



Effects of liberalization of Law on GMO on the soybean market in the Republic of Serbia

Sector study, 2016.

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FOREWORD

Ministry of Agriculture and Environmental Protection, Republic of Serbia

Danilo Golubović, State Secretary

Serbia is the only country in Europe that is self-sufficient regarding production and processing of soybean for domestic industry, and, in addition, achieves export of soybean products in amount of 82 million USD. At the same time, Serbia is completely closed to import of genetically modified products. However, the market is changing, all European countries are starting to cultivate soybean intensively, and provide large subsidies or large areas. Therefore, we must find a way to keep the leading position and improve soy production in Serbia.

The Government is working on a strategy that will enable Serbia not only to keep the position of the largest producer of genetically non-modified (GM FREE) soy in Europe, but also, through the development and continuous improvement of infrastructure, provide the producers of meat, eggs, milk and

other producers that use GM FREE soybean in their production process, to accentuate the quality of their product and valorize its value.

In May 2015, The Ministry of Agriculture of Republic of Serbia officially approved and supported the use of Danube Soya quality label on food products in Serbia which guarantee GM FREE quality and European origin of soya. This way, for the first time in Serbia, the representatives of food industry have the opportunity to highlight the unique quality of their products and, at the same time, the consumers have the possibility to choose domestic products without GMO.






FOREWORD

Danube Soya Association

Matthias Kroen, president



Serbia has a treasure which is the envy of Europe: It is the only country with an integrated and self-sufficient soya industry. This important part of the economy brings many benefits to the environment, consumers, farmers and processors. In the EU the situation is different, 95% of soya used has to be imported, which is a problem for food security and a risk for the future. Many consumers also prefer GMO-free products and in the EU most imports are GMO-modified. The Danube Soya Initiative, with its head office in Vienna and the Regional Centre in Novi Sad, with 210 members from 16 European countries aims to effectively improve the situation of the whole value chain. Via our certification we propose to valorize the intrinsic value of European Soybean production – Regional origin, GMO-free production and sustainability – and bring a value added product to the consumer. Danube Soya is a platform for all concerned and committed to support farmers and processors in Serbia. Through our cooperation with many actors in the soya sphere, through exchange, cooperation, training and research we want to advance the soya production, which is facing important challenges which are part of the wider re-orientation of the Serbian Economy in the process of EU accession. The harmonization of GMO Law with EU standards and preservation of Serbia's leading position in GM FREE

soybean production demand action and attention of actors from all spheres. If we want to preserve Serbia's leading position in European Soya production, actors along the chain have to start valorizing their non-GM soybean production, market it to the consumers and develop a common market strategy. Danube Soya Association through intensive cooperation with the Ministry of Agriculture, is committed to create good framework conditions and thus support Serbia in development of strategies in order to direct competitiveness towards quality.

Like other European countries, Serbia has a chance to integrate domestic soybean production into European GM FREE market and develop and valorize existing value of domestic market chains as well, through implementation of Danube Soya quality standard and labelling.

We hope the excellent study will help actors in Serbia to adapt to common challenges and formulate new strategies for bringing soya production to the next level.



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I. INTRODUCTION

Serbia is one of the three largest soybean producer in Europe and at the same time the only country that is self-sufficient in the production and processing of soya for the purpose of domestic feed compound industry and additionally completely closed to imports of genetically modified (GM) products. This means that all meat, eggs and milk in Serbia are fed with domestic none genetically modified (GM FREE) soybean. However, Serbia is facing certain challenges, such as higher prices along the whole market chain than in other countries, but also import of not labeled GM fed meat, milk and other products from the EU countries. In the future, the real challenge for Serbia is harmonization of GMO Law with EU standards and WTO towards liberalization of GM trade.

On the initiative of Danube Soya Association, in cooperation with consultancy company SEEDDEV and support of the Ministry of Agriculture and Environment Protection of the Republic of Serbia, GIZ project "GMO-free quality soy from the Danube Region", Austrian Development Agency (ADA) and more than 50 participants form the whole value chain (soybean producers and processors, farmers associations, Institutes, and leading meat, eggs, and milk producers..), during 2015, has been elaborated the Sector study "Effects of liberalization on the soybean market in the Republic of Serbia" in order to analyze and predict possible effects of GMO Law on the soybean market in Serbia.

The main goal of the Study is to provide information how to preserve leading position and GM FREE identity of our country in the new conditions of open market, as well as to give recommendations and help all stakeholders along the value chain and policy creators in order to make appropriate businesses and government strategies.

Danube Soya is an international, non-profit organization that brings together producers and processors of soybeans, producers of meat, milk, eggs, and retail chains across Europe, which together contribute to creating a solid basis for the production of high quality food for humans and animals with GM free quality and controlled origin in the Danube region and the labeling of food products (Danube Soya label).

II. METHODOLOGY

Preparation of the Ministry of Agriculture and Environment Protection of the Republic of Serbia the Study consisted of four parts:

1. Data collection for context and possible development directions analysis

Data for the analysis of global, regional and local trends in production, prices and trade were collected from various sources in a time series of at least 5 years, which enable trend analysis. Data sources were: the Statistical Office of Serbia and neighboring countries, EUROSTAT, FAO data on production, the FAO/ OECD outlook, UN COM-TARDE (6 digit level), WTO statistics, the UN TRADE DATA (10 digit level).

2. Interview with the participants in the supply chain

50 stakeholders in the soybean and related supply chains and experts were interviewed, either through individual interviews or group discussions in focus groups.

3. Data Analysis

In order to get the overall image, collected information obtained from interviews and focus groups were cross analyzed with the data.

4. Verification by the principal actors in the supply chain

Main findings and conclusions were presented at the verification workshop. Discussion and conclusions made at the workshop contributed to the final version of the study, which was disseminated amongst all the interviewees in order for them to submit comments.

III. EXECUTIVE SUMMARY

Serbia is the only country in Europe which is self-sufficient when it comes to the production of soybean. The research subject of this Study is whether the harmonization of Serbian GMO legislation with that of the WTO and EU would influence this fact, and in what ways. Changes on the soybean market have their effect on all related productions, yet simultaneously changes on those other markets in turn define demand for soybean and its products, so the Study also covers the production of meat, milk and eggs. A separate part of

the Study is dedicated to certification and labelling, as well as to unavoidable part of every market chain oriented towards quality.

The Study contains comparison of two periods: five years before the adoption of the Law on GMO which prohibited trade in GM products and five years after its adoption. The aim was to define the changes which occurred and to attempt and identify the exact influence of the Law, since the period in which Serbia prohibited trade in GM soybean meal was also one of highly dynamic global market trends, primarily increased demand which conditioned the increase in production, as well as in price. It is hard to assess which of the changes occurred solely as consequences of the global trends, and which due to the closing of the domestic market for the import of GM soybean meal. Be that as it may, when we compare 2004-2009 period with 2010-2014 period characterized by GMO prohibition in Serbia: (1) the production of soybean stabilized and slightly increased, (2) the price of soy and soybean meal increased, (3) the import of soybean meal decreased, but did not entirely stop, (4) the consumption by soybean extruding facilities increased, (5) the export significantly increased, (6) the production did not decrease, on the contrary, it slightly increased.

The soybean produced in Serbia is directed towards two markets. The major part is used by the animal feed and livestock producers and this soy mainly ends up on the domestic market, while

the other part is processed for human nutrition and is mainly exported. Some 190,000 tons of soy are processed into animal feed by extrusion. A portion of soybean is processed directly on the farms owned by pig or poultry farmers/companies. Some 250,000 tons are processed by the biggest soybean processor in Serbia, around 95,000 tons of it into soybean meal, and the remainder into a range of products used in human nutrition. Soybean meal is additionally produced by the other company, some 20,000-25,000 tons a year. Certain quantity is also imported – from 18,000 to 61,000 tons varying on the year (averagely 30,000 tons per year in the period from 2010 to 2014).

The soybean produced in Serbia stays in Serbia – most of it is integrated into the local market chains of animal products. It has been assessed that two thirds of the soy produced in Serbia is utilized in the productions of meat, milk and eggs. Around one third of the soybean averagely produced (438,000 tons) in the period 2010-2014 was exported through processed products such as soybean meal, soybeans, oil, a component of the exported animal feed, or, after processing, as highly valued products for human nutrition and other purposes (concentrates, flours).

In the section of the Study which includes the analysis of the effects of liberalization of GMO Law, the first part provides answers to the issues which would influence the market in the most significant way, the second part is focused on the influence of those changes on certain market chains, while the

final part deals with different options and their probability of imports of soybean meal as well as impact of such import on related markets.

The only thing which would definitely be amended in harmonizing Serbian Law on GMO with the regulations of the WTO and EU, would be to allow the import of the GM soybean meal into Serbia and its use in animal feeding, since this is permitted in all the countries in Europe and in the world. In this way a possibility will be created for GM soybean meal to be imported, which does not imply that this would definitely happen, since this may be prevented by either market related factors (inexistence of the economic interest), or factors unrelated to the market (gentlemen's agreement of the stakeholders in the market chain as is the case in Switzerland, administrative barriers in implementing the law, etc.). The Study investigates the three possible options pertaining to the import of soybean meal:

The first option is for the import of soybean meal not to occur, or to be minimal. It is assumed that this option will be realized in case the import premium for GM soybean meal is to be small, or at the expected level of 30 EUR per ton, in case the price of soybean on the global market remains high so that Serbia is able to produce price competitive soy, if majority of the stakeholders in the market chain decide to build their strategy on GM FREE products and stick to it, while major soybean meal retailers decide not to import due to a gentlemen's agreement, or

their own interest/fear. In this case, the effects on the domestic market would include the increase of export due to higher prices at the global market, as well as processing of soy into soybean meal for the needs of domestic market; the export of soybean products would decrease, but the exported products would establish their quality label, the production would increase in volume to the level of self-sufficiency, the prize of soy for the producers would remain higher than in the region, etc.

The second option is for the import of soybean meal to peak at 10-20% of the total needs. Preconditions for this scenario include continued decrease in the price of soy on the world markets, price difference between domestic and imported soy higher than the price of transport, certain stakeholders in the market chain opting for import (retailers, meat or animal feed producers). In this case, the interest of soybean producers to introduce quality labels would increase, the volume of production would rise at the expense of cereals, while the biggest processor would increase the volume of their soybean meal production at the expense of highly valuable protein products.

The third option is for the import of soybean meal to significantly increase. Preconditions for this include the increase in export due to the lower price on the domestic market which would thereby fuel the import to provide for the missing quantities, a significant decrease in the global price and the change of strategy by some major stakeholders and their decision to use

GM soybean meal in their production chains. The effect on the soybean market in this case would be an increase in the export of GM FREE products, slight decrease in the volume of the production, cessation of processing soybean by extruding, as well as increased export of soy by retailers.

The most realistic is the second option, due to all the reasons comprehensively elaborated in this Study: starting from the decrease of global demand, increased production in the Danube region, the ways in which market chain in Serbia functions and is organized, demand by the related productions, competitiveness of our producers, consumers' concerns, down to individual business plans and relations, i.e. irregularities on the domestic market. The first option is also possible, in case the state decides to implement the strategy of the import obstruction, thus stimulating an agreement between the producers and retailers to maintain status quo with an aim to promote predictability of the market. The real challenge in the future would be the occurrence of a bad year in terms of production, due to unfavorable weather conditions, which might result in moving on from the first to second option, or from the second to third.

Apart from predicting behavior of the stakeholders in the soybean market chain, the Study also addresses behavior of the participants in the related market chains.

Producers of pork and poultry are the greatest domestic consumers of soy-

bean meal, regardless of whether they directly produce their own animal feed, or they buy concentrate feed. Thereby their decision to either use, or not to use GM soybean meal, would largely influence the level of the import. Therefore, pork producers may become actuators of the import. However, even if cheaper imported soybean meal becomes available on the market, not all meat producers would rush to buy it. The first option for the producers of broilers and eggs would remain to be cooperation with soybean extruding facilities, for as long as they exist.

More than any other group of producers, egg producers are pressured by low prices. Big competition, especially in certain parts of the year, forces them to sell eggs at quite low prices, so they often try to cut their price by any means available. Therefore, they were the first to accept the inferior quality extrusion products, and this would be the very reason that they would be the first to introduce GM soybean meal. Their survival on the market with simultaneously keeping higher prices is possible only if they obtain some quality label for their eggs, which might stimulate consumers to pay a higher price for them. Such labels do exist, though their participation in the market is low, yet constantly increasing. Producers of these high quality eggs would use only GM FREE feed which would mainly be produced by extrusion facilities, but also provided by the domestic producers of GM FREE soybean meal.

Animal feed producers lack a clear strategy and they would base their

decision on the price difference. The price of animal feed demonstrates exceptional elasticity, meaning that in the case a certain type of feed is any cheaper, farmers would decide to use it. Furthermore, the farmers are easy to change their supplier as the product is highly standardized. Additionally, animal feed producers have an interest to decrease their price in order to increase their share on the market at the expense of the farmers who make animal feed on their own. This implies that only one producer who seeks to have competitive prices and therefore begins to use cheaper GM soybean meal, is required for all other producers to have a great interest to follow suit. On the other hand, controlling the production process of animal feed is very hard in the context in which GM products are present, and it significantly inflates production costs. So the fear of contaminating one's production facilities with GM soybean while the market still might refuse GM products, however cheap they may be, or even the possibility that situation pertaining to the prices might eventually change, leave enough space for the animal feed producers to think well before introducing GM soybean meal into their facilities.

Milk producers would definitely switch to GM soybean meal, if it becomes available on the market. The reason for this lies in the fact that commercial milk producers who use soybean meal as a rule calculate their costs quite precisely, so they would be able to make cost savings regardless of how little soybean meal they use in their feed mixtures. Soybean meal is used in a small

percentage in the overall nutrition of cows, while dairy companies do not have intention to introduce control of the process, or to segregate the milk of the animals being fed by GM FREE soy.

Meat processors realize the potential in labelling their GM FREE products, yet they are under the pressure of competition and low purchasing power of the consumers. In such environment, those processors which are price oriented have more success than those oriented towards quality. The solution for this second group of processors is either to enter the lower price category, or to introduce quality labels for the products which would be appreciated by a small number of consumers who possess means and wish to buy superior quality products. Entering the lower price category is significantly harder and more uncertain in the long run. Therefore, the majority of the quality oriented processors would opt to add value to their products through introduction of quality labels. This will include using meat of the animals fed with GM FREE soybean meal. In this respect, there is no doubt that these processors' initial strategic decision would be to either have an entirely GM FREE product range, or to segregate their products. To what extent would this option remain sustainable under the additional pressure of the market, would depend on the business vision and capacities of each individual processor.

SITUATION OVERVIEW

IV. CHARACTERISTICS OF SOYBEAN MARKET

Changes in production, demand and trade of soybean, in the last ten years, are so great that they can even be called a phenomenon. That's why it's important to keep exploring these processes, identifying their driving force and find appropriate strategies to adjust to development at state or individual level.

IV.1. The World

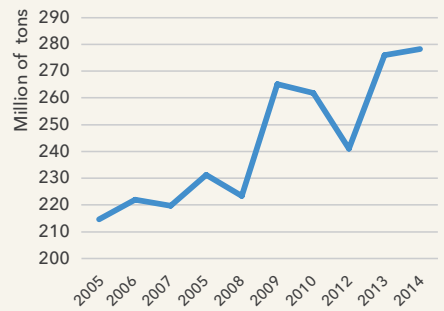
World production growth

World production of soybean in the past seven years has grown at an average annual rate of 3.5%, while the cultivated areas increased at a rate of 2.4%. That means that average production in the world, in the last five years, amounting to 253,484,303 tons, is 12% larger than production in the previous five years. In 2013 there was almost 18% more soybeans planted than ten years ago.

