local jobs. To enhance the awareness in Serbia in this respect, also of local consumers, is therefore becoming more and more important, after having put a higher emphasis on the production in the past (MK: 37, 39, 43, 51, 67, 73; UB: 33; MV: 62).

7.2 Certification

Certification was a topic mentioned in the interviews in different aspects. We have already come across the 'certified seeds' from seed houses and the 'certified GMO-free' milk. Certified seeds are tested in many aspects, regarding quality, the germination, the weeds and the genetic pureness. These seeds are 'registered', and when farmers buy them from a seed house or a distributor, they get a declaration (Dr. SS: 90; NP: 98, GS: 116). The certified GMO-free milk is a topic related to Donau Soja and will be discussed in the next chapter. In this chapter, I will focus on the certification of producers, their cooperation with certification bodies, the specific certification regarding organic production, storage certification requirement as well as the certification by buyers.

Farmers are not required to certify their production and to commission certification bodies. Especially smaller conventional family producers therefore refrain from doing so. One producer stated that he makes 'his own norm', performing his own experiments and implementing what works best for him (VP: 138-140). Other farmers, however, do work together with certification bodies. There are different certification bodies in Serbia, one farmer estimates that there are almost 10 of them. He is working with a certification house from Subotica in the northern part of Serbia, working according to Swiss standards. The advantage he feels getting from this cooperation is the quality assurance obtained, the guarantee that his produce is free of GMO and without pesticides and last but not least, that he himself is able to export directly (GS: 128-130). Besides Jugoinspekt, the Swiss company SGS has been mentioned explicitly by a producer. SGS for example checks the soya of the farmers before their produce is bought by Sojaprotein (DR: 138; JI: 102; MH: 156; MP: 145, 69). The Quality Manager of the largest organic company producer (NB) mentioned in the interview that they are certified regarding their organic production by the Bio Suisse AG and by

the EU-BIO Organic Control System and their storage facilities are certified through application of ISO 9001 quality management norm and the Hazard Analysis and Critical Control Points (HACCP) quality control system[80]. She explained that during an annual inspection by the certification body, samples of plants are taken to do the GMO testing (NB: 212, 214). The parent company of the smallest company producer interviewed, being additionally engaged in various activities such as the trade with pesticide and fertilizer, the distribution of animal feed, having storage capacity of up to 35'000 tons and therefore offering as well to other farmers to store their products and storing state corn- and wheat-reserves, works together with Jugoinspekt as well as SGS, the mandated control house of Victoria Oil. Being legally obliged to do so, they apply the HACCP standard as well (MH: 28, 156).

The buyers of soya normally commission certification bodies to check the quality of the produce to be bought each time before putting it into their silos, one aspect of this check being the genetic pureness of the crop in question which can be done in a couple of minutes. In this respect, one can say that in the end all farmers are 'confronted' with certification bodies. Either they themselves assign certification bodies to come to their farm, checking their way of production, their quality system, their plants and their produce and providing them the according certification, as shown above. Or, if famers choose not to do so, then at least their produce is checked at the time of storage reception by certification bodies commissioned by the respective buyer. Buyers additionally request certain standards, like the maximum level of humidity to be observed during storage, and commission certification bodies to visit farms to control them and to perform additional checks (DR: 124, 136, 138; 142; STB&SAB: 174-177; NM: 136).

7.3 'Donau Soja' in the Vojvodina

The regional center of Donau Soja in Novi Sad was opened in 2014, staring with one project and one cooperation. The initial focus was strongly on soy cultivation with demonstration fields and trainings for producers. Over the years, raising the general awareness how soya is used after the production gained importance to develop the human food customer markets and to make the brand Donau Soja better known. This development does not only hold true for Donau Soja in Serbia, but for the whole international non-profit association. Today, Donau Soja sees itself as "*the bond between the producers, the silo operators, the processors and the final product*" (MV: 26, 62, MK: 61, 71, 73; UB: 79; DM: 27; ML: 216; VB: 27; BS: 26).

[80] "HACCP (hazard analysis and critical control points) is a specialized quality control system with food safety as its objective that has become the norm in the food sector" (Fulponi 2006: 3).

The value chain of 'Donau Soja'-labeled end-product[81] on the customer market can be summarized as follows: The producers, members of Donau Soja, are recommended to buy certified seed from a seeding company. The production is done according to the requirements of the *Danube Soya Standard* and the producers confirm their application in a self-declaration. After harvest, the crop is brought to a first gathering point, normally a silo-operator. The soybeans are tested, at least strip-tests for GMO-detection are always performed on-place and the documentation for traceability reasons starts by recording the tons delivered. Donau Soja beans are separated from other beans in Donau Soja certified silos. From there, they go either via trade or directly to processing. This first processing company must be a member and have a contract with Donau Soja. The beans are again processed separately from other soya and products like soy oil, -meal or -grit are made, or the soybeans are toasted. From this point onwards, every partner in the remaining value chain, like further processing companies such as animal feed producers, cattle breeders or chicken farms feeding Donau Soja as well as the distributors of the final product have to be Donau Soja certified and either be member or have at least a contract with Donau Soja in order to be able to label the tofu, the meat, the oil, the milk, the eggs etc. as a Donau Soja end-product (MV: 48; UB: 45).

Under the *Danube Soya Standard*, its different pillars described in the introduction and included in Appendix I, the crop producers themselves are not necessarily controlled by a certification body, but they must sign a self-commitment declaration, stating that they comply with the requirements of the standard. The formal and documented certification process, however, starts already during storage reception, the first gathering point, as shown above. Certification is not performed by Donau Soja themselves. Independent external certification bodies are authorized to control the implementation of the *Danube Soya Standard*. In clear difference to other certifications like the RTRS or ProTerra, Donau Soja certifies the origin of the produce as well. Once a batch is registered during storage reception, it is fully traceable, being kept completely separated from other produce. Additionally, Donau Soja has developed an isotopic database, allowing to identify the origin of soybeans retrospectively by comparing them with reference data A consumer can therefore be sure that a Donau Soja labelled product is 100 percent made from Donau Soja soy. (MV: 26, 32; UB: 35, 45; MB: 126; DO: 132).

The *influence* of Donau Soja and its standards on the producers and the *benefit* they preceive in an affiliation are generally seen positive, although to a slight extend undefined. One producer sees an *"additional value to our product" (NB: 209),* by giving the buyers of their produce the assurance being not genetically modified and safe without any further tests needed, while another farmer sees in

[81] See Appendix I for further information regarding standard and logo.

the standard *"a good process for us producers, we know what we produce and how" (GS: 122).* The representative of a conventional company producer explained this 'how' in more detail:

> *"All standards [sic, read criteria from Danube Soya Standard] are very important and we observe them all. For example, we do not produce GMO, we only use certified seeds, we keep electronic diaries documenting every single step of the production, the use of pesticides and other. We only use pesticides allowed both by the EU and the republic of Serbia. We produce only on existing arable land, not on any riverbank or on marshland. Our applied labor- and social law complies with EU und Serbian law. We have external control" (MB: 122).*

