CHAPTER 5
RESULTS

First this chapter portray the chances and limitations of a European soybean market based on the results from the expert interviews. These are presented within a table in six categories of the second analysis cycle. The second part includes the results of the European soybean growing potential analysis. Both results will be discussed in order to respond the objectives and research question of this thesis.

The categories are based on the interview guideline. The statements that were mentioned most by experts can be found in the following table 12 and are listed according to their importance in a decreasing order. In the following section the most important results will be shown and briefly summaized.

When it comes to economic efficiency all experts agreed that growing soybean in Europe must be profitable in terms of its revenue situation. This includes its ability to compete with world market prices of non-GMO soybeans as well as its competitive quality. Even opposite corn prices should be able to compete with European soybeans so that farmers would be willing to substitute land. Until now there has been the constraint of a limited availability of appropriate varieties of soybeans, which simultaneously limits the revenue situation. That aside, the soybean market in Europe could create the opportunity for a higher added value.

The trend towards more regionality in the food sector is itself a chance for the European soybean market. It would be seen as long-term and would in addition advocate sustainable farming. A limitation on regionality persists in the available areas within Europe. The Danube Soya Association is often mentioned as a particularly encouraging example which brings interested market players in the Danube region together and sets and controls quality standards.

The zero tolerance of GMO traces of seed shared by the majority of EU members poses opportunities as well as limitations for the European soybean market. There is an opportunity to be found here in the fact that the possibilities to purchase soybean seeds

from abroad are ever decreasing in the face of increasing worldwide GMO farming. This also poses a limitation for the same reason, since within Europe only adapted varieties are available. Greening has proved itself to affect soybean acreages positively, like experts stated based on the soybean acreages extension in 2015. At the same time it is often observed how there are only few political measures. Furthermore, it is said that political support represents no long-term alternative for European soybean cultivation.

Table 12 Chances and limitations of a European soybean market

Chances	**Limitations**
Economic efficiency • Value creation • Lower costs of transportation and controls • Low input costs	Economic efficiency • Lack of adapted soybean varieties • Competitiveness with non-GMO soybeans • Low yields due to a gap of knowledge • Incompetent industry (wholesale buyers, processors, logistics)
Regionality • Consumer demand • Sustainability • Danube Soya	Regionality • Limited area and acres • Diversity within Europe
Policy • Threshold value (0,0 for seeds) • Greening measurement	Policy • Threshold value (0,0 for seeds) • Expandable law, too less activities to promote EU protein supply
Market • Demand for non-GMO products • Demand for organic meat • Vegan/ vegetarian diet trend • Demand from the dairy sector	Market • Appropriate marketing program • Hesitation from food retail sector • Consumers decide price –oriented • Lack of interest from many consumers
Animal feeding • Combination of amino acids • Protein content • Economically not substitutable	Animal feeding • Limited application for pig/ cattle
Environment • Positive for crop rotation • Less nitrogen application	Environment • Day length, • Temperature and moisture

Source: Own table 2016.

There is a chance for the market with respect to consumer demand, which, through increasing consumption of non-GMO, organic, vegan or vegetarian food, has been indicated to be growing. The retail and wholesale sector, on the other hand, would describe the market as debilitating, since the introduction and the marketing of non-GMO products has not been implemented until now, and where it has, it has been too hesitant. However, the conduct of the retail sector stems from the consumer behavior of the general public, which makes price-based decisions.

The irreplaceability of soybean components in animal feed is a chance for the market as there are no economically sensible alternatives that serve as a 100% replacement.

Soybeans in crop rotation can be seen as an opportunity for the environment. Nitrogen fixation has positive effects in crop rotations the environment and incidence of diseases, which under certain circumstances can offer economical benefits, for example, by reducing input factor costs. However, in contrast, the environment itself does not offer the optimal conditions for growing soybean in Europe. The day length, temperatures and partly drought conditions put restrictions on the yield potential.

The results of the acreages analysis from chapter 3.2 are represented as follows in figure 17 and 18. These illustrations serve a visualization of the allocation of MGs for each country. The numbers of total area planted with soybeans were obtained from statistical databases and were assumed to be 100 %. These were divided into MG according to the European maturity classification map of chapter 3.2.2. Thus, the mapped maturity classification zones were used as coarse grid to estimate major MGs for single European countries. Own assumption were strengthened based on experts opinions as well as from inquiries of plant variety offices. Figure 17 outlines the acreages of soybeans per country in 2014 and 2015. Here an increase of soybean cultivation has been recorded in all countries, especially in countries that until now have not produced soybeans in larger quantities. These are, for example, Germany, the Czech Republic, Slovakia and Bulgaria which all vigorously expanded their soybean farming in 2015. It is also noticeable that an additional quantity of early varieties (000-00) were grown in these countries (apart from Bulgaria).