Compared to world average, the biggest increase of soybean production, during the last decade - was in Europe. However, share of European soybean in total world production is only 2%. The biggest contributor to world production, South America, also records a positive growth and production in this part of the world grows 3% faster than world average. North America and Asia, grow slower than the rest of the world, while only Asia recorded a decrease in average production in the

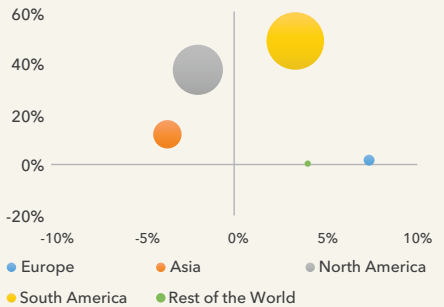
previous decade. Sudden drop of production in the last three years was due to combination of influences of agricultural policy (higher subsidies for wheat production) and stagnating soybean yield.

Graph 1: World production of soybean (millions of tons)



▲ Sudden growth of soybean production in the world since 2009.
Source: FAO

Graph 2: Production by continents (2005-2014)



▲ Soybean is mostly produced in South America, but grows fastest in Europe
Source: FAO

Main drivers of such growth of soybean production were:

1. Increased demand, especially in the region of Asia where the development of economy and increase of population led to increased demand for meat and oil. Economies of China and India in the past decade had periods of growth, even over 11%. Growth of these economies, with population over 2.5 billion people, created an opportunity for them to afford more proteins such as meat, milk and eggs, but also products made from soybean and cooking oils. That led to an increase in global demand for chicken, pork and beef, animals fed on soybean meal. Soybean production could not follow this increased global demand so there was a soybean price increase due to imbalance between supply and demand.

2. New technologies and building of infrastructure lowered costs, increased availability and yield. With the increase of demand and prices, research investments into new technologies that were directed toward increasing quality and lowering the prices also increased. Also, development of infrastructure, primarily in South America, Africa, and CIS countries, increased availability of soybean and created pre-conditions to increase production in these areas.

3. Increased processing capacities in China. In a short period China increased its processing capacities

(from 8.4 million tons in 1997 to 57 tons in 2013) which enabled China to become a large soybean importer. China imports 4 times more soybean than EU, and EU is the second largest importer. Annually, Europe imports around 35 million tons of soybean meal (34.8 million tons in 2014), mostly from USA and South America. This soybean is mostly used for feed and without import Europe would not be able to sustain its current level of livestock production.

4. Increased demand for biodiesel, due to high prices of oil and the need to increase independence and ecologically acceptable energy sources.

5. Depreciation of the dollar which contributed to the increase of trade between dollar-oriented countries such as China.

6. Entry of financial institutions on the global soybean market. Institutional money found its way into international goods market.

This unexpected development was caused by instabilities in the USA stock market and debacle of second rate mortgages. Since global goods achieved better results in almost all markets, institutional investors created goods' index funds and invested billions of dollars into goods market. This trend of investment into goods started with oil and spread to other types of goods, including agriculture. The result was a sharp increase of soybean and soybean product prices although there was no great changes in supply and demand.

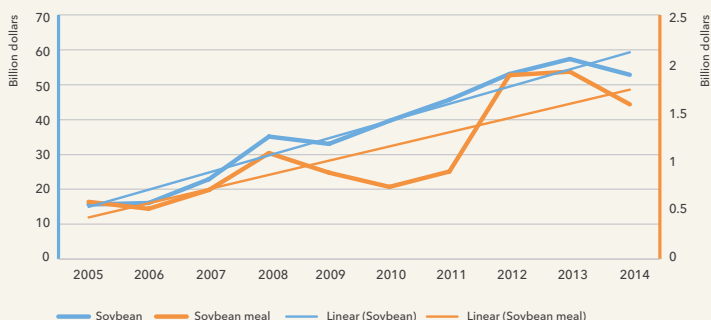
Increased soybean and soybean meal trade

Increasing production was followed by the increase of trade. In the last 10 years the value of soybean export was increased by 70%, and soybean meal by 63%. In 2014, 40.7 million tons or 38% more soybean was exported than in 2005 and 831.000 tons or 28% soybean meal.

Graph 3: Soybean and soybean meal export in the world

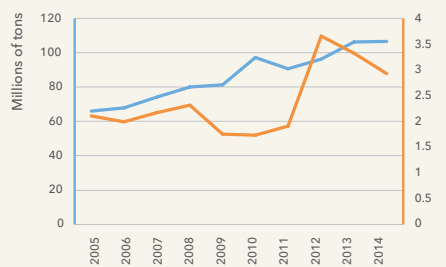
In previous, 2014, two thirds more soybean was produced, that is, soybean meal, than ten years ago

Source:
UN Comtrade



Soybean trade constantly grows with an average rate of 5.7% in the last ten years, and 7.3% in case of soybean meal. World market mostly gets its soybean from Brazil, while the largest exporter of soybean meal is Argentina. Increase of trade, apart from increased demand, was also influenced by improved infrastructure in South America, which enabled a more efficient transport of soybean and soybean meal.

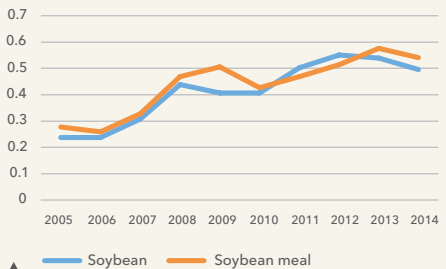
Graph 4: Export of soybean and soybean meal in the world



Export of soybean constantly grows, while in the case of soybean meal there are considerable variations and considerably smaller values.

Source: UN Comtrade

Graph 5: Unit value of world export



Unit value of export records a constant and considerable growth in the last ten years.

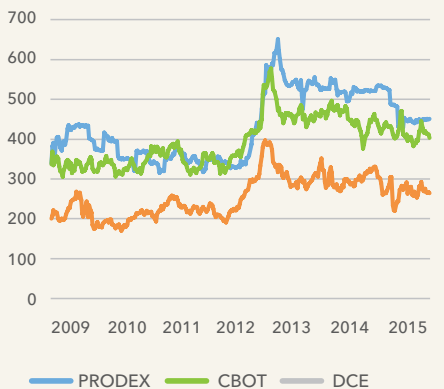
Source: UN Comtrade

Increase of prices

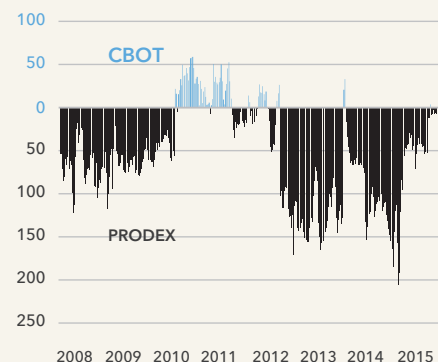
World stock markets usually have consistent trends so the price difference, with smaller oscillations, is pretty constant. Although the price trend is the same, the most expensive soybean meal is sold on the Commodity exchange in Novi Sad. The greatest difference in price of soybean between stock market in Chicago and Novi Sad was 205 euros per ton, in August of 2014, only to drop to 12 EUR/t in April of 2015.

After historical maximum from the second half of 2012, the price of soybean meal in world markets has experienced a negative growth trend. The price of soybean meal on product market dropped faster since the second half of 2014, but still records around 10% higher values than in 2009.

Graph 6: Soybean meal price trend on the world stock market



Graph 7: Relationship soybean price on stock markets



▲ The price of soybean on Commodity exchange in Novi Sad records a sudden drop at the beginning of 2014 and became almost equal with prices on leading world markets that were also decreasing in the last couple of years. Compared to 2009, the biggest price growth was recorded on DCE stock market, while the soybean price was least increased on the Product stock market (2.4%).

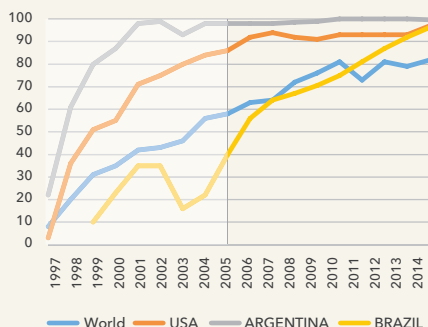
Source: PRODEX, GMEX, DCE

Increase of GMO crops production in the past decade

Soybean is a culture with the highest percentage of GM crops in total planted areas. Since 1996 when the first soybean seed was modified in USA, areas under GM soybean cover over 60 million hectares and make up 82% of total world acreage under this crop.

In USA and Argentina the cultivation of GM soybean is allowed without any limitations, which means it is treated just like conventional varieties.

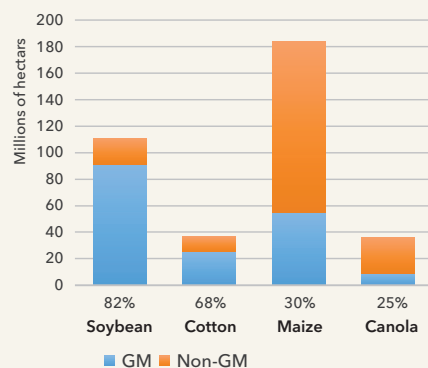
Graph 8: Share of GM soybean in total planted surfaces



▲ Since 1997, share of genetically modified soybean in total production, was increased from 8% to over 80%.

Source: FAO

Graph 9: GM and non-GM areas of main crops in 2014



▲ Compared to other main crops, largest share of areas under GM crops is under soybean. Even 82% of world areas under soybean are genetically modified plants.

Source: Daube Soya Market Analysis Inputs



Increase of GM free crops and RTRS soybean in the last three years

Annually, EU imports around 40 million tons of soybeans, mostly from USA and South America. This soybean is mostly used to feed the livestock and without it Europe would not be able to maintain its current level of livestock production. Out of this amount, around 15% is the demand for GM FREE soybean, which is largely shipped from South America. Demand for sustainably produced soybean (RTRS, Pro Tera and Danube Soya) grows, governed on one hand with concern of consumers about using GM products and on the other hand created by policy which supports the production GM FREE soybean in Europe, where the driving forces are large supermarket chains all over Europe.

Conclusion

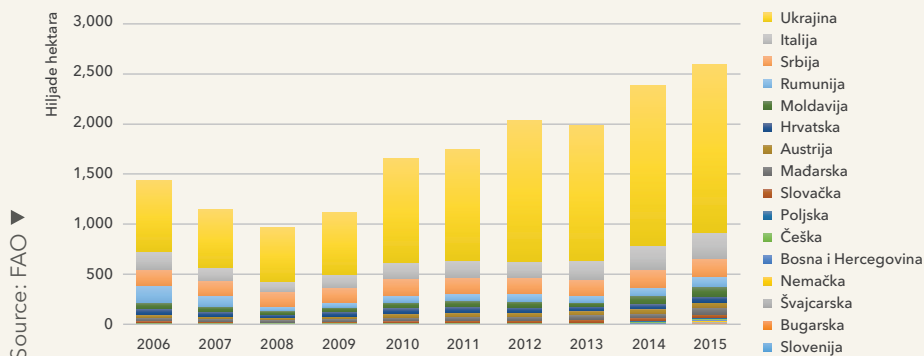
The growth of soybean production in the last 20 years is parallel with the growth of world meat consumption, especially poultry and pork meat. The biggest production was in South America based on to conquering new surfaces and accepting new technologies, mostly biotechnology.

IV.2. The Danube region Increase of soybean areas

Soybean production areas in countries of the Danube region are constantly growing. Since 2005 total areas under soybean in countries of the Danube region increased at an average rate of over 11% and in 2013 there was 50% more soybean planted than in 2005.

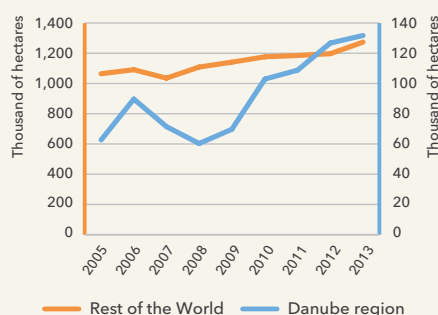
The largest soybean producer among countries of the Danube region is Ukraine, producing over 60% of "Danube" soybean. Growth of soybean production in Ukraine started after 2000, when 7% of total area under soybean in the Danube region was located in this country. Today, two thirds soybean areas are located in Ukraine, and estimation is that over 60% of this production is GM soybean. On the other hand, share of surfaces in Serbia in Danube region has dropped from 20.7 percent in 2000, to just 7.5% last year.

Graph 10: Soybean production areas in the Danube region



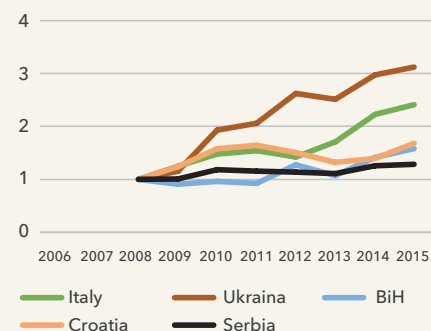
Soybean acreage increases all over the world. However, in countries of the Danube region growth is much faster. In the last 5 years the average country of the Danube region has increased its surfaces under soybean by 54%, while that growth is below 13% in other countries.

Graph 11: Increase of soybean production areas in the Danube region compared to the rest of the world



▲ Average surfaces under soybean in countries of the Danube region grow faster than in the rest of the world, Source: FAO

Graph 12: Growth trend of soybean production areas (2008=1)



▲ All countries increase soybean production areas, Source: FAO



Soybean production in the EU countries started to be subsidized

EU budget for the period of 2013-2020 introduced voluntary payments related to production and in that way subsidies for certain crops are introduced. Crops are chosen by the member country in order to support the production of currently neglected cultures. This opportunity was used by 16 countries (Bulgaria, Czech Republic, Greece, Spain, Finland, France, Croatia, Hungary, Italy, Ireland, Lithuania, Latvia, Luxemburg, Poland, Romania, Slovenia),¹ to subsidize protein crops, including soybean. This represents 10% of the total budget for voluntary subventions in 2015 and total amount intended for these subsidies is around 400 million euros a year. Additionally, 15 countries have decided to use the possibility of supporting nitrogen fixer crops within ecological payments, which includes soybean.

¹ European Commission: Direct payments post 2014, State of play on 07.05.2015.

Table 1: Examples of countries from the Danube region that have subsidies for production of soybean

Country	Subvention value	Note
Romania	280 - 325 €/ha	Based on the current surfaces, the increase to 376 €/ha till 2020 is expected.
Hungary	175 - 220 €/ha	Upper limit is based on current surfaces, and decrease is expected in case the number of hectares under soybean as increased.
Croatia	260 €/ha basic	+ 65 €/ha coupled
Slovenia	365 - 419 €/ha	
Poland	326 €/ha	For high protein plants
France	100 - 200 €/ha	

Conclusion

Soybean, as a relatively extensive crop which is traded on stock markets requires a large areas for production. In that regard, Europe lacks the necessary agricultural areas. Europe competitive livestock production will rely in the future on import soybean while domestic soybean production will be directed to domestic markets that are able to pay the additional value of GM FREE soybean. In this sense, Europe should increase investment in sustainable and competitive production in order to partially meet its own needs.