Regarding the production-method required by Donau Soja, one farmer stated: "*for me no influence, because I already produce organic" (VB: 155).* This statement was repeated by other organic producers, as they perceive the requirements of their organic standard to be more demanding than the *Danube Soya Standard* (ML: 210; JB: 94). The main content of the *Danube Soya Standard* in the perception of the farm representatives interviewed is often solely 'GMO-free soya', an aspect already required by law. In the light of this limited knowledge, the perception of most organic farmers interviewed is conclusive, but superficial and confirming the need to raise the general and broader awareness. While detailed knowledge regarding the *Danube Soya Standard* criteria with exception of one company representative already cited above was rather rare, it can albeit be considered a good start taking into account the short three-year local presence of Donau Soja at the time of the interviews[82] (MH: 150; DO: 132; SAB: 31; STB: 166; MP: 137; VB: 149; AK: 103; BS: 76). The interviewed representative of the local trading company feels that Donau Soja provides a 'better system', meaning that the producers know what kind of seeds they are getting, what kind of pesticides they are allowed to use and how they are to be applied. Regarding his company, he feels that the reputation has increased thanks to the Donau Soja affiliation, and therefore the cooperation is taken very seriously (BB: 28, 115). The seed producers profit from the *Danube Soya Standard* as well and stated openly, that Donau Soja is 'very helpful' for their seed selling business, as they recommend using certified seeds and generally promote soya (AMP; BS: 70). One organic producer explained in more detail that his company profited strongly from the field days Donau Soja organized on his farm. People from all over the Vojvodina came to visit and saw how they are producing. The event was covered by newspapers and reports published in journals. This was felt to be excellent public relation for the company farm, now being well known for their professional organic production (DM: 119-121). A similar positive experience with field days was

[82] In one case a farmer even asked me, if I had more knowledge about the criteria of the standard and could explain them to him.

mentioned by the biggest company producer interviewed. Organized by Donau Soja, they were able to test a harroweeder which was afterwards presented during the field days to a larger public. The same company certified its milk, the first company in Serbia to do so, now being able to carry the 'Donau Soja' label. This has enhanced their competitive position and given them additional security for their production and their quality system. Their profitability of the soy cultivation has increased since they are Donau Soja certified. Regarding the production method, the *Danube Soya Standard* has not required changes to be implemented, the only difference being, that the processes are now well documented which is again an advantage for the quality assurance (MP: 28, 40, 124, 130). The biggest organic company producer was also able to test a machine for a longer period thanks to Donau Soja. Just like the conventional company, they consider buying one next season, as the machine proved to be better than their own comparable machines (ML: 220).

Important for members and appreciated is the exchange thanks to Donau Soja, both between the producers and the representatives of Donau Soja as well as between the members and by establishing new contacts for example with different institutes (BB: 113; DM: 119). The relationship between the producers and Donau Soja is seen very cooperative, supportive and helpful for the producers. The field days organized by Donau Soja offer such kind of exchange and are highly appreciated, as discussed above (VB: 27, 45; DM: 117; MB: 28; NB: 35; Dr. SS: 80).

7.4 Economic focus

7.4.1 Economic situation of producers

"The economic reasons are the main reasons why they are producing soybean" stated a faculty member of the University of Novi Sad (Dr. SS: 48). It was therefore interesting to see, how the perceived economic situation by the producers is described by themselves. The answers given by the interviewed representatives, however, must be seen against the background that at the time of the interviews, the farmers just ended a year of drought with significant yield losses for most producers, as shown in the discussion of the water challenge. It was therefore not a surprise that the answers given being asked how they judge their economic situation, ranged from '*very bad*' to '*very good*'. Unexpected was, however, that out of the 15 producers interviewed, the large majority (13 answers) were on the positive side of the spectrum, starting from having '*enough for living*', '*a little profit*' or being '*satisfied*', moving up to '*not so bad*', '*healthy*', '*positive*' and coming to a head with '*very good*' being mentioned twice. The two negative answers, '*not so great, it has been a year of drought*' and '*this year was very bad because we had problems with drought*', both referenced to the actual situation coming out of a very difficult year (MH: 135; NP: 138; MB: 116, DM: 115; ML: 203; DR: 130; DO: 128; SAB: 153; VP: 134; NM: 128; MP: 131; GS: 114; JB: 88; AK: 93; VB: 136). To conclude,

however, that economic difficulties of farmers cultivating soy are inexistent, would certainly be premature. Having asked the question in the context of the soy cultivation, the following conclusion can be drawn: in comparison with other agricultural undertakings, the soy cultivation compares favorably. The economic outlook as a motivation to change partially to soy cultivation, as stated by Dr. SS above, was therefore confirmed in the context of this specific field research, or in the words of two producers: *"It is money. It is the main benefit"* and *"Money. Money. Profit. Yes, the main driver"* (DO: 42; DR:44).

To be successful in agriculture and having enough funds to invest, however, is difficult in the Vojvodina, specifically for smaller or mid-sized family producers and despite the good profitability achievable in soy cultivation. As shown in chapter 5.2, some family producers are dependent on alternative sources of income such as a second job during the winter season for example, in order to make a living, finance the necessary investments or to grow by buying additional land (Prof. VR: 42; VB: 138, 141; DO: 116; SAB: 156; VP: 39, 76; DR: 108; JB: 80; MV 52). Having another job or revenue source outside of the agriculture is one option to make a better living, especially for smaller family producers. The other possibility is to have complementary revenues within the agriculture sector but outside the arable farm, by diversifying along the value chain. More precisely, this means for example offering storage capacity to other farmers, processing crop, selling the obtained end-product in sales outlets. Cattle breeding is also an obvious diversification option, as soya is predominantly used in the feed. Some of the interviewed partners are doing so, however, making profit in this sector seems to be even more difficult. There are companies in the sample, which had been active in livestock breeding, but abandoned it due to profitablity reasons. As a matter of fact, none of the five company producers in the interview sample is a pure arable farm and therefore active in other areas as described above (MH: 28; NP: 30, 76; MB: 28; DM: 33; ML: 149). For family producers, not having sufficient investment capacity, this diversification option is only possible to a limited extent, for example in trading with pesticides (SAB: 158). Creativity, however, knows no limits and one family producer entered the more lucrative seed business as he explained, of course not certified, non-registered etc.:

> *"You cannot live just from the land. You need to have some side job, like our seed processing center, then waiting for a favorable price for selling, then selling the seed off the books … It turns out that it is these side jobs where we can earn … It would be better if we could just seed the crop, harvest it, sell it for a good price and then live on that. But we cannot do that" (completely anonymized for confidentiality reasons).*

As shown in the agricultural context discussed in chapter 5, subsidies were recently reduced by government from an already low to a very low level in Serbia (Dr. SS: 48). Subsequently, subsidies only play a minor role in the economic situation of the farmers. An organic family producer for example stated, that she only gets 23 euros support money per year from the state per hectare of organic cultivation, that is less than what two helpers on the farm earn together in one day (VB: 132). A conventional company producer gave the following quantification regarding available subsidies: 4'000 RDS, that is 34 euros per hectare, half of it in support of fertilizer and half for supporting diesel-costs (MH: 142). The validity of the mentioned subsidies for diesel is questionable however. Maslac (2016) mentions 4'000 RDS, with 50% of it for fertilizer, the other half however, for buying certified seeds and not diesel. Another producer mentioned 2'000 RDS, which makes sense, as he uses his own seeds (VP: 102). Irrespective of whether the exact amount is 34, 23 or 17 euros, the big picture does not change at all: the low level of subsidies plays a minor role in the economic situation of producers. As discussed in chapter 6.2.2, revenues from the soy cultivation can be expected to be around 175'000 RDS per hectare in a good year, that means close to 1'500 euros (see *Table 7*). The subsidies per hectare in this concrete example are therefore only in the range of 1.5% of revenues. An organic company producer stated that the total production cost per hectare soy cultivation amounts to 1'000 euros. Subsidies therefore just cover 2.3% of cost (ML: 89). All statements together imply a possible margin with soya of almost 500 euros per hectare achievable in a good year, under the assumption that there is no rent for the land to be paid as the organic company produces only on its own land. Subsidies of 23 euros are inferior to 5% of this margin. Even with a margin of only 300 euros per hectare, mentioned by another producer, the subsidies represent less than 10% (KK: 138). Indeed, this is not economically relevant for the farmer and very low when compared with the high 650 euros subsidies paid per hectare to organic producers in Croatia or the 600 euros paid in Italy for soy cultivation under irrigation (ML: 111; MH: 142). Comparing this rough calculation from Serbia to the overall agricultural support in Switzerland provides one more benchmark to support this conclusion. In 2017, the state agricultural support in Switzerland represented 22% of total revenue, that is almost 15 times higher than the 1.5% calculated in the specific example above (BFS 2017: 2).

