CHAPTER 6
DISCUSSION

Research question 4 How much of total soybean imports could be replaced by European soybean production? couldn't be fully answered. Multiple factors were collected during the analysis that would need to be considered in order to come to a comprehensive conclusion. Obviously there is a complex framework behind the following factors, revenue and market price situation, crop water demand and crop reaction to drought. However, one could conclude from the results of the comparison that substituting corn and sunflowers by soybeans would partly make economic sense in either case. Following the expert's statements in their interviews, corn acreages turned out to be the better substitute to be replaced by soybeans in reality compared to sunflower. In order to be economically competitive, soybean yields would need to increase considerably in order to be competitive with respect to their revenue situation compared to corn (chapter 3.3) as corn revenues per hectare are 258 to 515 USD higher than revenues in soybeans. Yet, soybean could compete with sunflower regarding revenues but not in view of a replacement on typical sunflower ground reasoned by mostly unsuitable exogenous factors for soybeans.

The similarities and differences between the interviews will be approached once again and discussed in the following.

During the interviews, the experts agreed with each other for the most part in the following categories: regionality, economic efficiency and environmental aspects. Their statements on these subjects were mostly clearly expressed. All experts reflected the macro-environment in a relatively balanced way. This means they all took the ecological, economic, political and also partly social and technical aspects into account. Nevertheless, branch-specific differences were able to be observed, as expected, particularly with respect to the GMO subject.The plant breeding industry demands viable GMO threshold values like what the ESA (European Seed Association), the European plant breeders association, has already been trying to establish for years. The argumentation behind this is that the purchase and distribution of quality seeds would be

made significantly easier with legal threshold values. Besides this in our technical world there is always a threshold as 0 % in terms of purity (genetical purity) does not exist. Moreover, aiming to be GMO free causes cost for testing which increases the price for the commodity. The US American and Brazilian farming and processing industry therefore have less cost for controls and identity preservation as GMO is accepted in their administration. According to Stoll (2016) the surcharge is reflected with 3 € per ton for GMO content analysis on a seed lot. As Europe grows in present about 5 mn ha soybeans it can be assumed by an average yield of 2.7 t per ha (Ovid, 2016) that 1.85 mmt were produced. This leads to costs of round about 5.5 mn € only due to GMO content analysis in seed.

A comparison to the animal feed industry demonstrates that it is closer to reality to comply with a threshold for unavoidable GMO traces of e.g. up to 0.9 %. It appears very questionable to have thresholds in feed compounds and not in seed. Due to the coexistence of GMO and non-GMO commodities a zero threshold is simply not existent. According to the ESA, a GMO threshold for seeds of 0.4% would meet the subsequent standards of non-GMO animal feed processing. This way, the benefits offered by a GMO threshold for seed it could be taken advantage of more effectively, at least in in the plant breeding and seed producing industry as trading withseeds would be less threatened to take a risk due to minimal GMO traces.

However, the vision of the NGOs and the organic sector is to aim for more intensive political measures to promote a sustainable and GMO-free environment as well as biodiversity. This poses the decisive question of who would bear the costs for the added value in terms of testing and separation. An almost equally distribution of costs along the value chain would be most fair but in many cases this is far from reality. Because one sector might not be willing to pay surcharges for another. For example, the meat industry might not be willing to pay more for non-GMO pig fed if there are difficulties to release such surcharges on the consumer side.

From the standpoint of research however, the aspect of freedom from GMOs is being ignored since GMO technics themselves are reported to be safe. What is more important to them is to create a more balanced agricultural structure, in terms of import and export relations. The criticism for unbalanced structures is valid especially in export

oriented countries with intensive livestock farming. Huge amounts of protein imports are correlated with an overproduction of meat which exceeds the regional consumption and thus will be later exported again. Focusing on more regional production systems should be aimed in the future.

The GM technology therefore still is a broad field for discussion. A discussion that entails as many different views as there are regulations within the European Community. In order to have a functioning and integrated European soybean market, the uncertainties in relation to the legal basis for GMOs in the agricultural and food industries need to be removed. Standardized GMO thresholds and homogenized control systems in the value chain would be significant steps towards making the European soybean market more manageable and cost efficient. In order to discuss the subject of green technologies in public in a grounded manner, there may need to be improved and more neutral ways for consumers to inform themselves.