IV.3. Serbia

Serbia is the only country in Europe which is self-sufficient in production of soybean. Analysis included comparison of two periods - 6 years before the Law on GMO that prohibits marketing GMO in 2009, and 5 years after the Law in order to identify the changes created after the ban of GM soybean meal import, the only GM product that was imported in Yugoslavia (Serbia) since 1996. Period when the law that bans the marketing of GM soybean meal was passed overlaps with the period of increased demand for soybean in the world and increase of soybean price. It is difficult to assess which changes happened exclusively as the result of world trends, and which ones as the result of closing of domestic market for import of GM soybean meal. Still, there is no dilemma that in those cases where there was a synergy effect of both influences, the changes were most obvious- increased production, increased soybean price and export of soybean products and animal feed.

Table 2: Comparative characteristics before and after the Law on GMO was adopted

Characteristic	2004-2009	2009-2014
Production ²		
Areas under soybean	Average of 144.500 hectares (130.900 – 156.700)	Average surfaces of 162.400 hectares (154.200 – 170.200)
Soybean production	Average production of 360.350 tons (303,950 – 429,639)	Average production of 438.691 tons (280,638 – 545,898)
Degree of area variations	2.93% Production (0.61%)	-2.43% Production (6.04%)
Soybean oil production	Average production 50.724 tons (46.269 – 54.313)	Average production 54.114 tons (39.157 – 66.889)
Production of meat of all categories	Average production 456.895 t (433.854 – 473.459)	Average production 462.178 t (448.901 – 478.027)
Price ³		
Unit value import of soybean	0.55 \$/kg	0.53 \$/kg
Unit value export of soybean ⁴	0.57 \$/kg	0.77 \$/kg
Trade		
Import of soybean	10.893 t	26.105 t
Import of soybean meal	66.528 t	31.406 t
Import of soybean oil	987 t	819 t
Import of animal feed ⁵	23.058 t	39.362 t
Import of meat of all categories	6.418 t	20.161 t
Export of soybean	2.372 t	29.084 t
Export of soybean meal and other products (flour, concentrates...)	9.034 t	32.376 t
Export of soybean oil	24.173 t	39.659 t
Export of animal feed	32.496 t	100.368 t
Export of meat of all categories	8.504 t	11.147 t

2 Data source: Statistical office of Republic of Serbia

3 Data source for prices and trade – UN Comtrade, statistical trade database of United Nations

4 Data for soybean meal are calculated by summing data for the following tariff lines:

- 120810 – flour and soybean grits
- 230400 – oil cake and other solid remains created by extraction of soybean oil, non-grinded, grinded or palletized

The reason for this procedure is nonexistence of tariff line for soybean meal and uncertainties about assigning tariff line to this product. Namely, comparison data on soybean meal trade, from several sources, are not consistent. According to international tariff system, tariff line 120810 relates to soybean meal, that is, flour and soybean grits. However, Serbian imports under this tariff line was insignificant, which does not correspond to real situation, considering that Serbia imports considerable amounts of soybean meal (flour).

5 The term animal feed includes animal feed preparations (tariff line 2309- Animal feed preparations)

Conclusion

Compared to the period of 2004-2009, during the GMO ban period of 2010-2014: (1) production of soybean was stabilized and slightly increased, (2) price of soybean and soybean meal was increased, (3) import of soybean meal was reduced but did not stop, (4) consumption for the purpose of extrusion was increased, (5) export was increased, (6) production of meat was not reduced, on the contrary, it was slightly increased.

IV.4. Market chain of soybean and soy based products in Serbia

Production of soybean in Republic of Serbia is based on domestic seed and cultivars

Tested amounts of soybean seed in 2014/15 amounted to 18.657 tons, of which only 5 tons was imported⁶. Seed market is divided to 70% held by NS Seme and 26% held by Selsum. According to interviews it can be concluded that 50% of crops is based on framer’s own seeds.

From 2004 to 2009, in average 12 new cultivars entered the registration process annually, and since 2010, 24 cultivars. Since 2001 for 261 cultivars application were filed, and 79 was registered and received a license to be grown in Serbia. There were only three registered cultivars with special properties, and two without Kunitz trypsin inhibitor and one with black seed coat.

Value of seed produced in Republic of Serbia is estimated to around 18 million euros.

Data related to the export of seed, which were received from the seed producers and the statistics are very different. Seed export is increased due to demand for certified GM free seed in countries that have established subsidies for the production of soybean since 2014.

Export of soybean seed according to Statistical office expressed in tons

Year	2012	2013	2014
Statistical office of RS	1600	598	2309

Soybean producers in Serbia have access to cultivars with special quality, but demand for such cultivars is very small. Relatively small offer of cultivars with special quality is consequence of non-existing demand for specifically created quality which was led by the processors.

Conclusion

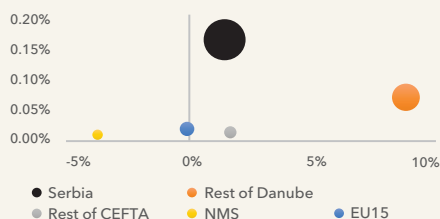
Meaning of the quality term of soybean is reduced on division GM to GM free soybean. If Serbia wants to maintain a competitive production of soybean it will have to introduce, increase and innovate other qualities, along the whole value chain from producers, processors and consumption of soybean and soybean products.

6 Annual report on tested amounts of seed and planting material in 2014/2015. PSS “Sombor” Ltd, Sombor

Slight growth and stabilization of production after 2009

Production of soybean varied in the last 6 years from 280,638 to 545,898 t. According to data from Ministry of agriculture it is estimated that value of soybean production in Serbia in 2010 was 140 million euros and in 2014 it was 182 million euros (author's calculation).

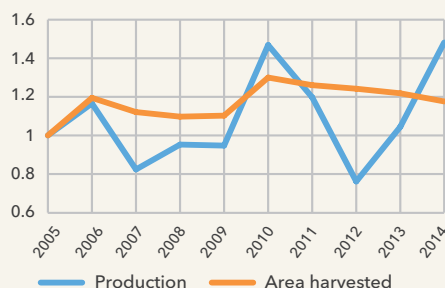
Graph 13: Increase of soybean production in observed regions in the world and share in world production (2005-2013)



▲ Serbia has the largest share in world production and positive growth in relation to the world. However, average growth of other countries of the Danube region is considerably higher

Source: FAO

Graph 14: Production trend and surface under soybean in Republic of Serbia (2005=1)



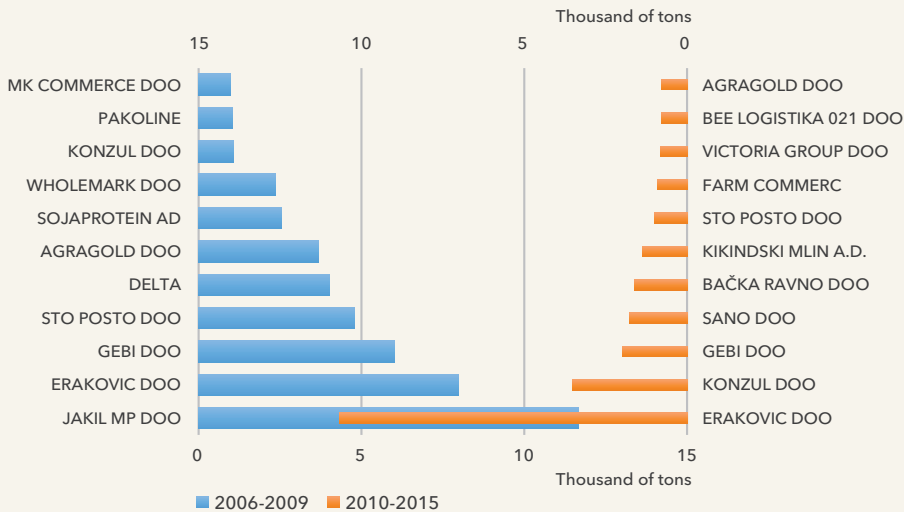
Soybean produced in Republic of Serbia is directed to two markets: animal feed market, for the most part, and processing for human use. Around 190.000 tons of soybean is processed for animal feed by extruder processing. This amount was calculated based on the annual purchase of soybean by animal feed processors and estimate of their share in the animal feed market. One part of the soybean is processed directly on the farms or companies that produce pigs and poultry. Around 250.000 tons is processed by biggest soybean processor, and one part (95.000) goes to soybean meal and by processing soybean grain a whole pallet of products that find their application in the diet of humans is produced. Soybean meal is produced by other processor (20-25.000 t). Also one part of soybean meal has is imported ranging from 18.000 to 61.000 t depending on the year (in average 30.000 t in the period of 2010-2014,).

◀ While surfaces under soybean, with slight oscillations, mostly increase, yield is highly variable

Source: FAO

6 Estimate was done based on interviews because although several requests were sent to Veterinarian directorate regarding capacity of extruders for soybean, data were not received.

Graph 15: Companies biggest exporters of soybean meal



Conclusion

Although biggest soybean processor, which has a large influence on the market value chain of soybean, processes 250.000 tons of soybean, large portion of soybean production (over 50%) still ends up being directly processed by extruders of animal feed producers or directly by pigs and poultry producers. Contrary to expectations, prohibition of GM soybean meal import has expanded the number and influence of players on the soybean market and reduced the influence of biggest processor, because other numerous buyers have emerged, whether being extruders or traders.

Where does soybean produced in Serbia ends up?

Soybean produced in Republic of Serbia ends up in Serbia: for the most part it is integrated in the local market chains of animal products. It is esti-

mated that 2/3 of soybean produced in Serbia contributes to the production of meat, eggs and milk. Due to structure meat and milk producers, it is very difficult to estimate how much soybean really ends up in certain meat and milk productions. In case of production of chicken meat the estimate is a bit clearer because 56% of animals are located at large farms for which certainly large soybean consumers are. In the production of milk, farms that have less than 10 cows participate in the production of 2/3 of milk produced in Serbia, and such farms hardly use additional soybean proteins to feed the cows. Estimation of soybean consumption for the production of animal products was made on the basis of data on grams of soybean necessary to produce one kilogram of meat (Table 3) and according to data on the average production for the period 2010 - 2014, over 60% of soybean in Serbia ends up in the

production of meat, eggs and milk. In countries with developed livestock production (Netherlands, Germany) 70-80% of soybean ends up in the production of animal products. There is a possibility that a larger amount of soybean per kilogram of animal product is used in Serbia, due to poorer conversion of feed, considerably poorer breed composition and other factors.



Approximately one third of soybean ends up in export, such as soybean meal, soybeans, oil, a component of the exported animal feed, or, after processing, as highly valued products for human nutrition and other purposes (concentrates, flours). In period of 2010. – 2014. 101.118 tons of soybean, soybean meal, oil other soybean products were exported. If one takes into account the average exports of animal feed at same period (100.000 tons) with important component of soybean - it can be estimated that 30% of soybeans are marketed through exports.

Table 3: Estimate of soybean share in market chains of meat, milk and eggs in Serbia from 2010-2014

	Chicken meat	Pork meat	Beef meat	Eggs (pieces)	Milk
Production (t)	93.400	259.800	80.400	1.782.000.000	1.471.000 (485.430)
			20 % producers use soybean in fattening		30% uses soybean
g of soybean/kg of finished product	820	480	180	20	50
Total tons of soybean	76588	124704	2894	35640	24271
Share (%) in total production of soybean	17.5	28.4	0.7	8	6
Production of soybean (t)	438.692				

Conclusion

Trade ban of GM soybean meal had a positive influence of the third of soybean production which ended up with processors who charged for additional value of by marketing the product without GM. Majority of soybean has ended up with those who were less competitive due to a more expensive input. Based on estimation 60% (maybe even more) of soybean produced in Serbia ends up in the production of animal products- meat, milk and eggs. By intensifying livestock production the demand for soybean grows. Current structural changes in the livestock sector (except poultry) are slow and do not present a driving force for soybean demand.



Soybean supply chain has room for improvement

Main factors influencing the trends in a soybean value chain are as follows:

- Competition of other crops (corn, sunflower, barley, wheat, sugar beet...), which in the case of largest number of producers and years are more profitable than soybean
- Soybean is a nitrogen fixator and producers know that they will need less investments for fertilizer
- Structural shifts of producers toward enlarging family households at the expense of buying and especially renting land from old farms and the state. These trends influence the improvement of production technology and yield itself, because the land falls into hands of professional producers who possess knowledge, technology and equipment
- Possession of irrigation systems largely influences the decision on growing soybean, since main competitors - wheat, sunflower and maize do not require irrigation, or in case of maize which is easy to irrigate.
- When purchasing soybean, there is plenty competition – largest proces-

sor, traders, extruders who guarantee that the soybean will be bought and that there will be competition when the price is formed.

- Increase of demand for GM FREE soybean in Europe, grow of demand for GM soybean in Asia
- Increase of soybean production areas in the region, but also in Ukraine
- Import ban of GM soybean and soybean meal
- Agricultural policy of area payments, currently present in Serbia, suits production with low investment, such as soybean.

Main barriers for development of soybean value chain:

- Assess to soybean production in a way that it does not require a lot of investment and it will provide good yield even in extensive cultivation
- Even still, great variations of prices between years
- Quantity of used certified seeds (it is estimated that it is only 50%) which threaten sustainability and quality of soybean production

- Monopolized market of quality soybean processing which had the consequence of establishing numerous extruders who took up a large piece of the market and whose products are very limited regarding quality

Main opportunities for development of soybean value chain:

- Opening input market and access to new technologies that improve yield and quality but also export
- Direction toward production of organic soybean for the EU market which is currently procured from China and India. Serbia should take advantage of the EU tendency toward use of European produced proteins, not only for livestock feed production, but also for human use.
- Opportunity for diversification of varieties and the use of certified seeds, with particular attention to varieties with special characteristics intended for human use, as well as finding producers who are interested in this specific production of varieties with specific properties for processing and production of products such as tofu, milk, yogurt etc.
- Increase of number of specialized producers to whom the soybean is their main crop, especially in areas where soybean is extensively grown
- Reduction of losses and improvement of growing technology by procuring new mechanization, especially combine harvesters

- Cleaning and separating soybean by quality categories that can improve export and quality of processing
- Increase of competition on a processing level, which will be able to process and prepare the product for export
- Improvement of quality of seed that will primarily lead to better characteristics- higher percentage of oil and proteins
- Opening new markets, geographically (Japan, North European...) and with new products on the existing market

V. BASIC CHARACTERISTICS OF SOYBEAN RELATED MARKETS IN SERBIA

96% of meat, that is the source of proteins that prevail in the structure of proteins for feeding population, is produced in the EU. The situation with plant proteins that are used for animal feed in order to produce meat is completely different. 69% of these proteins is imported and EU owns only 3% of the necessary amount of soybean meal that makes up 64% of 5 proteins that are a good source for meat production⁸. Soybean meal is the main source of lysine, amino acid that is most important in the diet of pigs and poultry. Unlike EU, Serbia receives it plant and animal proteins from domestic production.

⁸ <http://www.ocl-journal.org/articles/ocl/pdf/2014/04/ocl140021.pdf>

Serbia produces 100% of soybean for its needs and is the only country in Europe that is self-sufficient when it comes to the production of soybean. In the production of meat, Serbia has a degree of self-sufficiency similar to the EU. However, if the consumption of meat in Serbia would be the same as in EU, Serbia would import soybean.

Logical questions that are raised are why the EU decided to import much needed proteins? Why is Serbia the only country in Europe that has a different strategy? In the first case we are talking about a simple global distribution of competitiveness, where Europe, with its limited land capacity, is much more efficient and better at producing higher value crops that yield more profit. The answer to the second question is a little more complex and lies in the fact that Serbia has land capacity where it produces crops of lower value and in such distribution of competitiveness soybean finds its place. Serbia developed considerable capacities for processing soybean meal that have for 40 years directly influenced the development of soybean production.