Investments made on a regular basis into modernization of the equipment or enlargement of the land are an additional indicator of the economic situation of a producer. The possible contributions from the state when investing into modernization are significant, in contrast to the subsidies for cultivation as discussed above. Support from the state when buying machinery can be applied for

and IPA funds from the EU[83] are about to be introduced in Serbia. Depending upon the specific equipment to be bought, the state covers 30% to 70% of the price of new machinery. Getting support, however, especially the maximum of 70%, is not easy and regarded as a yearly fight. For example, every year other types of machinery are supported with the maximum rate, i.e. in one year tractors, next year combines. As shown in chapter 6.1.2 about the mechanization, so-called service providers do profit from such state funds, buying machinery and the providing services such as harvesting with the combine bought subsidized by the state (Dr. SS: 72; MH: 140; GS: 98). Without state support or available means from other jobs, farmers are often not able to invest and modernize as needed, often using old and obsolete machinery. Modernizing the machinery park and/or buying additional land must therefore be carefully planned by younger family farmers, for example buying one machine every five years. Older farmers openly declare not wanting to invest anymore because of their children not being interested in agriculture. One farmer rather continues cultivating less land and using the tractor of his father and other machines from this grandfather (DO: 130; SAB: 60; NM: 130, 134; MP: 133; JB: 44, 64, 78). Company producers have less financial constraints, they take advantage from the state support and have their own means to invest (MH: 140; MB: 118; DM: 29). Knowing that the majority of the agricultural land in the Vojvodina is cultivated by family producers, it becomes again obvious, that a push for modernization is necessary, but not able to be financed by the means of most current family owners from their agriculture revenues. Considering the additional need of irrigation in the region because of more frequent droughts, new financial sources are needed and therefore foreign investors have come into focus.

7.4.2 Foreign investors

According to the press and confirmed by answers given during the interviews, fertile soil and good climate conditions, low-cost labor availability as well as low priced arable land, local production know-how, a growing market and comparatively good infrastructure in the Vojvodina attract foreign investors (ML: 198-199; DM: 107; MB: 94; AK: 71; BB: 94; SAB: 133). But how is this perceived by the farmers? When asked, the replies were once more diverse:

> *"They [the foreign investors] should avoid it [the Vojvodina]. It is like a pond full of crocodiles. The land is limited, its area is decreasing and there are more and more people who would like to work on it and exploit it" (NM: 104).*

[83] Instrument for Pre-Accession Assistance (IPA), granted since 2007 by the EU to candidate countries, one component being support for the rural development.

Disapproval and fear dominated the first fraction. One farmer feels that the foreign investors are not needed as the local farmers are working good and are achieving better yields than some of the foreign investors already present in the province. He is also very concerned that land concentration will be accentuated and many families lose their means of existence. This fear is shared by others and represents the main reason for the dislike of foreign investment voiced. Companies as well as individuals from Croatia, Germany, Saudi Arabia and the UAE were mentioned, always buying 'a lot of land'. A company representative additionally sees an excess supply for seed, fertilizer and pesticide due to the foreign investors (DO: 122; SAB: 133; MP: 111; AK 71; BB: 94).

The other fraction sees foreign investment positive and places great hopes and expectations into these new players. One producer works already for twelve years together with a German investor and cultivates a sizeable piece of land for this partner besides the own land. The experiences made in this concrete example were described as very positive and supportive. The German partner pays for the organic certification and the local certification body, has invested in buildings and machinery and is an important buyer making any additional sales efforts needless. In short, the investor-partner helped during the last twelve years in many different aspects, financially and other, and thereby grants the farmer a great deal of personal security. Other representatives, without such a personal direct experience, are all the same glad that the Vojvodina attracts foreign investors. They especially appreciate when the foreigners invest not only into land and agricultural production, but additionally into storage or processing capacities and when they provide new sales opportunities for example in their home countries. The advantage of foreign investors bringing new and often better knowhow and technology regarding the land usage, as well as their fast way of learning and adapting to the local soil and climate conditions, are highly valued, in addition to their investments in modern machinery and in irrigation systems. Lastly, it is recognized that foreign investors create local jobs, requiring both highly educated workers as well as less qualified labor (VB: 130, 132; DR: 114; DM: 107; JI 128; JB: 78; GS: 102; NP: 116; MV: 54, 56; Dr. SS: 68; Prof. VR: 54).

In summary, the negative feelings against foreign investors are mainly due to the understandable fear, that the land concentration already taking place by local players is further accentuated. The potential recognized on the other side, is more differentiated. Besides the financial investment in the arable production, specifically the modernization and irrigation, the expectations, or partially already concrete experiences, are to profit long term from the new know-how, technology and increased professionalism, the network abroad, the further development of the subsequent value chain and from the creation of local jobs.

8. Status and perspectives of soybean cultivation in the Vojvodina

The empirical research of this master's thesis has shown that the soybean cultivation in the Vojvodina is shaped by various aspects such as mechanization, economic rationale of producers, changing climate conditions or crop management and is embedded within the broader structural changes of Serbian agriculture. This concluding chapter seeks to contextualize these processes by means of synthesizing and discussing the findings of the thesis within the theoretical framework and referring to the research questions.

8.1 Soybean production and land use – Vojvodina's agrarian question

The aim of the first research question of this thesis was to provide an overview of the soybean production in the Vojvodina. The analysis of the processes behind the soybean cultivation in the Vojvodina in chapter 6 has revealed that a key aspect is the mechanization of production. All farmers utilize machinery to a high degree and see further mechanization as a priority of their future evolvement. There are two main constraints regarding this development however. One lies in the small-scale and fragmented ownership structure of agricultural holdings in the Vojvodina while the other is represented by the usually scarce financial capabilities of these smaller agricultural family holdings. Thus, there are various access mechanisms as proposed by Ribot & Peluso (2003) influencing producers' relationship with soya and arable farming in general. *Access to technology* in the form of more modern and advanced machinery is often limited to already bigger company and influential family producers with the necessary *access to capital*. While the company producers have sufficient means to invest and consequently grow or want to enlarge their production, some family producers struggle with these kinds of investments or alternatively rather cultivate less land. Similarly dichotomous is the outlook and expectations regarding the future development, which for the company and largest family producers is clear, many smaller family producers however just do not know what will happen with their farms in the future and their current perspective ends with their remaining phase of activity.