Country	FR	DE	CZ	SK	UA	AT	HU	RO	IT	HR	RS	BG	RU
Area planted **2014** in 1000 ha	75,6	10,0	7,2	33,2	1792,0	43,8	42,3	79,3	232,9	47,1	154,3	0,3	1691,0
Area planted **2015** in 1000 ha	79,0	17,0	12,3	43,7	2145,0	56,9	72,7	122,2	265,7	81,0	240,0	37,0	1880,0
Difference in (%)	+4	+70	+71	+32	+20	+30	+72	+54	+14	+72	+56	+12233	+11
000 = Early in %	20%	70%	100%	90%	40%	10%	5%						17%
000 in 1000 ha	15,80	11,90	12,30	39,30	858,00	5,69	3,64	0	0	0	0	0	319,60
00 = Mid in %	20%	30%		10%	30%	70%	45%	20%					17%
00 in 1000 ha	15,80	5,10	0	4,37	643,50	39,83	32,72	24,44	0	0	0	0	319,60
0 = Mid- Late in %	20%				20%	20%	50%	35%	20%	20%	10%		22%
0 in 1000 ha	15,80	0	0	0	429,00	11,38	36,35	42,77	53,14	16,20	24,00	0	413,60
I = Late in %	20%				10%			35%	40%	60%	40%		22%
I = Late in 1000 ha	15,08	0	0	0	214,50	0	0	42,77	106,28	48,60	96,00	0	413,60
II = Very Late in %	20%							10%	40%	20%	50%	100%	22%
II in 1000 ha	15,80	0	0	0		0	0	12,22	106,28	16,20	120,00	37,00	413,60

Figure 17 Results soybean acreages development (2014-2015)

Source: Own illustration, data obtained from Eurostat 2016. APK-Inform 2016, Sorte 2016, Gossort 2016, Hartmann 2016.

Country	FR	DE	CZ	SK	UA	AT	HU	RO	IT	HR	RS	BG	RU
Area planted **2015** in 1000 ha - corrected	101,1	17,0	12,3	43,7	2145,0	56,9	72,6	122,2	265,7	81,0	240,0	37,0	1880,0
Area planted **2016** in 1000 ha	141,0	15,2	10,6	35,2	1846,0	49,8	66,5	130,3	299,1	75,3	186,0	14,0	2020,0
Difference in (%)	+39	-11	-14	-20	-14	-13	-8	+7	+13	-7	-23	-62	+7
000 = Early in %	20%	70%	100%	90%	40%	10%	5%						17%
000 in 1000 ha	28,20	10,64	10,60	31,64	738,40	4,98	3,32	0	0	0	0	0	343,40
00 = Mid in %	20%	30%		10%	30%	70%	45%	20%					17%
00 in 1000 ha	28,20	4,56	0	3,52	533,80	34,85	29,91	26,07	0	0	0	0	343,40
0 = Mid- Late in %	20%				20%	20%	50%	35%	20%	20%	10%		22%
0 in 1000 ha	28,20	0	0	0	369,20	9,96	33,23	45,62	59,82	15,06	18,60	0	444,40
I = Late in %	20%				10%			35%	40%	60%	40%		22%
I = Late in 1000 ha	28,20	0	0	0	184,60	0	0	45,62	119,64	45,18	74,40	0	444,40
II = Very Late in %	20%							10%	40%	20%	50%	100%	22%
II in 1000 ha	28,20	0	0	0		0	0	13,03	119,64	15,06	93,00	14,00	444,40

Figure 18 Results soybean acreages development (2015-2016)

Source: Own illustration, data obtained from Eurostat 2016. APK-Inform 2016, Sorte 2016, Gossort 2016, Hartmann 2016.

When comparing the farming figures for 2015 with 2016 (figure 18), one notices clearly in the row Differences in % that primarily those countries sharply reduced their soybean cultivation which before 2015 had only grown little soybean acreages. France,

Romania, Italy and Russia, the largest European soybean producers are the countries which increased the planted area in 2016 also.

After a strong rise in soybean acreages of more than 20% in 2015, the subsequent year shows an obvious decline. Despite the decline in soybean farming in nine countries, among them the Ukraine with 399 tsd. ha, as much as Italy's entire soybean acreage, the overall decrease is in planted land by 3.5% is relatively well compensated for by the main producing countries. (chapter 3.2). With regards to MGs, particularly the strong producing countries are shown to have substantial numbers of hectares in later MGs (I-II). These are France, Romania, Italy, Serbia and Russia. Even Croatia uses later maturing varieties, but it was left out due to having limited land possibilities growing soybean

Figure 19 shows the hectare numbers and percentages of all maturity zones in 2016. One can recognize from this graph that the areas in Europe offers regions largely for early maturing varieties. The regions of Europe that require MGs from 000-0 make up altogether 65.86% of the entire possible acreages for growing soybeans.

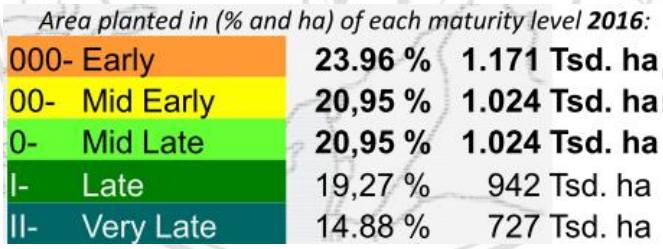

Figure 19 Percentage share of MGs grown in Europe
Source: Own calculations 2016.

In chapter 3.2.1 it was worked out that the early maturing varieties (000-00) in Europa cannot keep up with the strength of yield of the later maturing varieties (I-V) of the US or Brazil. For this reason, the excellence of farming in the US and Brazil may be rated as considerably higher than in Europe.

The investigation into the revenue situation of soybeans, sunflower seeds and corn has revealed that the average soybean prices of 2014/2015 could not compete with corn prices. The sunflower commodity prices, on the other hand, could be placed in competition with soybean commodity prices. So long as a substitution of corn or

sunflowers by soybeans is being considered, just looking at the revenue situation will be inconclusive. Further influences, such as water demand and reaction to drought stress, should be taken into account as limiting factors of soybeans capability of being a substitute. As a result, the option of replacing sunflower or corn fields by soybean poses an economic risk in both cases.