The price of soybean and soybean meal is higher in Serbia than in the EU and that (in some cases more than in others) influences the competitiveness of related products such as production of livestock food, meat, milk and meat products. That is why state policy on production of plant proteins should not focus only on particular interest of soybean production but also on influences on related productions.

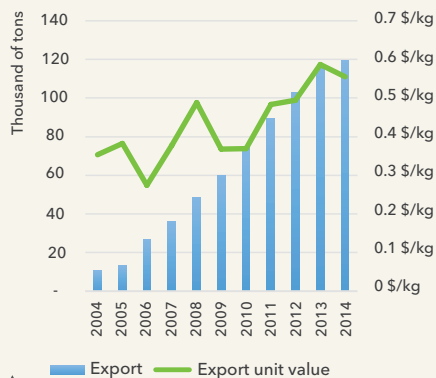
V.1 Animal feed

Before it reached the meat, milk or egg producers, about third of soybean in Serbia is first processed in animal feed factories. Unlike other feed that is made on farms, in large and modern industrial facilities or small mixing plants, this feed is traded with and is searching for its buyer. There are two types of factories: large capacity factories of which one group sells feed on the entire territory of Republic of Serbia (large part of production is export oriented), while the other group are factories that are oriented toward own production. The estimate is that large factories take up around 85% of total production and almost entire export. Second type is locally oriented larger mixing plants with a small market share.

Basic characteristics of the concentrated animal feed market are:

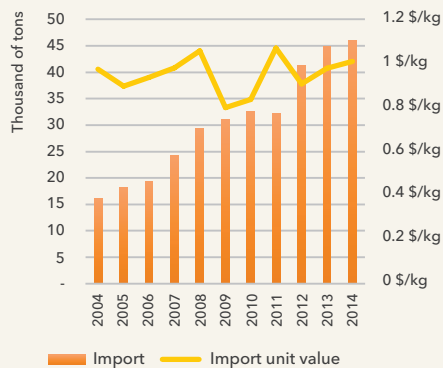
- Unused and often obsolete capacities. Estimate is that out of 2 million tons of capacity only half is being used- of which one tenth produces premixes.
- Constant increase of export and import
- Increase of unit value of export, which follows the prices of grains and relative stagnation of unit value of import as the consequence of stagnation of premix prices and food additives that are mostly located in import structure
- Considerable competition that still leads to growing concentration of production

Graph 16: Export of animal feed from Serbia



Source: UN Comtrade

Graph 17: Import of processed animal feed into Serbia



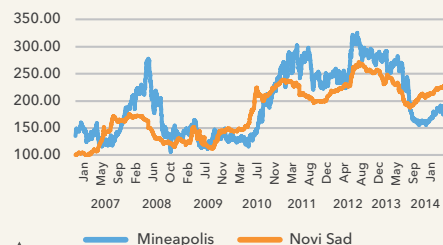
Source: UN Comtrade

Serbia has access to competitive feed, except soybean

In the last five years, Serbia is an important exporter of maize, a basic component of feed for pigs, poultry and considerably influences the con-

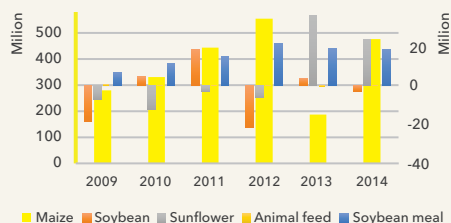
centrated feed of cattle and sheep. Apart from that, In Serbia there is a completion in feed production- among producers with "on farm" mixing plants as well as among large industrial objects for production of various types

Graph 18: Maize price in Minneapolis and CommodityExchange in Novi Sad



Maize price as the main components of animal feed in Serbia, in essence follows the price on world markets and does not depend much on domestic consumption and production, because excesses is exported. That means that animal feed follows the same trends. Source: PRODEX, GMEX, UN Comtrade

Graph 19⁹: Balance between trade of maize, soybean and soybean meal, sunflower, animal feed (2009-2014)



⁹ Graph represents a balance of trade, that is, difference between import and export of selected products. Considering that maize has a considerably higher positive balance than other cultures, values that relate to it are

displayed on the left vertical axis, marked with yellow colour. Values for other products are more than ten times smaller and are displayed on the left.

and categories of concentrated feed. For meat producers the problem lies in non-competitive price of soybean and soybean meal, which takes up to 30% in certain feed mixes. Serbia has decided for production, but also for consumption of GM free products, and that deprives it of access to competitive soybean and soybean meal from Brazil, Argentina and USA. That is why animal feed producers, through their representatives in Serbian Chamber of Commerce, since the introduction of Law on GMO in 2009, demanded the approval of imports of GM soybean meal or prohibition of imports of meat from animals that were fed with GM soybean meal.

V.2 Meat and meat products

Serbia has a stable production of all kinds of meat

Very often it has been emphasized that the livestock production in Serbia is in bad situation. However, the data are showing that the number of cows is decreasing but the milk production stays the same what implies that the productivity is bigger. The number of bullocks in the fattening is constant and the small decrease in production annually is smaller than in the new member states. However, there is increase in poultry and mutton production, especially comparing to the European countries. The number of pigs is cyclic like it has always been.

Table 4: The number of the animals (.000) and the production (.000 t) of the basic animal products; 2010-2014.

	2010	2011	2012	2013	2014
The number of animals					
Cattle (total)	938	937	921	913	920
out of them cows	530	510	480	451	460
Out of them milking cows	482	477	455	429	437
Pigs (total)	3,489	3,287	3,139	3,144	3236
Poultry	20,156	19,103	24,175	23,450	17167
Meat production					
Cattle	167	165	161	161	73
Pigs	399	393	368	381	258
Poultry	120	140	140	128	95
Cow milk (million liters)	1,462	1,434	1,442	1,418	1.492
Eggs (billion eggs)	1,219	1,219	1,387	1,755	1.892

Structural changes in Serbia in livestock production in Serbia happen differently from sectors and regions, and their speed and intensity certainly affect the consumption of soybean in Serbia. For example, in poultry production 539 farms with over 5000 animals produce more than half of total number of broilers in Serbia, while 411593 farms has less than 300 broilers. Analysis based on the Serbia average does not correspond to real situation because structural changes happened in all areas of Vojvodina, where the agricultural production is most intense. For example, in Sombor 41% of pigs in Sombor are at the farms with over 400 animals, and 45% of all cattle is located on farms that have over 30 heads of cattle. It is obvious that in the area of Sombor there is a specialization of farms and manufacturers so that the production of soybean is increased to over 10.000 ha although not all terrain is suitable to grow soybean.

For the production of pork and poultry meat in Serbia almost 200,000 tons of soybeans are used. The structure of the meal for pigs soybean meal makes an average of 20% and poultry meal more (30% broilers, 15% hens). The largest production is at on large farms that are big meat producers and large consumers of soybeans. It is estimated that more than half of the poultry production takes place on large farms. Large pig farms in the whole of Serbia do not have a large share in the production structure but in the regions of Vojvodina and Macva almost half the animals are on large farms that are large soy consumers. It must be stressed that

even small producers are using concentrate or just preparing animal feed in which soybean meal standard ingredient.

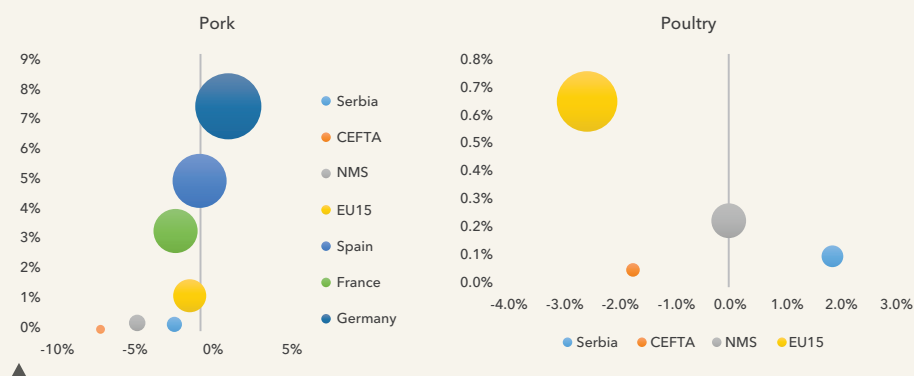
In beef production estimates based on interviews and farm structures are showing that soybean is in feeding about 20% of cattle for fattening. Small farms and regions which rely on free range and pasture do not use soybean.

Serbia keeps pace with the trends in meat production with majority of European countries

Serbia with the production of around half millions of tons of meat is on the sixth place in comparison to the new member states behind Poland, Hungary, Czech Republic and before Bulgaria, Latvia, Slovakia, Croatia and other countries. During the Tito's time, the production was bigger since it was for SFRY and the export being subsidized. The production is nowadays adjusted to the Serbia's needs (there is neither big export nor import) and the reduction in production is adjusted to the reduced number of citizens and the changed eating habits. However, Serbia keeps pace with the trends in the most European countries and the production there. Moreover, the sheep and poultry production is growing for around 2% in relation to the world average and the beef and pork production in Serbia in the last 10 years has been decreasing a little comparing to the world.

It has been expected to keep this trend in the future assuming of course that

Graph 20: Meat production growth comparing to the world average



Source: FAO

something unpredictable will not happen like the ban of the import of meat to Russia or the outbreak of some disease. It has been perceived that the liberalization of the market with the EU has not had either positive or negative effect on the meat production in Serbia.

Consequence of non-developed market chains are both - cyclic prices and the cyclic production

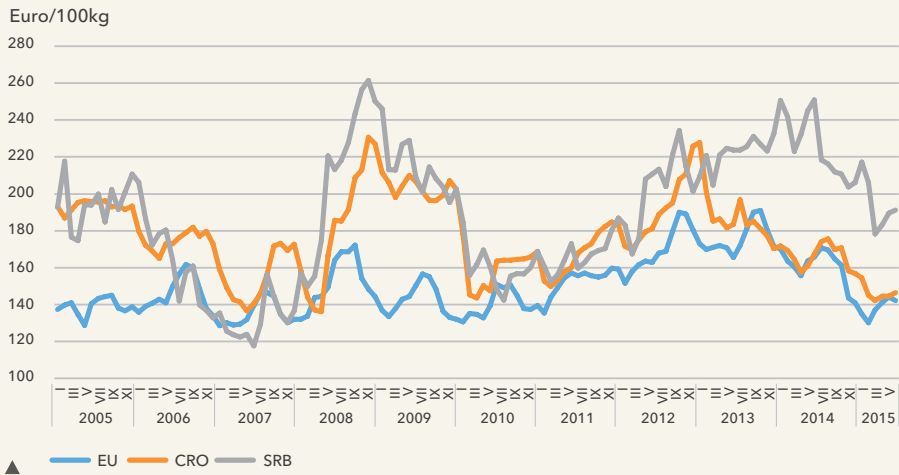
The pork and poultry meat production is not stable especially at the farms of small and medium producers. Moreover, the big number of producers having the capacity for the feed production as well as the stables for the animals is easily going in and out of the production creating big oscillations in the production and prices in this way. Furthermore, when the price is low, they work with smaller capacity what influences increasing the prices in the future because of the reduced offer and that is when they increase their production.



Another reason for the price oscillations is the global price and its influence since Serbia generally keeps the pace with the world trends in a way that when the price in Serbia is lower, it is much lower comparing to the EU countries and when it is high, in Serbia it is much higher.

The prices and the production in cattle breeding do not show such big oscillations like in hog production, primarily because the cycle is longer, the producers are more specialized and there is smaller number of the ones being in and out of the production depending on the cycle.

Graph 21: Price cycles in pig meat production comparing to EU



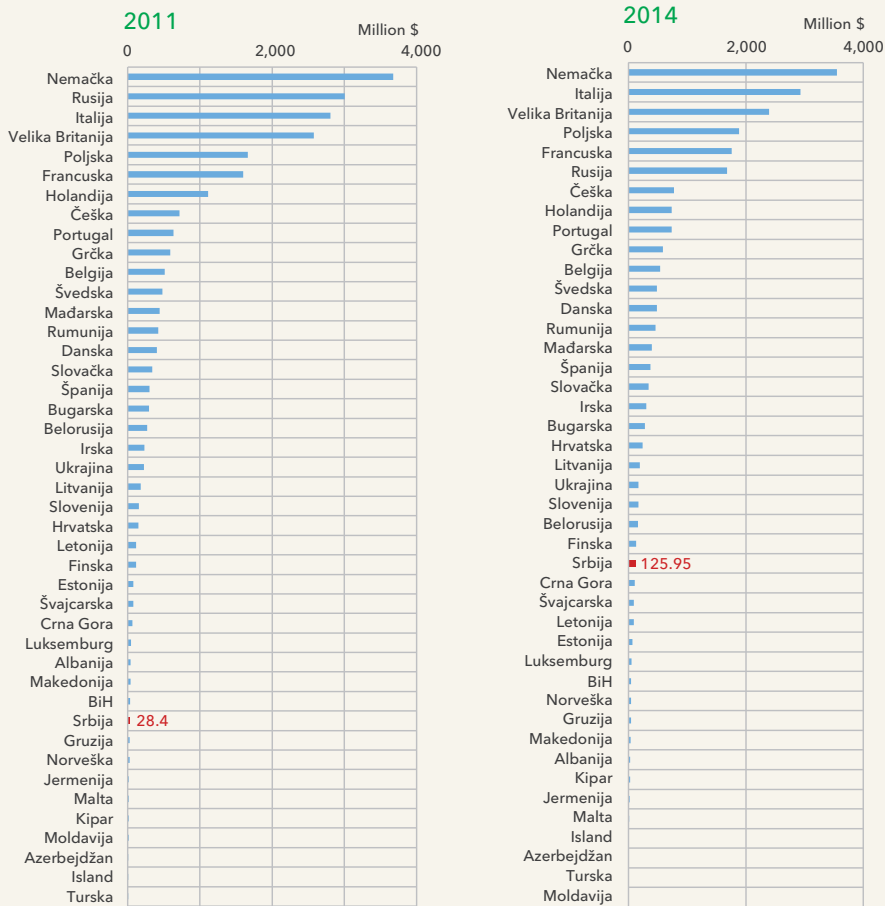
Source: TISUP, STIPS, Eurostat



Serbia imports the small quantities of pork in comparison to EU import

Although the import of meat is growing, these quantities are small especially comparing to the countries in the region and the new member states in EU. Serbia is still at the bottom of European countries by the amount of imported pork. The most commonly imported frozen meat: until 2011 it was about 10 million and increases in 2012 to 39 in 2013 to 49 million euros. In 2014, imports from the EU increased to 100.3 million euros while exports reached 58 million due to changes related to the ban on imports to Russia.