Wealth and capital also induce other forms of access through the social status and power they afford, leading to affluent actors additionally possessing the necessary *access to authority*, granting them advantages by bringing state-owned agricultural land under their control. Consequently, the phenomenon of land concentration is very present in the in the Vojvodina, reminding much of findings (Leguizamón 2014: 153) in Argentina, where a reduction in the number of farms alongside an increase in farm size was noted and landholding thus concentrated. In the Vojvodina, this

observation is expressed as follows: *"We have a problem here with five people who own all of the land in Vojvodina … they keep enlarging their estates. We cannot do that because for long we did not have access to the fund from banks (SAB: 133)*. In the Vojvodina (see *Table 3*), 83% of all farms cultivate less than 10 hectares of land and in total 23% of the overall utilized agricultural area (UAA). The remaining 17% of farms have 77% of the UAA under their control. However, in comparison with Argentina, the process of land concentration is (yet) less pronounced. Comparing the biggest 1% of all agricultural holdings in both countries reveals that they cultivated 36% of land in Argentina in 2002, compared to just 17.8%, that means half of it, in the Vojvodina, more than a decade later (Gras & Hernández 2009: 24; Bogdanov et al. 2017: 322). The Vojvodina is therefore comparatively less concentrated, or at least in an earlier stage of the concentration process. A reason for this can be found in the structural differences of the two countries at the outset of the respective concentration process. Today's farm holding structure in the Vojvodina is still strongly influenced by the special scheme of former Yugoslavia, which allowed the ownership of up to 10 hectares per privately owned farm, the so called 'land maxim' (Prof. VR: 26). Because of this land maxim, the privatization process starting in the 1990s did not concern these farmers who were already the owners of their respective land and limited the possible transfer of ownership to state owned land, which was naturally in the focus of already bigger and better connected players, often not even available to smaller farmers, as they did not have access to the necessary financial means. To acquire land from all the small subsistence farms giving up their agricultural activity, however, does in turn not make sense for company and bigger family producers, and so smaller family farms acquired this land. Once they were big enough themselves, they became interesting for even bigger producers or as the professors from the university stated, "*the small fish was eaten by bigger fishes*" *(Prof. VR: 40; Prof. DB: 55, 84)*; this tendency of land concentration is expected to continue, albeit hindered by the described ownership structure with a high number of small subsistence farmers growing soya for their own use. Connecting this development with Harvey's concept of accumulation by dispossession, reveals that notably the aspect of privatization plays an important role in this context. Although the privatization process of the 1990s did not have as big an effect as in other former socialist countries due to the mentioned 10 ha land maxim, common or state owned land is presently however predominantly leased to already bigger and more powerful actors, thus affirming the redistributive character of neoliberalism. Moreover, gaining control over further land resources has often been stated as desirable: if family owners (see chapter 5.3.2) proclaim, that land control means literally 'everything' to them, then Levien's conclusion (2012: 966), that within the agrarian question there has been a shift from the surpluses of agriculture to the control over land, presents a compelling argument. The high significance attributed to land control

observed in the empirical research, combined with the broadly mentioned ambition to grow further and acquiring additional land in order to benefit from it, supports both his understanding of the agrarian question as well as underpinning the social category of land as a resource.

Yet another trend that can both be observed within the large-scale production system of GM soy in Argentina and the Vojvodina is the emergence of rural contractors that typically own no land but only machinery and thus travel from farm to farm to provide their services in the form of planting, spraying and harvesting (Leguizamón 2016b: 320). "*That was not a kind of business, now it is business and some guys, which are usually well educated, clever, they bought machinery and do not drive it anymore. They just pay drivers and that is kind of service*" (Prof. VR). Furthermore, comprised in the quotation above, is the general increase of professionalization within the Serbian agriculture. This professionalization constitutes yet another manifestation of an access mechanism following Ribot & Peluso (2003), that is *access to knowledge*, which allows on one hand for more efficient production techniques and concurrently signifies an enlargement of the scope of activities: *"In order to realize good profit, we have to be economists, farmers and traders at the same time" (VP: 76)*. This coincides again with developments in Argentina, where "those in charge of managing production are no longer 'farmers' but agronomists, engineers or masters in business administration" (Leguizamón 2016b: 320). Moreover, this last discussed access mechanism enables the producers to apply for funds and subsidies, as this process often requires specific and timely knowledge. Additionally, better *market access* can be obtained, if farmers know the necessary contacts and procedures, interlinking these two mechanisms. Market access is important insofar that it generates the necessary demand and enables producers to sell their soya on the local market or export it for a good price. *"Soya has the most stable price – it is the basis and the backbone of our production" (NM: 30)*. Trust and friendship were mentioned as other aspect which are important to producers, thus confirming that *access through social relations* is also influencing farmers in the Vojvodina. *Access to labor* however, in the specific context of local soybean production, is less relevant. This is mostly due to soybean production not being labor intensive because of the high degree of mechanization. Consequently, primitive accumulation as developed by Marx, separating productive labor from its means of production, is only reflected in the fear many local producers voiced regarding foreign investment (see chapter 7.3.2), 'losing' land to these investors and depriving current family producers of their livelihood.

In summary, the empirical findings of this thesis confirm that the implications of 'neoliberal agrarian restructuring' lie primarily in altering dynamics of rural change, namely the intensification of production regarding land and capital, the reconfiguration of rural production processes and cropping patterns as well as a gradual transition of the production purposes from domestic use to production for the domestic or export market as proposed by Akram-Lodhi & Kay (2010b: 270).

The second research question set out to assess the implementation of the *Danube Soya Standard* in the region. Donau Soja promotes the cultivation, the processing and the marketing of GM-free soya from the Danube basin. The criteria of the *Danube Soya Standard*, besides defining the region of origin, have a strong attention on cultivation as well, covering the GM-free definition, plant protection, the change of land use, additional requirements for producers and inspections, the last point not only applying to producers but the whole value chain, thus including storage, processing and distribution. On the level of the farmers and regarding production techniques, this research has shown that the effect is nonetheless not very pronounced. The development of stable markets and the local extension of the value chain beyond production are gaining focus however. This can be viewed from two different angles. First, it might surprise at the very moment, because the empirical findings have clearly shown that demand is currently absolutely no issue and the prices paid are good, both paid in the domestic- as well as in the export-market. On the other hand, this itself confirms the importance of stable markets and good demand for farmers to decide and to continue to grow GM-free soya over the coming years, again referring to the mechanism of market access (Ribot & Peluso 2003). To achieve a long term sustainable cultivation of GM-free soya, keeping in mind the discussion about a possible lift of the ban in Serbia because of political reasons in conjunction with an EU-membership, the focus right now on the market development of GM-free soya including the increase of its share in human food also in local markets like Serbia, is immensely important to grant a price premium for non-GM soya in order to keep the farmers from switching to GM cultivation or to lose the customers to cheaper imports from Latin America and the USA.

8.2 Conclusion and outlook

As this thesis has revealed, soya is an easy crop to cultivate and very suitable for mechanized farming, reducing the dependency on common labor input with few exceptions such as weeding in the organic production. This insight was gained in the rather small-scale agrarian structure of the Vojvodina, compared to Argentina for example, which is dominated by big agribusiness holdings with farms of 10'000 hectares and more. A similar concentration process of land has started however and is progressing, recently attracting foreign investors as well. Thanks to the relatively stable yield of soya, the comparatively high profitability granted to its producers and the well-recognized soil enrichment, soya is after 40 years since its introduction into the sowing structure of the Vojvodina well accepted and therefore grown on many farms, specifically also on most of the smaller farms. Soya ranks among the top five crops cultivated in the region. This development and the production method were not dependent on genetically modified seeding

material. The GMO-ban of Serbia in 2009 even proved to be of minor influence on the cultivation process. The protection of both the local as well as the export market, mainly to the EU, has proved to be a positive aspect of the ban. The growth conditions for soybean in the Vojvodina are favorable. Changes in the climatic conditions with more frequently occurring droughts, however, are a big worry of the farmers. Financial means for investments being limited, irrigation is 'reserved' to bigger producers and this may in the end become a catalyzer for further land concentration and more foreign investment. The local processing chain in the Vojvodina is established, has sufficient capacity and is developing as more players enter the market. The final demand has continuously outsized supply and is dominated by the livestock breeding's protein feed requirement. The non-profit organization Donau Soja is appreciated in their effort to transfer specific production know how and to promote soya. Presently it aims to enhance the general awareness of the socio-economic benefits of direct human food consumption of soya in order to develop a market supporting the sustainable local soy production.