With reference to the entirely positive appraisals of greening measures by experts, the point in time when the interviews were carried out (12/15-04/16) should be taken into account. Just like what the results of the acreage analysis demonstrate, the enthusiasm for the introduction of greening in 2015 was particularly great. The decline of soybean acreages in 2016 on the other hand shows that, despite the political incentive (coupled payments) with the direction to promote a European protein strategy, the revenue situation is an essential element if one or another crop is grown. The revenue situation for soybean was not profitable in many countries, especially not in a climatic difficult year like 2015 which lead to limited yield potentials. Whilst it is partly felt that the political assistance is too hesitant, it is mostly the case that a longer-term market cannot be created on political intentions. A historical comparison with other political agricultural subsidies shows similar movements. This is why in the year 2000 after the Blair House agreement (restriction for oil plants) a massive decline in sunflower farming was recorded (LfL, 2001). The same could be observed for oil flax when oil flax subsidies were reduced (Mlul, 2002).

Considering such examples, it becomes apparent that farmers base their crop planting decisions firstly on income and secondarily on soft factors like for example ecological advantages. Therewith, farmers are economists following the target of

maximizing profits. The ecological advantages of soybeans in crop rotation have been acknowledged by all interviewees as beneficial and important. Nevertheless, the revenue situation remains the ultimate decision criterion for a farmer.

Overall, the results of the market and surface analysis of this study are mostly congruent with diverse market analytical forecasts. The OECD crop planting study forecasts until 2025 confirms the results of the surface analysis and the statements by the interviewed experts. Therefore, yield increases are mainly expected in Eastern Europe. However, in Western Europe the decline of oil crop production has been predicted along with a more intensive focus on cereals. The experts already stressed the decline in rapeseed. According to the analyses of this work, the future substitute crop, though, is presumably only very unlikely going to be soybean. The experts stated on average that a maximum of 20% of the todays imported soybean commodity quantities could be replaced by a European non-GMO soybean production. As a result, a growth in European soybean production of 48% would be required. This would mean a European soybean acreages expansion from today's roughly 5 mn ha up to 7.4 mn ha. As specified in chapter 3.2.3 this would go along with crop substitutions because of very limited possibilities to extend arable land in Europe and therewith crop planting decisions are economically justified. Based on leading aspects like economic profitability as well as agronomical oriented management systems farmers potentially could decide to replace corn by soybean. This assumption is plausible on the one hand reasoned by similar claims for growing conditions on the other hand an increased pressure from insect infestation as for example corn rootworm (Diabrotica vigrifera), the soybean could be an alternative (sanitation) crop for specific regions.

This development would be conceivable, provided that also the eastern states (the Ukraine, etc.) convert to a reliable non-GMO soybean production. This includes the application of same regulations for non-GMO seed as well as the same testing and separation procedures for commodities.

Analyzed trends on the consumers markets towards more non-GMO labelling as well as the growing demand for regional, vegan and organic products shows that this market niche has the potential to grow. Along with the experts' statements, consumer studies and studies by the BMEL (2014) and Kearney (2014) confirm the development of

this trend. If also the demands for corresponding marketing strategies of non-GMO soybean products were put into place in the retail and wholesale sector, like what the experts are asking for, then one could definitely start to think about a mid to long-term increasing market potential for soybean in Europe. The regional soybean production is however restricted as described. Therefore, the market potential of regional non-GMO products would presumably remain the way it is as far as none of the specified arguments like an improvement of non-GMO commodity separation or non-GMO promoting marketing strategies will be implemented.

If one were to go a bit further in the GMO debate, one could say that the current TTIP negotiations are causing mistrust among consumers. The rejection of gene technology could force a non-GMO label. Essentially, it would though be more sensible to remain faithful to the European regulations and to label as long as GMOs and traces of GMO are contained in products. The aim should be to simplify the European GMO regulations for the benefit of non-GMO producers, and not the other way around.

Finally, a few comments on the method used in this thesis.

The interviews with experts and the specific choice of various stakeholders have proved to be worthwhile. In this way, a wide data basis from different perspectives could be collected. However, in order to have focused the analysis even more on Europe, further representatives from across Europe would have also made interesting interview partners. For a subsequent thesis it could be recommended to choose further interviewees from more diverse countries. In particular, it could be interesting to involve countries which accept GMOs legally in order to achieve a comparative appraisal of GMO and non-GMO production systems.