Graph 22: Import of pork in European countries



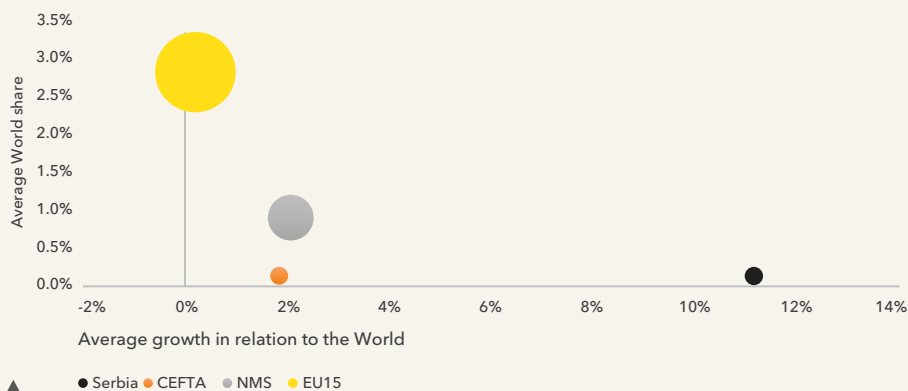
▲
Serbia imports small quantities of pork in comparison to other countries
Source: UN Comtrade

Serbia does not import large quantities of meat products but the trends are extremely negative

The growth rate of the meat products in Serbia has been 8% in the last five years what is above the world average and the import growth recorded in EU15,

NMS and CEFTA countries. On the other hand, according to the value of the meat products, Serbia is ahead of Moldova, Luxemburg, Albania, Estonia, Montenegro and Macedonia.

Graph 23: Import of meat products (2005-2014)



The growth rate of imports of meat products EU15 is barely above the world average. Countries NMS and CEFTA countries in the last five years of record growth in imports at a rate of 2% compared to the world average, while in Serbia import growth to 11%. The value of imports of products in Serbia is close to the average value of imports CEFTA countries, and much lower than the average NMS and the EU15.

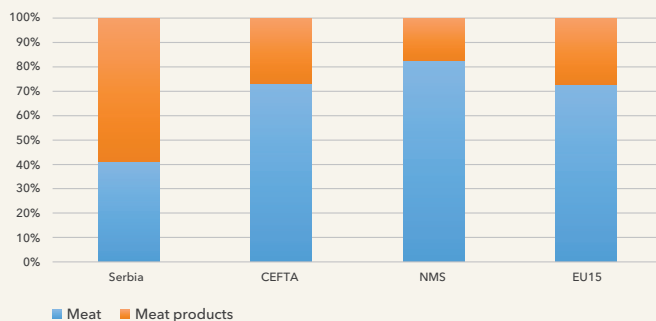
Source: UN Comtrade

Serbia imports more meat products than meat, unlike EU countries

Serbia unlike the neighboring countries, the EU and the world, imports much more meat products than meat. Moreover, this directly damages the

domestic processing industry and the livestock production which are put on the unacceptable level of the primary production without the developed processing which can bring the added value to both the country and the society. Therefore, the processing industry is falling behind the competition especially the one of NMS.

Graph 24: Structure of import of meat and meat products



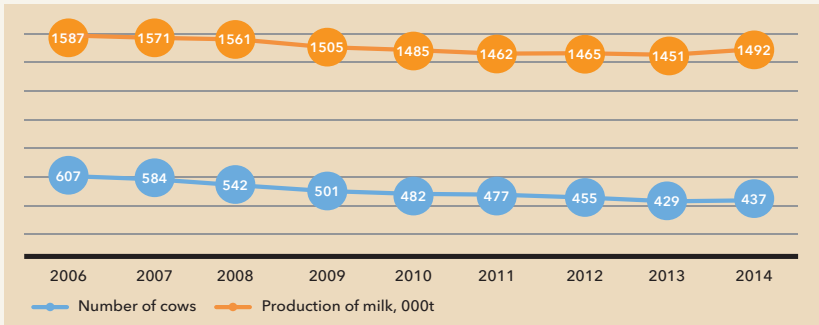
Serbia imports 60% of meat products and 40% of meat from total import of meat and meat products. This is totally opposite the relation of the import of meat and meat products in EU15, NMS and CEFTA countries, where the import of meat is from 70 - 80% in relation to meat products.

Source: UN Comtrade

Conclusion

Production of meat and meat products did not avail the status of the country where GMO import trade and marketing were banned. Input prices were high because global grain prices and closed markets for soybeans and meat producers have adjusted their price on these conditions and on the domestic market realized a higher price than the one that was average in the region and the EU. At the same time the meat industry is highly affected by the high prices of raw materials, an increase in imports of processed products from the CEFTA countries that have opened up access to cheap meat from the EU and has not used the opportunity to benefit from the fact of using local meat from animals that have not fed with GMO, neither in the domestic market nor export. The lack of opportunities for product labeling GM free quality have led to increased imports of products fed GM fodder, because EU law does not seek a positive labeling in this area. In this way, Serbia is failing to use its competitive advantages to using GM FREE products.

Graph 25: Milk production and number of cows 2006 - 2014



More prominent decrease in the number of cows than in milk production indicates increased productivity. Compared to 2006, in 2014 the overall milk production was 6% lower, while the number of cows decreased by as much as 28% in the same period.

Source: Statistical Office of the Republic of Serbia

V.3. Milk production

Fall in the number of cows, but relatively stable production of milk due to increased productivity

Production of milk in Serbia is one of the sectors with the greatest overall value when it comes to production, amounting to more than 500 million euros per year. Furthermore, raising dairy cows, production of milk and dairy products also represent major social support to the impoverished inhabitants of the rural areas.

Dairy sector in Serbia has had a fall in the production, while milk is one of the least competitive agricultural products. The number of dairy cows has also decreased, as well as the number of farms producing dairy. Further decrease in the number of farms is expected, similarly to what had happened in Croatia where in 2004 milk was bought from 54,000 dairy farmers, while their number fell to 14,000 by 2011 (with the rise in the share of "superior class" milk to 97%), and finally to 10,194 in 2014.

Three distinct groups of dairy producers are clearly distinguished in Serbia, and the way in which they use soy also varies:

The first group includes small producers owning one or several cows which, as a rule, do not have good genetic potential and give little milk. These cows are kept in inadequate conditions, substantially below the EU standard. These producers often process their milk into cheese and cream which they sell from their homes or at local market places. This group of producers do not use soy in feeding their cows.

The second group of producers are medium sized producers, having three to ten cows. They advanced a lot in the previous 5-6 years, they improved breed composition of their cows, conditions and technology of milking, yet the majority of them, even though they largely sell their milk to dairy products companies, do not fulfil the EU quality standards. The number of producers in this group has substantially fallen. This group does not use soy in feeding their cows either.

The third group consists of the large scale farms with favorable genetic potential, which are on the level of the EU, in both production and standards. Some 30% of the milk is produced in these farms and the usual diet of the cows in them does include soy bean.

Concentration of purchasing and processing in few dairy products companies

There are more than 200 dairies currently in Serbia. The most of them are

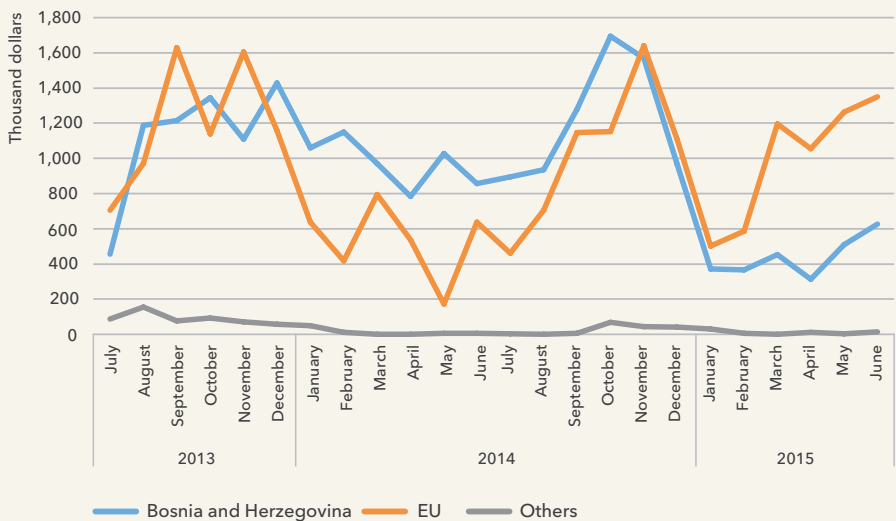
small craft dairies, while there are only 10% of the large scale industrial dairy production facilities. However, in spite of the large number of small dairies, they make for only 13% of milk processing. Simultaneously, large scale industrial dairies hold 67% of the processing facilities. All this indicates that dairy production sector is to be faced with a challenging period which will be characterized by attempts to conform to the EU standards.

Milk Import

During the last year, Serbia imported 21.5 million tons of milk, thus becoming 38th country in the world in this respect. However, when it comes to the increase of the export, Serbia is among the leaders.

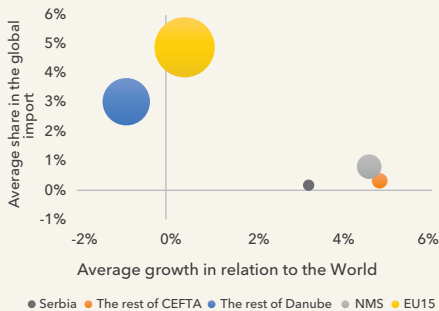
The import of milk into Serbia was rising during the last decade with the average rate of as much as 59.6%, while in 2014 94% more milk was imported when compared to 2005. Most of this milk is imported from the neighboring countries, primarily Bosnia and Herzegovina, while the major importers are dairy companies which process and sell their products on the both sides of the border, thus levelling their own and thereby also overall production and demand. The import of milk into Serbia particularly surged after the accession of Croatia to the EU, when Bosnian dairies had to cease exporting to Croatian market so this surplus had to find its market.

Graph 26: Import of milk and powdered milk into Serbia



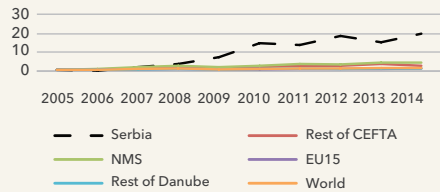
▲
Source: ITC

Graph 27: Increase of the import of milk in relation to the global average (2005-2014)



▲
Source: UN Comtrade

Graph 28: Milk import increase trend (2005=1)



▲
In the last decade, the import of milk into Serbia increased by as much as 20 times.
Source UN Comtrade

Conclusion

Production, processing and marketing of milk and dairy products represent a complex and sensitive system. This sector is bound to face numerous challenges, gen-

erated by weak competition in the field of milk collection and purchasing, but also the need to fulfil a number of demanding standards in the process of the EU harmonization and accession. What would be particularly challenging are the changes in the

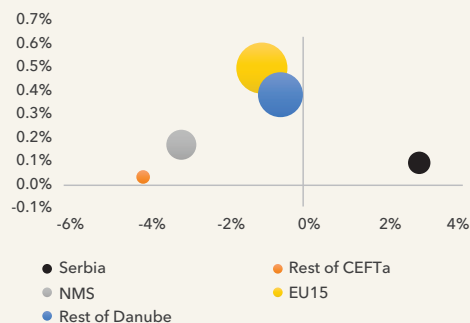
dairy production sector in Serbia's neighborhood as a consequence of the abolition of the milk quotas in the EU. Dairy production sector requires stability, but the production of milk also in turn offers stability and opens up the market for crop farming products (including soy bean), also providing resources for the production of beef. Using soy as feed is adopted by milk producers, especially specialized producers whose number is increasing, particularly in Vojvodina. Investments required by large scale farms are substantial, so less and less farms would possess enough resource to allow them to engage in milk production, so it is certain that the existing farms would have room for improvements.

V. 4. Egg production

Egg production in Serbia is associated with the times of substantial problems in the poultry sector, and a dramatic fall in the production when compared to the situation of several decades ago. While competition countries retained stable production, Serbian trend during the previous decade was quite volatile, with several points of substantial decrease and subsequent return to the level of production of 2004. Currently, some 1.7-1.9 billion eggs are produced yearly in Serbia.

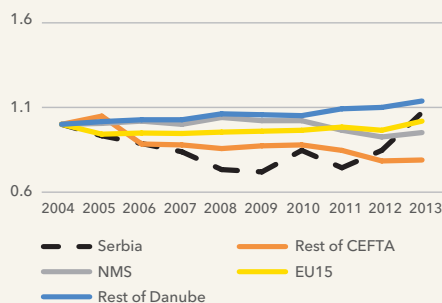
Production of table eggs in Serbia is not competitive due to many different reasons. The comparison of the basic production parameters in the production of table eggs indicate major deficiencies in this production in Serbia, when it comes to almost every assessment criterion – from higher prices of feed, pronouncedly higher prices of

Graph 29: Increase in the production of eggs in relation to the global average in the surveyed regions (2007-2013)



▲ Only Serbia has positive growth when compared to the global situation
Source: FAO

Graph 30: Egg production trend (2004=1)



▲ In the last few years, Serbia had a significant rise in the production and in 2013 it had the largest production in the previous decade.
Source: FAO

17 weeks old egg laying hens to be introduced into production, and high mortality rate of the hens, while on the other hand period of exploitation and number of eggs per laying hen are

somewhat lower than in other countries. Prices of feed (23.6 EUR/100kg as the minimum, 15.4 in US, 17.5 in GB, 19.5 in France) as well as the ratio of conversion of the feed into product, imply that every price support to the decrease of the total costs is significant, so it may be expected that the producers of table eggs would opt for the cheapest feed on the market.

Table 5: Egg production in Serbia

Production in millions					
	2010	2011	2012	2013	2014
Eggs	1.705	1.760	1.794	1.755	1.892

Within the current farming technology, egg production and laying hens’ feeding are largely dependent on the use of soy and soybean meal. Some 30% of the egg laying hens’ diet is based on soybean products, and there is currently no adequate alternative to substitute proteins from soybean meal in poultry feed mixtures.

Eggs are also among the products whose export on the EU market is limited, which is partly related to the systematic monitoring for salmonella and other pathogens, but also to the fact that less than 1% of eggs in Serbia is produced in line with the most recent EU regulations pertaining to keeping egg laying hens. Within the sector of poultry production the most substantial changes are expected exactly in the sector of egg production, and primarily when it comes to the keeping of hens. Application of regulations on the wellbeing of animals, which prohibit for egg laying hens to be kept in tradi-

tional cages, has been postponed until 2020. However, without strong support by and involvement of the state in the process of introducing new hens’ keeping systems, this postponement would not have any significant impact, since the investments required for this kind of change are substantial. According to the assessments of the Association of Poultry Farmers, domestic egg producers would need 50 million euros to buy new cages, and another 30 million euros for the necessary expansions of their facilities, since new and larger cages results in the loss of 40% of the space.

The sector of processing eggs into products, such as powdered egg and liquid egg yolk mélange, is almost entirely dependent on import, since there are no processing facilities for these products which are mainly used by confectionary industry and mayonnaise manufacturers. Even though this segment of import is not that significant when compared to the overall production, yet it contributes to this sector being less efficient.

When it comes to the structure of producers, there are three groups of them:

1. Small scale production in one’s own yard, mainly for one’s own needs, while the surplus is often sold to the familiar buyer, or directly. The number of egg laying hens depends on the size of the household, from a few to several dozen free range hens. When this number is multiplied by the number of these households, including those households produc-

- ing eggs without being registered as agricultural farms, this result in a substantial number. These producers are not sensitive to liberalization of the GM commerce regulations, since they usually give their hens self-made feed, or locally obtained grains. Even when it comes to buying concentrate feed, it may be assumed that potential decrease of the prices of feed containing GM soy would not be a crucial argument for this group of producers, since they produce to cater for their own needs, so they tend to deliberate more on the health risks inherent to GM food.
2. Another group of farmers includes small and medium scale commercial farms which introduced intensive production for the local market, farmers' markets and greengrocers, as well as privately and publically owned restaurants. This group of producers' position is really unfavorable, since they operate with quite a small difference between production and selling price. The feed is usually bought from the producers of animal feed so it may be expected that, depending on the reactions of the market, this group would divide into two distinct groups, those who will pursue price competitiveness at any cost and those who would create for themselves the image of GMO FREE eggs' producers, since eggs are cheap and may allow for higher prices, providing that they correspond to the expectations of the buyers, and that there is space for valorization of this advertised characteristic.
 3. Large scale industrial egg farms with modern and intensive production process belong to the third group, and there are 15-20 of them in Serbia. Their production capacities range from 10 to 50 million table eggs per year. These are simultaneously the producers who mainly prepare feed on their own, they have their own silos and mixing facilities and they directly buy grains, so they can create their own strategy of either using GM crops, or not using them. It is assessed that a half of the overall egg production comes from these farms, so a coordinated campaign with relatively small number of actors can attempt to influence the decision on using GM FREE soybean. However, bearing in mind the problems in covering the expenses with the existing selling prices, it is expected that some of these farms would opt for potentially cheaper crop which could significantly figure in laying hens' diet. On the other hand, some of the producers already base their marketing on organic production, sells free-range eggs and keep on working on sensitization of the consumers to quality, which could potentially involve feeding hens with the crops which are free of genetically modified organisms.