Further research on soy cultivation in the Vojvodina might, for instance, expand on alternative agricultural systems and focus on organic production alone. Especially regarding the integration of soya into cropping patterns, the employment of seasonal workers and naturally with respect to weed control and inputs there clearly discernible differences to conventional production. In order to present a comparative framework for the development of soybean production within the Vojvodina, the expansion of the study area to include other regions of Serbia constitutes another worth doing opportunity to continue and broaden the theme of this thesis.

Moreover, an in-depth analysis on the effects of the *Danube Soya Standard*, or certification systems in general regarding 'sustainable' and 'responsible' soybean production, on producers as well as various other actors along the value chain, remains to be done. This approach might take the *Danube Soya Standard* as a starting point to analyze production methods not just in Serbia but generally in countries where Donau Soja is active and compare them with each other, which could possibly provide an interesting contribution to literature concerning the rise and imposition of 'global' standards (e.g. Nadvi 2008). Similarly, the effects of a possible accession to the EU on Serbian agriculture (especially regarding the law on GMO) might be a topic for the future.

Another possible area for future research would be the shift to a different stage in the soybean commodity chain of the Vojvodina. The current thesis only briefly examined the necessary seed production and distribution processes prior to the cultivation phase or the subsequent processing and trade of the harvested soybeans. Such a change of perspective could certainly help gain an advanced understanding of the contemporary agricultural developments in the region and provide a broadened context of soybean production in Serbia.

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Donau Soja
for Promoting European Soya Production

IV. Appendix

IV.I Danube Soya Standard

The Donau Soja programme has been established to promote and propagate the cultivation, processing and marketing of GM-free, origin-controlled **quality soya from the Danube Region**. Our aim is to develop and guarantee a GM-free protein supply in Europe.

Donau Soja is a product of controlled origin and quality. It has two essential characteristics: The soya originates from the Danube Region (European **origin**), and the soya beans and the products derived from them are **GM-free**. Food produced from or using Donau Soja soya beans may be labelled as "Donau Soja" or "fed with Donau Soja". Use of the **registered brand** is subject to signing a Licence Contract as well as compliance with the Donau Soja and Europe Soya Agreement for Logo Use.

Partners located in non-EU member states shall comply with the current legal provisions of EU law, particularly those concerning the use of pesticides in soya bean cultivation and the processing of raw soya beans along the processing chain. Furthermore, both EU-wide and international regulations on labour and social rights (ILO conventions) shall apply. Agricultural producers of Donau Soja shall therefore undertake in writing to comply with these requirements.

Donau Soja certified produce automatically meet the criteria required for **Europe Soya** certification (see website www.donausoja.org for the Europe Soya Standard & criteria).

1 Definition of "Danube Region"

The countries and regions of origin for Donau Soja are defined in both political and geographical terms.

Enumeration of the countries in which Donau Soja can be produced is based on the list of countries in the Danube river basin as delineated by the International Commission for the Protection of the Danube River (www.icpdr.org/main/danube-basin/countries-danube-river- basin). The geographical definition of potential cultivation areas in each country is based on consumer expectations related to the term Donau Soja on the one hand, and on the feasibility of monitoring the origin of products on a region-by-region basis on the other hand. The geographical regions detailed on the Donau Soja Map (= Donau Soja cultivation areas) constitute a permanent feature of the Donau Soja Standard.

2 Definition of "GM-free"

Donau Soja soya is derived from GM-free cultivation using GM-free soya bean varieties either listed in the EU common catalogue of plant varieties or in the respective national catalogue of plant varieties. Farmers producing Donau Soja are not allowed to grow any other GM crop either. Animal feed with the quality label "Donau Soja" shall be approved for use with livestock, the products of which can subsequently be marketed with the quality label "Ohne Gentechnik hergestellt"/"Produced without GMOs".

GM-free labelling under the Donau Soja programme shall be based on the production, inspection and labelling guidelines as established by the Austrian ARGE Gentechnik-frei (Platform for GMO-Free Food Products, en.gentechnikfrei.at). Hence, the underlying legal provision regulating the GM-free status shall be the *Richtlinie zur Definition der "Gentechnikfreien Produktion" von Lebensmitteln und deren Kennzeichnung* (Guideline on the Definition of "GMO-Free Production" of Food and its Labelling) published in the Austrian Food Codex (Codex Alimentarius Austriacus) in combination with its *Leitfaden zur risikobasierten Kontrolle auf Gentechnikfreiheit* (Guideline on the Risk-Based Monitoring of GMO-Free Production). Products that fulfil the requirements of the German *Gentechnik- Durchführungsgesetz (EGGenTDurchfG)* may, with respect to the criterion of being GM-free, also be labelled as "Donau Soja" provided that they are monitored by an independent certification body, as stipulated by the German Verband Lebensmittel ohne Gentechnik (VLOG, www.ohnegentechnik.org).

Apart from the possibility of providing non-GM certifications in accordance with the Austrian Food Codex or the German VLOG, the GM-free status can also be verified, within the scope of Donau Soja inspections and certifications, by inspections conducted in compliance with the requirements and the Inspection Standard of the "Non-GM Danube Region Standard" published in 2016.

3 Plant protection

The relevant legal provisions of EU law shall apply. Furthermore, the use of desiccants prior to harvest (e.g. glyphosate or diquat) shall be prohibited. The "Best Practice Manual", which was published by the Donau Soja Organisation and is continuously updated, shall be considered a non-binding recommendation for improving the profitability of soya bean production while, at the same time, reducing the use of plant protection products.

4 Nature reserves and change of land use

Donau Soja soya shall not be grown in national and international nature reserves where the production of crops is not allowed. No new agricultural land shall be developed for Donau Soja soya production if this would result in the loss of nature reserves, forests or moors. Agricultural producers of Donau Soja soya shall therefore undertake in writing to only use land (for the cultivation of Donau Soja soya) that was dedicated to agricultural use no later than 1. January 2008.

5 Additional requirements for farmers

Agricultural producers of Donau Soja shall participate in the implementation of the CAP (Common Agricultural Policy) with mandatory *cross compliance* inspections. Alternatively, the producer shall participate in an ISCC certification programme or an equivalent sustainability certification programme[84].

Inspections:

Compliance with the Donau Soja Standard shall be verified against the detailed requirements specified in the Donau Soja Guidelines by an independent external certification body accredited in accordance with the ISO/IEC 17065:2012 standard. Furthermore, Donau Soja Organisation shall commission risk-based supervisory inspections.