Conclusion

Egg production in Serbia is one of the most risky businesses due to great fluctuations in prices and non-regulated markets of both eggs and related products. However, this production perseveres and has a potential to grow through both lower prices and adding of value through quality labels.

VI. QUALITY LABELS IN SERBIA

Contemporary context of food production and consumption has been changed. While safety of products has become a must, for many of the consumers, food ceases to be the way to satisfy their basic needs, and selection of food becomes an attitude of one's personal relationship towards environment, a message to be communicated about one's values and lifestyle. Quality does not include only characteristics of a product such as – appearance, taste, nutritional value and origin – but also production process (is it organic, fair trade, etc.) What is more, consumer requires a product which is healthier, “greener”, which travelled less between the locations of production and selling, which is fresh, unique and conforms to his/her value and ideological system. Establishment of quality labels, primarily through introduction of voluntary standards, facilitates distinguishing in the abundance of supply, guarantees quality and trend of systematic designation/informing of consumers on the quality and characteristics.

Underdeveloped Quality Labels in Serbia

Even though certification has become increasingly important in agro-alimentary sector, systemic framework in Serbia concerning voluntary quality labels is still inadequate. While in some countries, over 70% of the products are marked by corresponding quality labels, this system in Serbia is still in the initial phases of development and requires serious improvements.

Voluntary public quality labels include organic production and products with certified geographical origin, while in recent years there have been more and more privately owned voluntary standards whose introduction accompanied the arrival of big retail chains. Producers and manufacturers who wish to cooperate with some of the major retail chains must conform to some of the required standards. This enables retailers to decrease the risk and avoid sanctions in the case of complaints by the consumers and subsequent loss of their trust. These standards are mainly unrelated to consumers. This is Business-to-Business approach whose aim is to decrease variations in quality, especially when it comes to food safety.

What is currently underway in Serbia are the designing, creation and introduction of a new voluntary public label of superior quality which would be worn by the products whose quality is higher than that of the similar products, providing that they fulfil three additional conditions – that these are domestic products, made without using any GM products and that they are, if possible, made by using fresh rather than frozen raw materials and that they possess favorable organoleptic properties. The Ministry of Agriculture, under an EBRD-FAO supported project, and together with the representatives of meat processing industry, is developing specific criteria for meat products which would become the first category of products to carry this quality label. It is expected for this range of products to be presented to consumers in 2016.



Figure 1: What becomes increasingly important in Serbia is for retail chains to sell goods carrying their private label (brand), so the demands increase for safe products, especially by big retailers and manufacturers. These products are not based on their specific quality (but mainly on their competitive price) so they are intended for the consumers who are motivated by the price, but also by the additional guarantee of a big retailer which selectively chooses its suppliers. However, their distributors often market these products as specific standards, with the guarantee of the established threshold for a specific product.

In the following period it is necessary to adopt regulations pertaining to the labels of specific quality, which would regulate the possibility for a product to be distinguished by its properties and for this quality to be communicated to the consumers.

Quality Labels for Soybean

Ever since the global Greenpeace campaign in 2006, increased demand for and production of soybean were marked as the main reason for deforestation of the Amazon and conversion of this land to agricultural plots. The information Greenpeace campaign used an analysis of the market chain to point to the interdependency of soybean production which mainly provided for the needs of livestock feeding in Europe and the rest of the world, and loss of biodiversity and habitats for the local population, flora and fauna. Awareness of consumers of their own indirect responsibility heightened the interest and readiness to stop influencing nature through one's own choices and to stimulate responsible behavior. This has resulted in the initiatives/standards which establish limits for exploitation,

demanding of the producers and retailers to produce a proof of responsible business conduct, while they simultaneously offer informed choices for consumers and guarantee that the required norms have been met. This is also the period when the development of the standards for sustainable soybean production – the RTRS and Pro-Terra – began.

Apart from ecological and socially responsible production, another aspect of interest for consumers is the attitude towards the GM soybean. Consumers' studies indicate that more than 70% of the consumers in Europe and Japan prefer food which is not genetically modified. The result is that all the food produced directly out of the GM crops need to be marked in both Japan and the EU. However, nowhere in the world the meat, milk, processed meat and dairy products are marked in any way when originating from the animals fed by GM corn and soybean. The import of GM products is not prohibited, yet it is subject to comprehensive control and approval process, while the overall demand of Europe and Japan for GM FREE soybean makes around 10%

of the global soybean production, i.e. 7.5-9 million tons, or 5.5 million tons of soybean meal in Europe alone.

The research of the attitudes of Serbian consumers pertaining to quality labels and the quality of meat, which was performed a year ago, demonstrated that as much as 94% of the consumers find it to be highly important and important that the specific meat products are made of the animals that had not been given feed which contained GM components. This opens up room for the inclusion of this aspect into the future quality labels for meat and other related products.

Quality labels are mainly associated with the products with high levels of finalization, although globally even the goods sold on stock market, such as soy, are being sold accompanied by voluntary quality labels. Thereby soy and soybean products are being differentiated from the rest of the global production and find their way towards the diversified market. Even though the demand for GM FREE soybean is relatively modest in relation to the overall production, it is a significant factor influencing the decisions on utilization of land, as well as the establishment of trade channels, since the countries with large production may specialize in providing for this market segment. On the other hand, suppliers need to establish the market chain which would support segregation of GMO and GM FREE productions, all of which influences the organizational structure and costs of the value chain.

Two global standards which provide certification for environmentally re-

sponsible soybean production are the ProTerra and RTRS standards (the latter resulting from the Round Table on Responsible Soy). The most recent Danube Soya standard which supports and promotes production and processing of the Europe grown soybean in the Danube region, was introduced in order to contribute to a more sustainable supply with high-protein food in different related productions, as well as in human nutrition on the European market. This label communicates two aspects of quality – production of GM FREE soybean and designation of origin, accompanied with the additional criteria pertaining to sustainability, traceability and support to the regional economy.



ProTerra is a voluntary certification standard for social responsibility and ecological sustainability which was developed by the CERT ID company which generally certifies the use of GM FREE soybean seeds. It is applicable globally to all agricultural products and the products made by their processing, as well as to transport, storing and trade in agricultural products, as well as to the processing into the products intended for human and animal nutrition, fuel and other non-alimentary products. It was established in 2006 through the dialogue of a great number of stakeholders, in line with the Basel Criteria for social and ecological sustainability,

and it assumes certification by an independent body. Premium for ProTerra soy is around 4\$ per ton, on top of the standard premium for GMO FREE soy. Around 95% of ProTerra certified soy originates from Brazil, with the total of 4.2 million tons of soybean certified in 2011, 3.4 million tons in 2012 and 2.8 million tons in the previous year.

Soybean certified within the RTRS scheme first arrived on the market in 2011, while some 2.5 million tons have been certified by now, mostly originating from Brazil and Argentina, followed by Paraguay and India. However, only little bit above 50% of the certified soy was sold, mainly through internal trade along the value chain, while more than one million tons of the RTRS certified soybean is still available on the market. The specific characteristic of the RTRS certification program whose aims are almost identical to those of the ProTerra standard, is the option of trade in both GM and GM FREE soy as long as the segregation exists, by the companies which also may trade in both the RTRS certified and uncertified soy.

Danube Soya quality standard has been launched in 2012. into European market with tendency of continuous growth of certified soybean quantities according to this standard. In 2016. the DS certified soy volume is predicted to see a 100% growth, concerning the expansion of cultivated areas in the Danube region, as well as increased demand for local products of controlled GM FREE quality and European origin.

In our country, implementation of Danube Soya standard give the opportunity for the first time to representatives of domestic food industry to label their products produced with soya of controlled GM FREE quality and European origin. It is important for consumer to have in front of itself product with guaranteed quality, produced in Serbia, using European GM FREE soya. In this way, producer will have freedom of choice to choose product which has traceability and is controlled along the whole value chain (from soybean producers, processors, compound feed producers, animal producers, slaughterers to retailers) and in the same time GM FREE quality and European origin.




The Ministry of Agriculture and Environment Protection of Republic of Serbia recognized the importance of the Danube Soya labelling in Serbia on national level and in May 2015 officially approved use of labels according to Danube Soya quality standard.



Danube Soya quality label on food products produced a) with GM FREE soya and b) fed with GM FREE soya of European origin (meat, milk, eggs)

Table 6: General requirements of the standard

	ProTerra	RTRS	Danube Soya
Control of the process and product Possible certification of other productions	✓	✗	✗
GMO FREE	✓	—	✓
Social responsibility	✓	✓	✓
Use of the logo on the final products/direct communication with the consumers	✓ B2C primarily	✗ mostly B2B, while introducing B2C	✓ B2C primarily
Traceability and segregation of products	✓	—	✓
Good agricultural practice	✓	✓	✓
Certification by an independent body	✓	✓	✓
Respect for human and workers' rights	✓	Bez informacija	✓
Respect of regulations on the use of pesticides	✓	✗	✓
Limitations in using new agricultural land Use of land in agriculture	✓ Plots converted by 2004.	✓ Plots converted by 2009.	✓ Plots converted by 2008.

Legend:  Requirement fully provided for
 Requirement partially provided for
 Requirement not provided for

Conclusion

Recognition of the quality of agricultural and alimentary products in Serbia is not based on clear and systematic marking of the additional values of products, but rather on generalized campaigns which confuse consumers who are thereby bound to base their decision not on any certificates of quality, but on marketing campaigns advertising healthy food, domestic food, Serbian food, etc. In the case of soy, it was only when the label of Danube Soya was introduced that the recognition of GM FREE soybean was facilitated, even though such soy has been grown in Serbia for decades. The education on quality labels must be paid additional attention in Serbia, while credibility of the labels must be founded on clear control and monitoring procedures.

VII. GMO

Introducing innovations which are not in line with the convictions of the consumers entails high risk. The attitude of the citizens towards genetic engineering is very negative and this fact must not be ignored. Pro GMO FREE initiatives are not based on harmful effects of GMO, but rather on the readiness of the consumers to pay additional value to secure food which conforms to their beliefs and values. Apart from the aversion towards GMO, another significant attitude of the consumers involves increasing affinity and demand for the locally produced food.

Therefore, each state wishes to find an adequate response which would in-

tegrate health, economic, social, ecological and political equilibrium, and to translate this equilibrium into corresponding legislation which would be adequately implemented. The reality is that many governments, due to their insufficient capacities and excessive external pressures, are often unable to reach this equilibrium, let alone to implement it in practice.

Legislative Trends

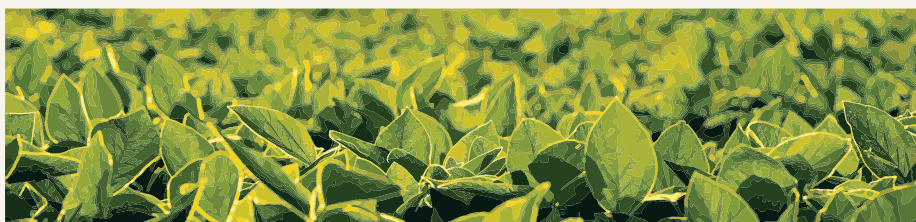
The European Union implements its rules pertaining to GMO through regulations and directives. Regulations are directly implemented and are binding for all the EU members, while the directives are implemented through the national legislation of the EU members. In line with the Regulation on Genetically Modified Food and Feed, 48 GMOs of different plant species are approved to be put on the market, providing that each of the approved GMOs need to be labelled in line with the Regulation on Traceability and Labelling.

On October 30, 2015 10 EU members requested the GM production exemption, decision was suspended until further notice.

Contrary to some other competing countries (NMS and CEFTA), Serbia has always tended to adopt extreme solutions in relation to GMO – both when it was the first country to regulate trade in these products, and when it prohibited GMO to be put on the market.

Serbia was the first country in the region to regulate trade in and production of GMO

Initial legislation (Law on GMO and its By-Laws) was adopted on the level of the Federal Republic of Yugoslavia in 2001, and it was applicable from 2001 to 2009. At the time of this Law's adoption, Serbia was the first country in the region which regulated trade in GMO on its territory. 2001 Law was in line with global standards and EU legislation and it facilitated applying for license for all types of GMO application (experimental work, commercial cultivation, putting on the market). Even though the Law provided for it, not one license was issued in this period for commercial cultivation of GMO, or for putting GMO on the market for the purpose of human nutrition. What was approved to be put on the market, as animal feed, either on its own or in products, was soybean meal made of GM soy (type of modification: tolerance to total herbicide glyphosate, commercial name: Roundup Ready). This soybean meal is a product which is not a living modified organism and does not entail environmental risk, and as such it cannot be used for human nutrition. A few licenses had also been issued for experimental work, strictly controlled field experiments in scientific institutes, respecting all physical and biological barriers necessary to prevent the contact between GMO and the environment.



2009 Law prohibited commercial cultivation of GMO and putting on the market of GMO and GM products.

The Law on GMO currently applicable in Serbia was adopted in 2009 ("Official Gazette of the Republic of Serbia" No. 41/2009). In its article 2, the Law prohibits commercial cultivation of GMO and putting on the market of GMO and GM products, while all the remaining articles regulate the area to which the Law is applied. The Law was also not harmonized with the Law on Food Safety. The Law is taken to be controversial due to the fact that immediately after the prohibitions introduced in article 2, in article 3 it defines exceptions from this Law. Article 3 reads: "Agriculture products of non-animal origin are not considered genetically modified organism if contain up to 0.9% threshold of genetically modified organism and impurities of genetically modified organisms. Seed and reproductive material are not considered genetically modified organisms if contain up to 0.1% threshold of genetically modified organisms and impurities of genetically modified organisms." Such definition of article 3 enables potential import and putting on the market in the Republic of Serbia of the products containing any genetic modification (including those which are still in experimental phase, i.e. are not allowed to be put on the market anywhere in the world), since an agricultural product of herbal origin is not taken to be GMO if it quantitatively contains up to 0.9% of genetic modification, while seed and reproductive material may be imported and put on

the market if it quantitatively contain up to 0.1% of genetic modification, as this is not defined as GMO (i.e. a shipment of 100 tons of seed material may contain as much as 100kg of GMO seed, according to Article 3, which is enough to sow 1ha with soy). Article 3 represents an example of a poor and imprecise interpretation of the EU regulations. Therefore, it may occur that seed material containing GMO (up to 0.1%) is imported and used for sowing. In this case border phytosanitary inspection cannot react on the border and ban the import of the seed, in line with article 3, since such seed is not prohibited by the law, i.e. it is not taken to be genetically modified. On the other hand, as this crop grows and Internal Phytosanitary Inspection suspects that this is GM crop and samples it in the field, while the report of the authorized laboratory confirms this suspicion, the problem of illegal GM crop occurs - i.e. we have illegal commercial cultivation as defined in article 2.