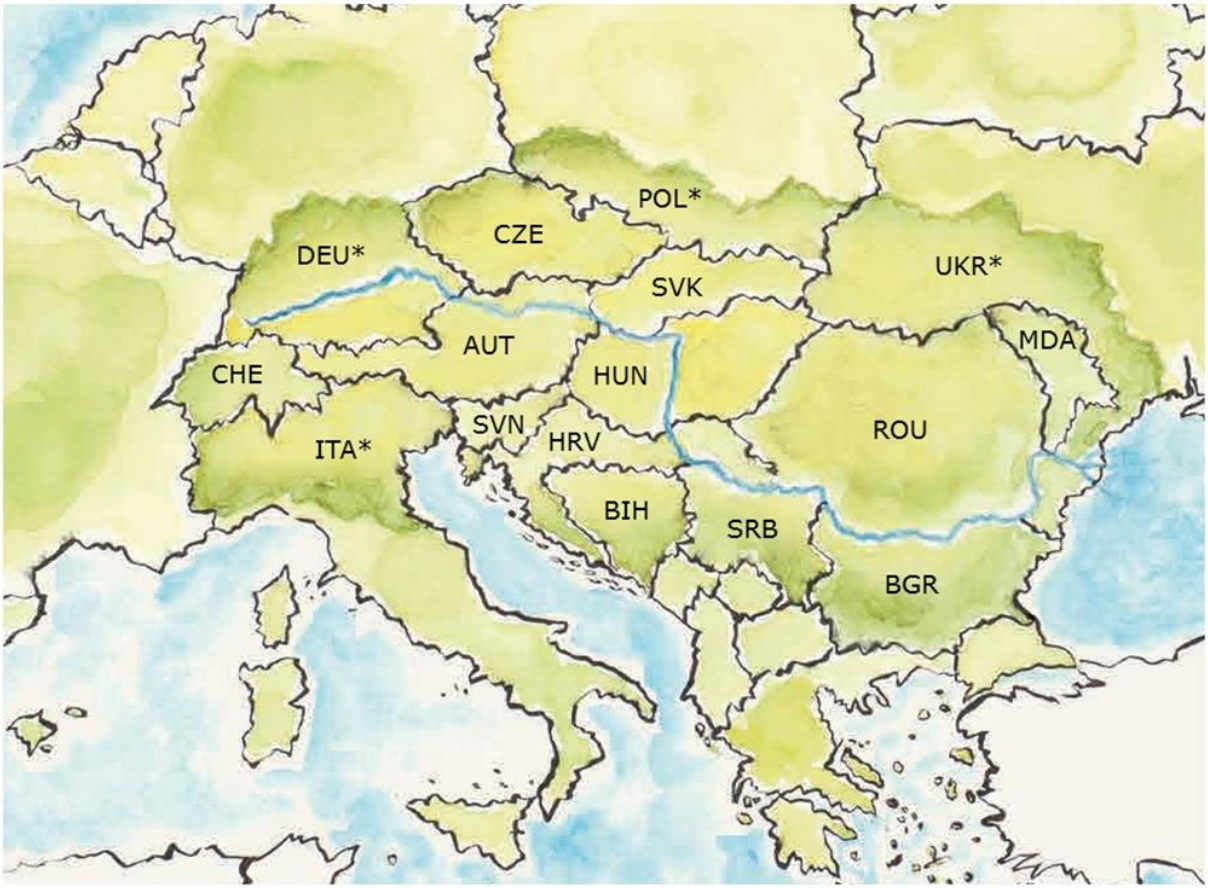
If there is reason to suspect that any provision has not been complied with, special inspections shall be conducted. Any breach of the Guidelines will result in remedial measures including the payment of penalty fees, up to and including the exclusion from the Donau Soja programme.

[84] An equivalent standard shall at least comply with the FEFAC sustainability criteria (available at: www.fefac.eu/files/62592.pdf) and can be approved as such by the Donau Soja Board upon request.

Donau Soja
for Promoting European Soya Production

Geographical map showing the Donau Soja cultivation areas

Donau Soja Map



* These countries are included with the following regions:

GERMANY: Bavaria, Baden Württemberg

ITALY: Trentino Alto Adige, Friuli Venezia Giulia, Veneto, Emilia-Romana, Lombardia, Piemont, Vallée d'Aoste

POLAND: Dolnoslaskie, Opolskie, Slaskie, Swietokrzyskie, Podkarpackie, Malopolske

UKRAINE: Uschgorod, Tschernowzy, Winniza, Odessa, Lwow, Ternopol, Chmelnizkij, Iwano- Frankovsm

IV.II Map and satellite imagery

Figure 9: *Overview of the Vojvodina and its seven districts with study-areas highlighted (own representation and design).*

The following satellite imagery (*Figures 10 to 17*) originates from the publicly available geographic information system (GIS) *Google Earth Pro* and has been supplemented with captions, visualizing the various study-areas and illustrating the importance of agricultural production in the region.

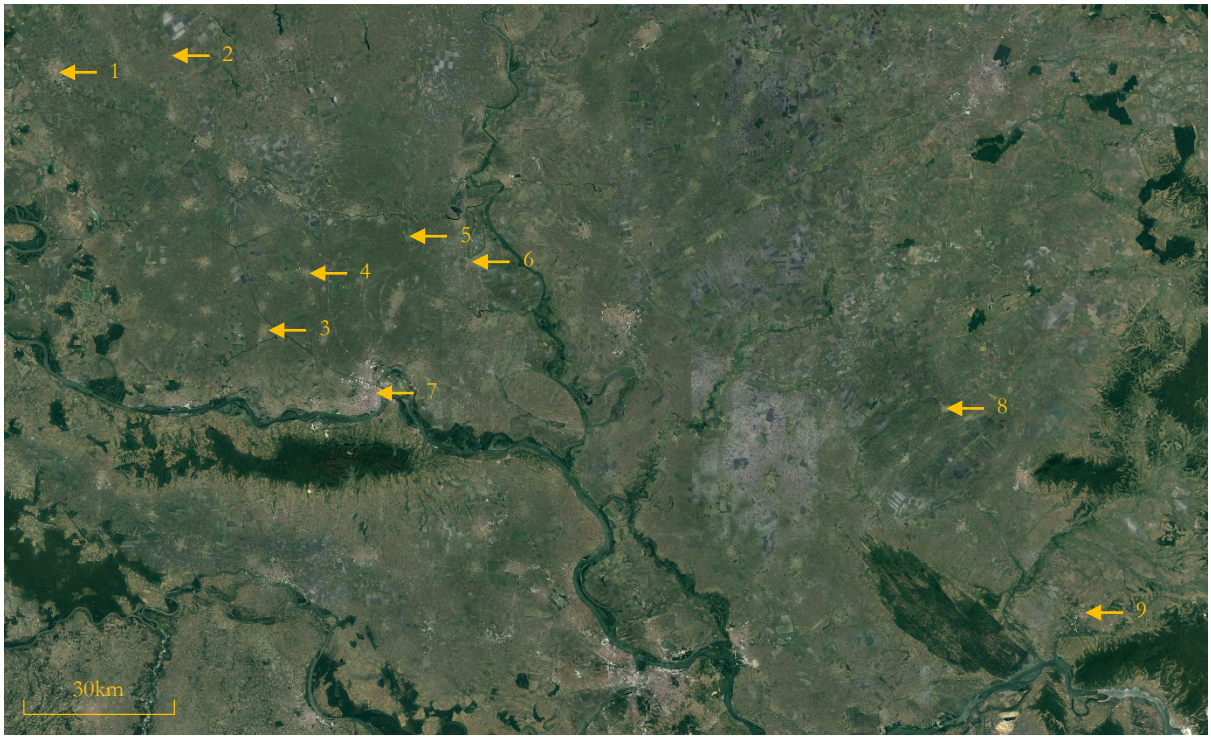


Figure 10: *Satellite image of the Vojvodina with the locations of study-areas (for number-references see previous Fig. 9) (Landsat/Copernicus 2018).*

Figure 11: *Satellite image of Nadalj (CNES/Airbus 2018).*

Figure 12: *Satellite image of Čurug, located on the Theiss, tributary river to the Donau (CNES/Airbus 2018).*

Figure 13: *Satellite image of Plandište with surrounding fields (CNES/Airbus 2018).*

Figure 14: *Satellite image of Bela Crkva, close to the Romanian border (CNES/Airbus 2018).*

Figure 15: *Satellite image of Telečka, example for the typical village structure of traditional Serbian hamlets in the region (CNES/Airbus).*

Figure 16: *Satellite image of Bački Petrovac near Novi Sad (DigitalGlobe 2018).*

Figure 17: *Satellite image of Zmajevo and surrounding area (DigitalGlobe 2018).*

IV.III Impressions fieldwork

Figure 18: *Center pivot irrigation system with drop sprinklers near Lugovo, Sombor (own photograph taken 04.12.2017).*

Figure 19: *Soybean storage in the open, Plandište municipality (own photograph taken 30.11.2017).*