Recommendation of the WTO and EU is to harmonize the existing law with the EU legislation

The law, with the provision which primarily prohibits putting on the market of GM and GM products is unacceptable from the points of view of the World Trade Organization and the European Union (primarily of the Directorate General for Trade - DG TRADE, as well as the Directorate General for Health and Consumers' Affairs - DG SANCO). This prohibition bans trade in goods, i.e. those GMO and GM products which have already been approved to be put

on the market, primarily on the market of the European Union, which is also in conflict with the WTO Agreement on Free Trade. Therefore the World Trade Organization and European Union insist for Serbia to eliminate article 2 from the Law on GMO. It is recommended for the present Law to be amended as soon as possible, i.e. for articles 2 & 3 to be erased and the Law harmonized with the EU legislation in the field.

Amendments to the Law on GMO and its harmonization with the EU legislation and the WTO agreements does not imply commercial cultivation of GMO, since new EU legislation leaves this decision to each individual state. As far as putting on the market and trade in GMO are concerned, each individual instance of GMO and required use of GMO need to be approved separately, so a substantiated explanation can always be found to explain why certain

GMO cannot be approved to be put on the Serbian market (with a scientific argumentation by the Expert Council for Biological Security – a counselling body consisting of 18 experts from different scientific disciplines). In case a decision is adopted on the prohibition of trade in a GM products (i.e. soybean meal), it needs to be proven that such soybean meal represents a hazard to the health of people and animals in Serbia.

Values and beliefs of the consumers need to be respected

More and more agricultural producers would need to conform to the ever evolving demands of the consumers. Consumers are increasingly concerned with the health safety of food and the assessed riskiness perceived in genetic modifications has to do exactly with this issue. Young, educated people with higher salaries, urban consumers and

Graph 31: What is the purpose of quality labels? (results of the poll)



women are increasingly interested in health safety and quality of food. Confidence in safety is established through long term acquaintance with the producers or attaining certain standards.

Introduction of innovations which are not in line with the beliefs of consumers represents a major risk. According to the research which was realized in 2014 under the EBRD/FAO project entitled Improvement of Quality and Safety of Products in the Sector of Meat Processing in Serbia, the most important issues for the consumers in Serbia are that a product possesses better quality of food and contains natural ingredients, while the aversion towards GMO is in the third place. Apart from the aversion towards GMO, the other significant requirements by the consumers include products without additives, secured quality monitoring by the state, as well as better taste of a product.

Conclusion

Serbia tended to apply extreme solutions in its GMO legislation and it is high time that the Law is harmonized with international legislation and that GMO is no longer a political issue. Monitoring of the EU legislation and its application with a few years' delay provide Serbia with a possibility to make decisions which are economically beneficial not only for the processors and industry, but also for the producers of soy, feed, meat, milk and eggs. A rational analysis of the economic effects, as well as of the values and beliefs of the consumers need to inform the guidelines for future decisions.

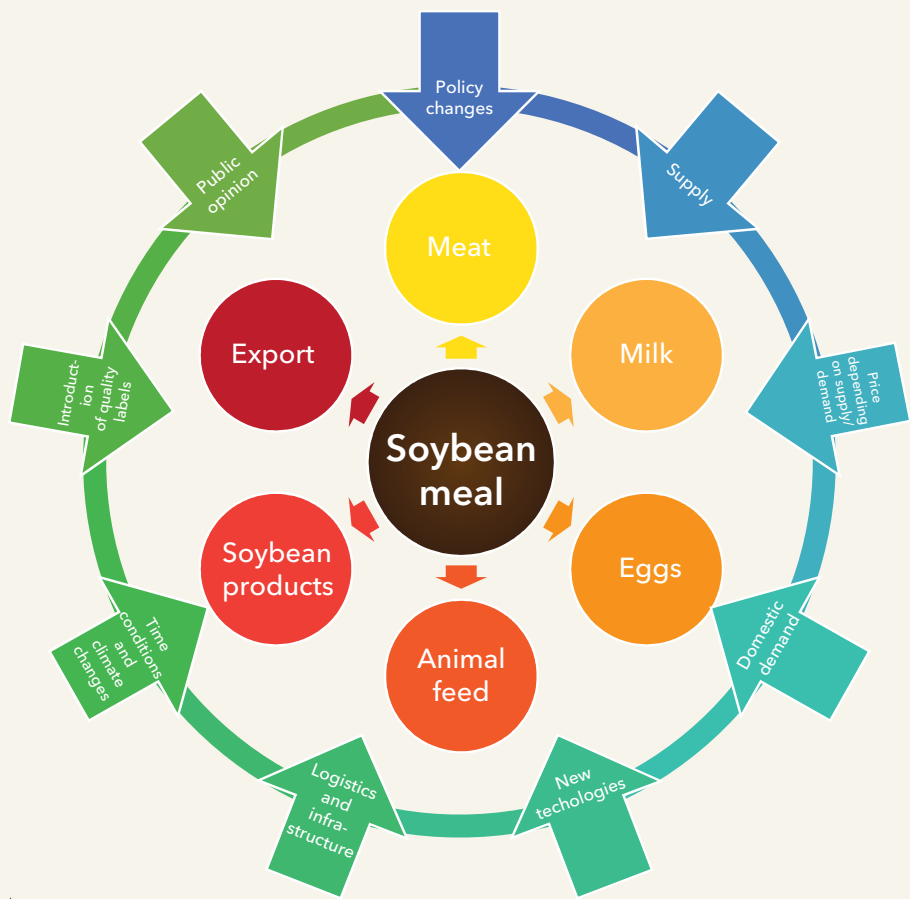
ANALYSIS

The basic aim of this Analysis is to identify potential effects of liberalization of the Law on GMO on soybean market in Serbian. The correlation between the market chain of soybean production and processing with other market chains, primarily those which use soybean the most, such as meat, milk and egg productions, results in the fact that this legislative change would have its effect not only in the soybean market chain, but also in those of the related productions. Furthermore, not only that soy influences these market chains but they also in turn influence the demand for soy and its products. Apart from these influences on the market, either direct to the soybean market, or indirect to the related production sectors, the liberalization would also have its non-market related effects. Therefore, to measure the effects of the Law on GMO's liberalization, it is necessary to review the entire context and all the related production sectors, and measure and assess all its consequences and potential results. The only thing which is certain is that in case the Law is amended, the possibility will occur for soybean meal to be imported. This possibility does not imply that the import shall commence, so all further points of the Analysis are based on assumptions which have been reached by analyzing the facts and the expected behavior by the stakeholders in the market chain.

The first part of the Analysis raises the questions and offers the answers to those questions which are bound to have the greatest influence on the mar-

ket, the second part is focused on the influence of these changes to individual market chains, while the final part includes looking at the options and their probability.

Illustration 1: Effects of liberalization



The only thing which would definitely be amended in liberalization of Law on GM would be to allow the import of the GM soybean. In the second circle is the impact of liberalization on related markets, and in the third is impact of others factors on soybean market and related markets-and such define possibility and quantity of import of soybean meal

VIII. INITIAL ASSUMPTIONS

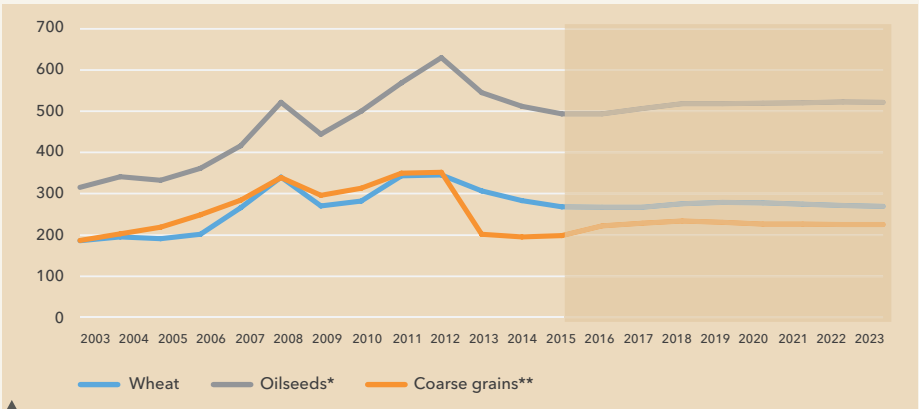
In this section some “big” questions are being raised, while the answers are provided as the most realistic options are stated in the conclusion to each subsection. These options are subsequently taken to be initial, most likely assumptions for the purpose of further analysis of the effects. The questions were selected in the interviews with the stakeholders in the market chain.

What will be the global demand for soy and soybean meal, how it will compare to other crops and, subsequently, what will be the price of soy and soybean products?

Many of the incentives which influenced the increase in the production of soy are no longer prevalent. Dollar rose, the demand for biodiesel decreased since the price of fuel is low, South American countries and Russia do not grow at the pace which was

characteristic for them in the previous decades, so they have less means for investments and infrastructure, the funds are being withdrawn from this market, etc. Furthermore, in the market context each excited system (and the demand for, supply and the price of soy in the previous years have been taken to comprise such system) tend to return to the initial state under the pressure of the opposite factors than those which spurred the changes. It is therefore logical to expect that the surface area sowed with soybean would increase, as a reaction to the incentive of potentially high profit, or on the other hand, that a decrease of consumption shall occur as a reaction to the incentive of a high price. This means that the entire economy implies managing different incentives, yet the reactions to these incentives are what stirs the economy in a particular direction and it is expected that the reaction would favor the decrease in prices.

Graph 32: Anticipated price according to the USDA, FAO and OECD



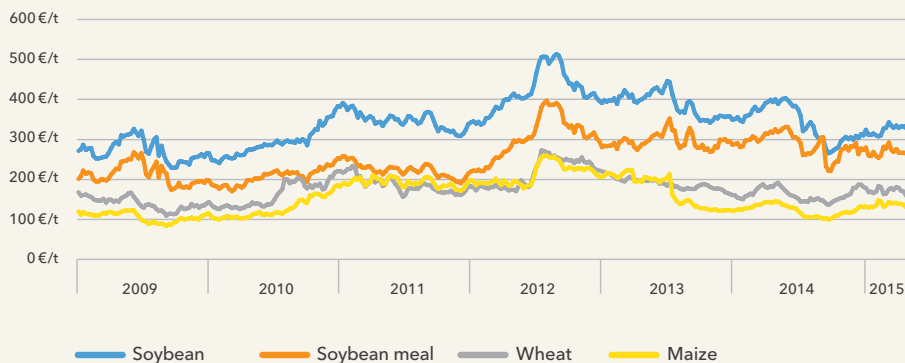
The price of the oilseeds, primarily soybean, would continue to be the highest. A slight increase of these prices is also expected in the following period, so compared to the leading cereals this difference would be even bigger in favor of soybean. Source: FAO, USDA, OECD

On the other hand, it is anticipated that the main impetus for the growth – the increase in the demand in China – would lose some of its momentum, but nonetheless continue to gain strength. It is anticipated that in the season of 2015/2016 the global trade would increase by 5% and amount to 122 million tons, with the entire growth being based on China whose total import would reach 79 million tons. It is also expected that by 2024, it would increase by additional 5-8% and would reach 82.6 million tons of oilseeds. In that case, the export rates of the USA and Brazil need to amount to 49 million tons each, in order to cater to this demand.

This growth can easily be provided for by production. However, the decision on the production would depend not only on the expected price and profit, but also on the profit expected of the

competing crops, in the case of soybean – the profit made by cereals. In case the prices of and profits earned from cereals are low, then producers would sow soybean. By increasing the production of soy, its price would fall. Conversely, if the expected prices of cereals are good, producers would opt to grow them rather than soy, so the decreased supply would influence higher prices of soybean. This implies that there is a clear correlation between the prices of the final products of the competing crops. The only things that vary are the timeframe in which one reacts to an incentive and potential annual specificities, but the correlation is undeniable. Low price of the cereals influence the decrease in the prices of oilseeds. Inverse influence does exist, yet it is weaker, since oilseeds are sown on significantly smaller surface area than cereals.

Graph 33: Weekly prices of wheat, corn and soy on the CBOT



▲ The correlation between the prices of cereals and oilseeds on the global stock exchange markets is obvious, so it is easy to conclude that the price of soybean would be influenced by not only the demand for soy, but also the production of cereals.

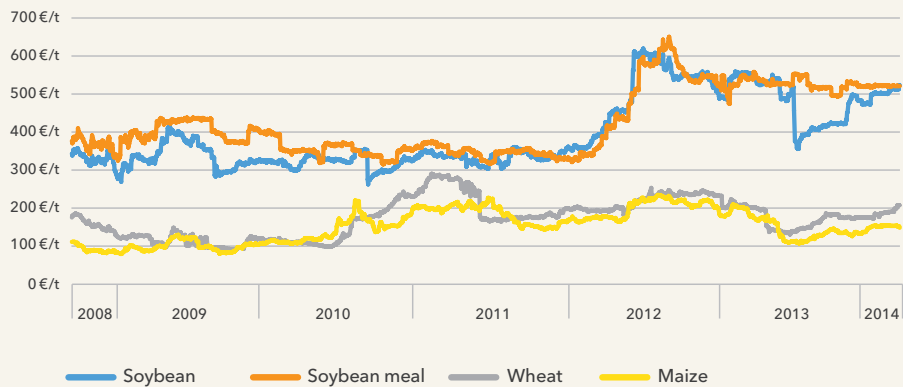
Source: CBOT

We see that the global price of soybean primarily depends on the demand and correlation with cereals. What is the situation like on a small, closed and export oriented market such as Serbian? This dependency present on the global market of both soybean and cereals still exists, yet it is much less prominent since it depends on a number of local limitations, where the behavior of one or two of the mill exists, yet it is much less prominent since it depends on a number of locajor stakeholders in the market chain may significantly distort market rules.

in the prices of cereals and continuation of this trend. Long term trends in the production of and demand for cereals indicate their increase and that the prices will plateau at a level which is somewhat lower than the current. It goes without saying that these productions would have annual variations, primarily due to weather conditions which influence these productions.



Graph 34: Weekly prices of wheat, corn and soybean on the Product bursa stock exchange market



▲
Source: PRODEX

The exchange market season of 2014/2015 was the record one when it came to the production of cereals, with the surplus stock amounting to more than one fourth of the overall production. Predictions for 2015/2016 include a slight fall in the production, yet the stocks are at their highest in a decade. Such situation indicates expected fall

Conclusion

It is expected for the price of soybean to start falling in spite of the continued growth of demand in China (a trend which is slowing down) since the rate of production would increase due to the expected low prices of cereals. Serbia would follow these trends up to a point.

What is the expected demand for the GM FREE soy and soybean meal in the Danube region?

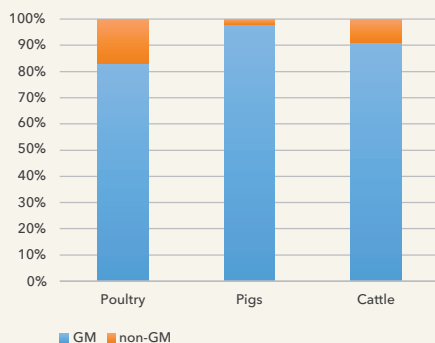
A significant number of European consumers are worried because of the use of genetic engineering technology. Furthermore, certain countries see their economic chance in this and thereby develop strategies according to which GM soybean would not be grown, with the additional plan to increasingly use the soybean produced in Europe and to use less GM soy. This is the main impetus for the growth of demand for GM FREE soy. Out of the overall demand for soy in Europe amounting to 40 million tons – the demand for GM FREE soy is 5.5 million tons and expected to increase to 6 million tons in the next 3 years.