Figure 20: *Tractor-drawn (pull-type) combine on the farm of an organic producer in Čurug (own photograph taken 29.11.2017).*

Figure 21: *Abandoned truck on the outskirts of Čurug (own photography taken 29.11.2017).*

Figure 22: *Company grounds of 'Global Seed' with soybean storage- and processing facilities in Nadalj (own photograph taken 29.11.2017).*

Figure 23: *Small subsistence garden (organic production) with large fields in the background, Čurug (own photography taken 29.11.2017).*

Figure 24: *Two older combine harvesters in a shed, conventional production farm in Zmajevo (own photograph taken 01.12.2017).*

Figure 25: *Advanced machinery of 'Global Seed' in Nadalj, see also Fig. 22 (own photography taken 29.11.2017).*

IV.IV List of interviews

Table 9: *List of conducted interviews arranged in chronological order.*

Date	Location	Interviewee	Occupation	Institution / Function	Data
01.06.17	Vienna	UB	Secretary General, Vienna Director, Communication/PR	Donau Soja	Recording & Transcript
06.06.17	Vienna	MK	Chairman, General Manager	Donau Soja	Recording & Transcript
06.06.17	Vienna	MA	Head of Quality Management	Donau Soja	Recording & Paraphrase
06.06.17	Vienna	LP	Head of Research and Innovation	Donau Soja	Recording & Paraphrase
23.11.17	Telečka	VB	Organic Soybean Producer	Ecoland RS	Recording & Transcript
24.11.17	Novi Sad	Prof. Dr. DB	Research on Management and Organization in Agriculture	University of Novi Sad, Department of Agricultural Economics and Rural Sociology	Recording & Transcript
24.11.17	Novi Sad	Prof. Dr. VR	Research on Management and Organization in Agriculture	University of Novi Sad, Department of Agricultural Economics and Rural Sociology	Recording & Transcript
24.11.17	Novi Sad	Dr. SS	Research on Field and Vegetable Crop Science	University of Novi Sad, Department of Field and Vegetable Crops	Recording & Transcript
27.11.17	Novi Sad	AMP	Head of Research and Development	Axéréal, Seed Supplier & Distributor	Notes
28.11.17	Novi Sad	MV	Research and Innovation Manager	Donau Soja	Recording & Transcript
29.11.17	Nadalj	DM	Plant Production Manager	Global Seed, Organic Soybean Production	Recording & Transcript
29.11.17	Čurug	GS	Organic Soybean Producer	-	Recording & Transcript

30.11.17	Plandište	MP	Conventional Soybean Producer	-	Recording & Transcript
30.11.17	Bela Crkva	ML & NB	Managing Director & Quality System Manager	Ecoagri Serbia, Organic Soybean Production	Recording & Transcript
01.12.17	Bački Petrovac	BB	Phytomedical Consultant	Agrogrnja, Agricultural Trade	Recording & Transcript
01.12.17	Bački Petrovac	MH & KK	Project Manager & Production Manager	Agrohemika, Conventional Soybean Production & Animal Feed Distribution	Recording & Transcript
01.12.17	Zmajevo	SAB & STB	Conventional Soybean Producer	-	Recording & Transcript
04.12.17	Sombor	JI & ZB	Agronomist, Seed Production & Soya Trials	PSS 'Sombor', Agricultural Extension Service	Recording & Transcript
04.12.17	Lugovo	MB	Agricultural Engineer	Agri Business Partner (APB) / Conroy Group, Conventional Soybean Production	Recording & Transcript
04.12.17	Telečka	JB	Organic Soybean Producer	Ecoland RS	Recording & Transcript
04.12.17	Telečka	AK	Organic Soybean Producer	Ecoland RS	Recording & Transcript
05.12.17	Novi Sad	DR	Conventional Soybean Producer	-	Recording & Transcript
06.12.17	Novi Sad	BS	Agronomist	Komercservis Agrovojvodina, Seed Supplier & Distributor	Recording & Transcript
06.12.17	Novi Sad	VP	Conventional Soybean Producer	-	Recording & Transcript
06.12.17	Novi Sad	NM	Conventional Soybean Producer	-	Recording & Transcript
13.12.17	Ada	NP	Deputy Director	Agrohalas, Conventional Soybean Production	Recording & Transcript
13.12.17	Novi Sad	DO	Conventional Soybean Producer	-	Recording & Transcript

IV.V Interview guidelines

IV.V.I Interview guide experts

First, thank you very much to be here with me and share your knowledge and expertise.
The aim of my master's thesis is to shed light on the impact of soybean cultivation on producers here in the Vojvodina.
Would it be ok for you, if I record the interview? This would help me concentrate on the conversation and not miss any important information since it is not easy to conduct an interview in a foreign language and writing notes simultaneously. Of course, the recording will be anonymized. Do you agree with that?

INTRO

Date, Location:
Information about the Interview partner:

SOYA

1. How did the production of soya start in the Vojvodina?

1.1 Replacement of other crops?

1.2 Motivation of producers to switch to soya?

1.3 What other crops are important for the region?

2. Where do you see the main challenges of producing soya in the Vojvodina?

2.1 What are the main benefits?

3. What are the characteristics of soya production in the Vojvodina?

3.1 regarding land?

3.2 regarding labor?

3.3 regarding inputs such as machinery?

3.4 Where do you see future development going?

4. What are the biggest differences of soya production in comparison to other crops?

5. Do you have knowledge about the production chain of local soya?

5.1 What happens after production?

5.2 Who generally buys the soya?

6. Has the demand for local soya changed over time?
6.1 How has this affected the region?

7. In 2009 Serbia banned the trade and cultivation of genetically modified (GM) products. How did this affect the Vojvodina?

PRODUCTION INPUTS (LAND/LABOR/CAPITAL)

1. Family farms are the dominant constituents of the Vojvodina, but there has been a noticeable decrease over the last two decades. What are the reasons for this trend?

2. In your research you say that soybean production needs to become more efficient to meet demand. How can this be achieved?
2.1 What are the dangers of such a development?
2.2 Influence on socio-economic condition of farmers?

3. What (other) changes have you noticed in the area (Vojvodina) over time?
3.1 regarding agriculture in general?
3.2 regarding soybean production?

4. Investors see the area (Vojvodina) as a profitable zone for investment. What are the implications of that?

5. How has the employment of labor changed over time?

6. How have the ownership structures regarding land changed over time?

OUTRO

We are already at the end of my interview; I thank you again for providing me this information. Do you want to add something particular, an aspect that was not mentioned during the interview that needs to be spoken about (without recording if you wish?)?

IV.V.II Interview guide producers

First, thank you very much to be here with me and share your knowledge.

The aim of my master's thesis is to shed light on the impact of soybean cultivation under the Danube Soya Standard on producers here in the Vojvodina.

Would it be ok for you, if I record the interview? This would help me concentrate on the conversation and not miss any important information. Of course, the recording will be anonymized. Do you agree with that?

INTRO

Date, Location:

Information about the Interview partner:

1. For the introduction of this interview, could you briefly introduce yourself and your affiliation with Danube Soya.

SOYA

1. How did you start producing soya?

1.1 Why do you produce soya?

1.2 What did you produce before you started with soya?

1.3 Why did you switch to soya?

1.4 What other crops do you have on your farm?

2. What are the main challenges of soya production for you?

2.1 What are the main benefits?

3. How do you produce soya?

3.1 What are the inputs you need for production?

3.2 What farm machinery do you utilize?

3.2.1 Do you own your own machinery?

3.2.2 Do you share machinery with other farmers?

3.3 Where do you get the seeds from?

4. Could you describe the production chain of your soya?

4.1 What happens with your soya after you sell it?

4.2 Who do you sell your produce to?

5. How does soya production contrast to other crops?

5.1 What is unique about soya production?

5.2 What is the importance of soya within your farm?

6. Has the demand for soya changed over time?

6.1 How did this affect you?

7. In 2009 Serbia banned the trade and cultivation of genetically modified (GM) products. How did this affect you?

PRODUCTION INPUTS (LAND/LABOR/CAPITAL)

1. How much land do you cultivate?

1.1 Who is the owner of the land/farm you work on?

1.1.1 How did you acquire it?

1.1.2 When did you acquire it?

1.2 Who has access to your land?

2. What does the land you work on mean to you?

2.1 What do you want to happen to your land in the future?

2.2 What do you want to avoid happing to your land in the future?

3. What changes have you noticed in your area (Vojvodina) over time?

3.1 How do you feel about those changes?

4. Investors see the area (Vojvodina) as a profitable zone for investment. How do you feel about that?

5. Who works on your farm?

5.1 How has the number of people working on your farm changed over time?

5.1.1 Increase?

5.1.2 Decrease?

5.2 What members of your family work on your farm?

5.2.1 Who does what?

5.3 What specialized workforce do you utilize?

5.4 What wage labor do you require for production?

5.4.1 Is there day labor?

5.4.2 Have there been changes over time?

5.6 Are there times where financial security is precarious?

6. How is your economic situation?

6.1 How do you feel about the financial future of your farm?

6.2 Do you have enough funds for investments?

STANDARD

1. What is the content of the Danube Soya Standard?

2. What does the Danube Soya Standard mean to you?

2.1 What is important about the Danube Soya Standard?

2.2 What do you think about the criteria of the Danube Soya Standard?

3. What are the challenges of the Danube Soya Standard?

3.1 What are the benefits of the Danube Soya Standard?

4. How has the adoption of the Danube Soya Standard affected you?

4.1 regarding farming techniques?

4.2 regarding your economic situation?

4.3 regarding how you utilize land?

5. How does Danube Soya control that you comply with the Standard?

5.1 How do you feel about being controlled?

OUTRO

We are already nearly at the end of my interview; I thank you again for providing me this information. Do you want to add something particular, an aspect that was not mentioned during the interview that needs to be spoken about (without recording if you wish)?

IV.V.III Interview guide 'Donau Soja'

Erstmals vielen Dank, dass Sie sich die Zeit nehmen Ihr Fachkenntnisse und Wissen bezüglich des Soja-Anbau in Europa im Rahmen dieses Interviews mit mir zu teilen.
Das Ziel meiner MA-Arbeit ist es, die Produktionskette von Soja welches unter dem 'Donau-Soja-Standard' angebaut wird, zu untersuchen sowie die Auswirkungen dieses Standards auf die Donau-Region.
Falls es für Sie okay ist, würde ich das Interview gerne aufnehmen, damit ich mich voll auf das Gespräch konzentrieren kann und keine wichtigen Informationen verpasse, selbstverständlich wird die Aufnahme anonymisiert. Ist das okay?

INTRO

Datum, Ort:
Informationen zum/zur Interviewpartner/in:

1. Als Einstieg ins Interview, können Sie kurz sich selber und ihre Arbeit innerhalb des Vereins vorstellen. (Falls nicht bereits erwähnt:)

1.1 Wie lange arbeiten Sie schon bei Donau Soja?

1.2 Wie sind Sie zum Verein gestossen?

1.3 In welchem Bereich waren Sie vorher tätig? (Hintergrund und Motivation)

DONAU SOJA

1. Können Sie den Hintergrund von Donau Soja erklären?

1.1 Wie ist der Verein entstanden?

1.2 Welches waren die wichtigsten Etappen?

1.3 Was sind die langfristigen Ziele?

1.3.1 aus ökonomischer Perspektive?

1.3.2 bezüglich Nachhaltigkeit?

1.3.3 aus umweltbezogener Perspektive?

2. Donau Soja vereint verschiedenste Akteure entlang der Wertschöpfungskette von Soja, können Sie diesen Prozess charakterisieren?

2.1 Was sind die Schwierigkeiten?

2.2 Was sind die Chancen?

2.3 Welche Akteure stechen heraus?

2.3.1 Aus welchen Gründen?

3. Welches sind die Chancen/Stärken des Soja Markts in Europa?

3.1 Welches sind die Risiken/Schwächen des Soja Markts in Europa?

3.2 Inwiefern unterscheidet sich Donau Soja von nord- oder südamerikanischem Soja?

3.3 Woher stammt das Saatgut?

LAND

4. Ein genannter Grund für das grosse Potenzial von Soja in Europa sind ungenutzte Brachflächen, wie möchte Donau Soja auf diese zugreifen?

4.1 Welches sind die wichtigen Akteure in diesem Prozess?

5. In welchem Umfang/Bereichen trägt Donau Soja zu Ermächtigung und Mitwirkungsmöglichkeiten von Landwirten bei?

6. Wieso ist der Anbau auf Flächen die mindestens seit dem 01.01.2008 landwirtschaftlich genutzt werden beschränkt?

6.1 Weshalb 2008?

STANDARD

7. Können Sie den Entstehungsprozess des Donau Soja Standards beschreiben?

7.1 Wie wurden die Kriterien definiert (anhand welcher Informationen)?

7.2 Welche Personen/Institutionen waren daran beteiligt?

8. Wie notwendig sind die Kontrollmechanismen bezüglich Einhaltung des Standards?

8.1 Sind gewisse Kriterien speziell?

8.1.2 In welcher Hinsicht?

8.2 Was sind Reaktionen seitens der kontrollierten Akteure innerhalb der Prozesskette?

PRODUKTIONSKETTE

9. Welche Stationen durchläuft Donau Soja auf dem Weg bis zum Konsumenten?

9.1 Wie wird es vermarktet?

10. Was sind die Herausforderungen lokale Wertschöpfungsketten mit dem Produkt Soja aufzubauen?

OUTRO

Wir sind bereits beinahe am Ende des Interviews, Ich bedanke mich nochmals, dass Sie sich die Zeit genommen und mir diese Informationen weitergegeben haben. Gibt es noch etwas (spezifisches), was Sie hinzufügen möchten, einen Aspekt der während dem Interview nicht zur Sprache kam und Ihrer Meinung nach wichtig ist (falls Sie möchten auch ohne Aufnahme)?

Kennen Sie noch weitere Personen/Institutionen (spezifisch Landwirte), die im Zusammenhang mit meiner Arbeit von Interesse wären und bereit ein Interview durchzuführen?

IV.VI Code system

Table 10: *Main code system for qualitative data analysis.*

Main Categories	**N° of Codes**	**Subcategories**	**N° of Codes**
Structure Serbia/Vojvodina	123	Agrarian Context	18
		Changes	19
		GMO	38
		Investments	8
		Politics	8
Economic Context	34	Input	12
		Output	6
Land	84	Size	7
		Acquisition	3
		Ownership	41
		Significance	12
		Future	9
Advantages Soya	93	Demand	19
		Profitability	23
		Microclimate/Conditions	9
		Crop Rotation	6
Challenges Soya	60	Land/Soil	3
		Water/Climate	19
		Weeds/Diseases	26
Production	313	Soil	22
		Seeds	44
		Fertilization	20
		Cultivation	34
		Crops	40
		Labor	61
		Machinery	33
		Know How	9
		Support	14
		Yield	3
		Organic	26
Processing	149	Certification	66
		Buyers/Distribution	62
		Storage	20

IV.VII Personal declaration

I hereby declare that the submitted thesis is the result of my own, independent work. All external sources are explicitly acknowledged in the thesis.

Zürich, 30.04.2018

Philippe Boesch