- The demand grows and is expected to continue to do so, based on the concerns of the consumers, yet this growth is limited. Following are the reasons for this limitation:
- Europe is the greatest exporter of pork in the world and it can retain its price competitiveness only through availability of the cheapest inputs;
- Europe largely depends on the import of soybean meal due to the size and importance of livestock production but does not have chance to change this fact. For example, if the Netherlands would seek to satisfy its need for soy through its own production, it would need 700 thousand ha, or

more than a half of all arable land in the Netherlands, the surface area on which much more valuable crops, such as fruit and vegetables, are currently grown;

- Not all consumers in the EU are concerned because of the use of GM products;
- The most of the EU consumers are not ready to pay higher price for such products.

Graph 35: Share of GM FREE products in the total products



Poultry production sector still somehow resists to the use of genetically modified feed, while the nutrition of pigs is almost entirely based on the feed which contains GM components.
Source: Danube Soya Market Information

Conclusion

The growth of demand for GM FREE soy and soybean meal in the Danube region is evident and will be faster than the rise in the global demand for soybean. However, this growth would have its limits.

What trends are expected in the production of the soybean in the region?

A significant growth is expected. The trend is already evidenced in the substantial growth of the sown surface area. The main impetuses for the growth are:

- Fulfilment of the Protein Strategy of the EU and subsidies by the states;
- Increased demand in the region for GM FREE soy and especially soybean meal produced in Europe;
- Recent and expected investments in the processing capacities;
- Trend of increased demand for the proteins from the local/regional production.

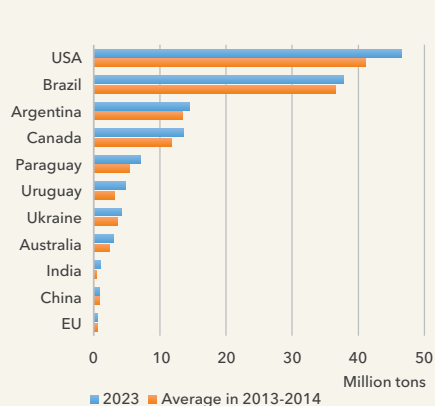
Increase in the demand would be defined by the interest to grow soybean and its profitability in comparison to other crops. There are justified expectations that this is not going to be substantial and that the growth in the production is thereby bound to be limited due to the following factors:

- Expected decrease of the price and premium for GM FREE soy;
- Results which are worse than expected, due to the lack of experience in cultivating soy, maladjustment of the assortment to the conditions, lack of adequate mechanization, etc.;

- Soy is more of an extensive crop and it requires large surface areas (USA, South America, Ukraine) and yields little profit per ha, so the very structure of farms and farmland is not adjusted to this crop;
- Competition by other products and already established market chains.



Graph 36: Assessment: Global leaders in exporting oilseeds in 2023 in comparison to the current export



▲ The assessment made by the OECD and FAO

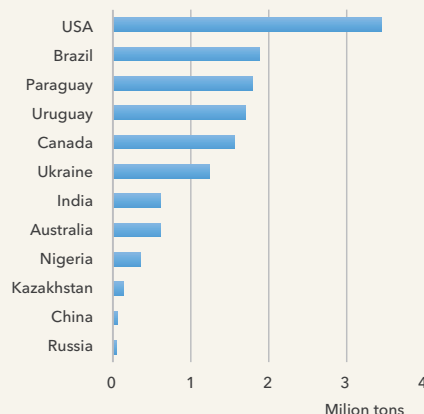
Despite the impetuses for the growth in the demand for soybean which exist in Europe, the FAO and OECD do not expect that this demand would significantly increase, or influence the global market, but rather expect continuation (with gradual slowing down) of the increase in production and export by the countries which possess large surface areas of land (South America, USA, Ukraine, Kazakhstan).

To what extent could Serbia be competitive in soybean production, in relation to both other countries and other crops?

Everything indicates that Serbia in the conditions of high prices on the global market, and even higher on the domestic market, has a competitive production and likely to sell the entire production with the prices which are even higher than globally. The main indicator for this presupposition is the increased production. However, it is still questionable whether Serbia is really competitive in an entirely open market.

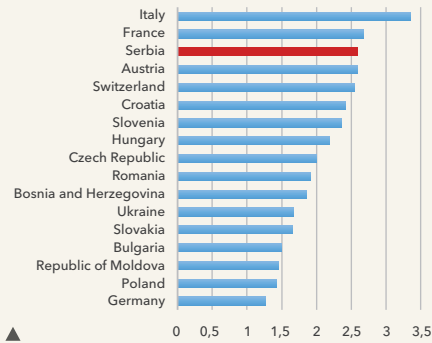
Competitiveness is hardly measurable and changeable category. This is par-

Graph 37: Assessment: the greatest growth in the export of oilseeds between 2014 and 2023



ticularly true for the agricultural competitiveness influenced by a number of different factors, which can thoroughly change with the shift in just one of the influencing factors. This factor can be directly related to production, including weather conditions, prices of inputs... but also fully unrelated to the immediate agricultural environment (exchange rate of dinar, taxes, and harvest in other countries). Competitiveness also depends on the context in which it is perceived, i.e. the width of the perspective. Serbia may be the most competitive country when it comes to the production of soy in Europe, but when compared to the global forces of the USA, Brazil and Argentina, it may end up among last.

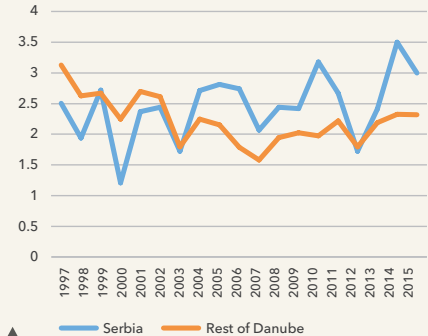
Graph 38: Average yield of soybean (2005-2014)



According to yield, Serbia came third in the period between 2005 and 2014, right behind Italy and France. Source: FAO

Cost price is certainly the best indicator of competitiveness. It largely depends on the investments in knowledge and equipment, costs of inputs and the scope of production and investments. Average yields in Serbia are among the highest in Europe, and higher than

Graph 39: Yield trend in Serbia and the remainder of the Danube region



The yield in Serbia has been dramatically growing since 2012
Source: FAO

those in the USA and South America. However, the unit costs of the inputs and production on large surface area, along with the stable business environment and availability of financial means tend to guarantee competitiveness regardless of the lower yields.

Table 7: Assessment of the availability of the resources and services in the production of soybean

	South America and the USA	Danube countries of the EU	CIS countries	Serbia
Access to high quality inputs	XXXXX	XXXXX	XXX	XXXX
Available work force and its costs	XXX	XX	XXX	XXXX
Subsidies and predictability of the policy	XX	XXXX	X	X
Access to finances	XXXX	XXXXX	X	XXX
Knowledge and experience	XXXX	XX	X	XXXX
Level of investments	XXXX	XXX	X	XXX
Vicinity of the market	X	XXXXX	XX	XXX
Volume of production and size of the plots of land	XXXXX	XX	XXXX	XX

The most important advantages that Serbia has when compared to its competition are knowledge, experience and the related level of investments in the production and processing of soy.

The most important advantages that Serbia has when compared to its competition are knowledge, experience and the related level of investments in the production and processing of soy.

In the narrow sense, competitiveness is defined as the capability of an individual, company, sector, region or country to sell certain goods and services on the given market. Furthermore, competitiveness of an individual and that of a country are two different things. The number of competitive individuals defines competitiveness of the country. In this sense, it is important that in Serbia the best producers have interest to cultivate soy. They would have interest in case they expect soy to return a bigger profit than some other crops. Thereby competitiveness in the production of soy would largely depend on the expected profitability of other crops, primarily cereals.

Table 8: Comparative net margins of soybean, corn, sunflower seed and wheat in Serbia in the conditions of intensive production

Indicators	Wheat	Corn	Sunflower seed	Sugar beet	Soybean 2014	Soybean 2 -15% of the price
Total production value	697	1,142	736	1,801	1,167	992
Price of inputs	391	459	414	1,187	458	458
Comparative margin	306	682	322	613	708	533



Gross margin of soybean is averagely in line with the other crops, in the case of intensive production. An exception was 2014, when, due to the extremely good price, the profit was larger than that generated by other crops, regardless of the standard costs of inputs.

Compared to other crops, it is evident that soybean does not have great profitability in average years, yet since it entails small costs, producers are ready to cultivate it, especially in those years when the access to finances is hindered and lower prices of cereals are expected.

Conclusion

Serbia has competitive advantages in cultivating soybean when compared to other European countries, mainly related to the long experience of cultivation and the existing investments into the production and processing. On the other hand, when compared to the USA and South America, Serbia has an advantage of the proximity of the market. In the average years, Serbia is able to find its place on the map of soy producers in case the best producers decide to cultivate it, which is often not so, due to the competition of other crops. Thus soybean remains the option for those who plan smaller input costs.

What will happen with the domestic demand for soy and soybean meal?

Domestic demand can be satisfied through domestic production and import. What part of the demand would be satisfied in which way depends on a number of factors, the most important of them being competitiveness of the product and tariff and non-tariff barriers. Domestic demand for soybean primarily depends on the purchasing

power of the population, as well as on the possibility to increase processing, which in turn can actuate another type of demand. Bearing in mind the trends thus far, as well as the experiences of the NMS, overall domestic demand on the related markets would be slightly falling in the next few years. The steepest fall is expected when it comes to the productions of feed, pork and milk, while an increase is expected in the sector of poultry production.

Table 9: What will happen with the domestic demand for soy and soybean meal?

Sector	Assessment of the demand for soy	Demand impetuses
Total	Slight decrease	<ul style="list-style-type: none"> (-) Purchasing power is at the status quo, or slightly weaker and it is expected that it would not grow significantly enough to stimulate an increase in the consumption of meat, milk, eggs and meat products (-) Continued depopulation of Serbia (-) Higher prices of products in the majority of the related productions which decrease demand
Meat products (as impetus of the demand for pork, poultry and beef)	Stagnation of the demand, but also increased export and slight increase in the demand for the products which pursue quality rather than price competitiveness	<ul style="list-style-type: none"> (+) Pressure of the import from the CEFTA and EU countries is rising - either legal or illegal which lowers the price and simultaneously increases the demand which is in turn compensated for through the increased import. (-) Concerns of the domestic consumer pressured by public opinion ("Serbian companies import meat of a poor quality and make product out of that meat") directed against domestic processors (+) Expected increase in the demand for superior quality products as a consequence of strategic positioning of the domestic processors, concerns of the consumers and introduction of quality labels
Production of pork	Remains at the same level due to the lower prices	<ul style="list-style-type: none"> (-) Continuation of the trend of slight increase in import at the expense of domestic production (+) Expected return to the CEFTA market, since domestic price would substantially decrease* (+) Sensitivity of the consumers which would lead to a number of non-market restrictions and favoring of domestic production
Production of feed	Remains at the same level in the short term, while it decreases in the long run	<ul style="list-style-type: none"> (-) Disappearance of the small producers which are the main buyers, in favor of large scale producers (+) Announced foreign investments would initially serve to buy animal feed, which will compensate for the loss of market which occurred with the disappearance of small producers (-) Expected decrease of the price of cereals on the global market would diminish the level of investment into inputs and subsequently the yield and production of cereals
Production of poultry	Increased demand	<ul style="list-style-type: none"> (+) Increased demand for poultry (+) Some of this growth would be provided for with the high quality free range poultry (-) Irregular market with many oscillations which negatively influence stability
Production of milk	Slight decrease	<ul style="list-style-type: none"> (-) increasing pressure from the EU import, due to the abolition of the production quota in the EU (+) Introduction of the protection clauses within the SAA, which would influence the decrease in import (+) Less interest in the production of milk in Bosnia and Herzegovina, subsequent decrease of the production and expected decrease in the export to Serbia (most of the milk is imported into Serbia from Bosnia and Herzegovina)

*The biggest unknown is the arrival of the German meat manufacturer Tönnies - and their market orientation, i.e. whether the meat would end up on the domestic or Russian market. The reasons which indicate that this meat would be sold on the domestic market, at the expense of the medium meat processing companies which are less competitive, include: primarily higher price of pork of around 20% on the domestic market, but also expensive transport to Russia, impossibility of export to the EU in the next 6-7 years at least, experiences of the investments in other countries...

Conclusion

The overall domestic demand in the related markets would slightly decrease in the next few years.

What are the expectations when it comes to the price of soy in the region?

The price would depend on the supply and demand in the region, as well as on the global trends. The FAO and OECD in their 2014 Study envisage that the price of soy would be decreasing slightly and be maintained at the high level (see 37). However, it is highly likely that the prices in the region would fall. The indicators for this include:

- Constant increase of the production in the region, rising at the same pace or even faster than the demand
- Considerable stocks and the expected fall of the prices of cereals, which influence increased production of soy (due to the less interest in growing cereals), but also due to the interrelation between the prices
- Significant subsidies for soy in the region, causing the decrease in the price
- Decrease in the related productions (meat, eggs) in the region

Conclusion

It is expected that the price of soy in the region would fall and stabilize when compared to the previous three years, just like the level of the GMO FREE premium.

Is it possible for any great discrepancy to occur between the prices of the GM FREE soybean in Serbia, GM FREE soybean in the Danube region and the global price?

Serbia - World: Serbia is a small and closed market which has by now kept the price of soybean on a level which is higher than the global. Trend of prices in Serbia followed the global prices but the values were occasionally significantly different. This indicates that the trade in soybean is not sufficiently integrated and that, when it comes to prices, domestic influences are the dominant ones.

World - Danube Region: The price of soybean in the Danube region follows the global price, with a possibility for periodical bigger or smaller discrepancies to occur between the prices of GM soy and GM FREE soy, i.e. in the cost of premium. However, the trend is for these prices to be kept on the economic level of 20-40 USD per ton.

Danube region - Serbia: the price in Serbia has not thus far followed the price in the Danube region, and was higher. It is expected that the prices would become harmonized, at the expense of lowering the Serbian price.

Conclusion

The prices would fall and would depend more on the global prices, both in the Danube region and in Serbia.

Are there any infrastructural obstacles that may limit the import or export?

International transit in/out of Serbia is operated by the Danube and Sava. The Tisa also received the status of an international river. Serbia also has an intricate network of the access canals and the river Begej, which allow goods to be transported to the larger barges. Serbia also has access to the fleet which is adjusted to the transport of soy and soybean meal in both directions.

Conclusion

Despite many problems that burden the price of river transport, Serbia has both capacities and possibilities to transfer its soy to any place in Europe and to import soybean meal from any port in Europe.

What is the probability that the prices in the region and in Serbia would be that high to guarantee profit to farmers despite low productivity?

The case in which the producers in Serbia are not competitive but they still produce soybean because the prices are high enough to guarantee profit is what often occurs, either due to the market rules, or to the market irregularities. These market irregularities may be actuated by different internal and external factors.

Table 10: Potential market and non-market indicators which may influence increased prices in the region

Possible anomaly	Influence	Probability
Non-market issues in the South America (strikes, devaluation of currencies, infrastructural problems)	Significant in the short run	High but short lasting
Prohibition of import of GMO soy by certain countries	Strong - in both the countries in which the prohibition is introduced and in other countries	Low
Escalation of the Ukraine crisis	Decrease in the production and export which would increase the price in the Danube region	Medium
Devaluation of currency in Russia and Ukraine and increased financial instability in the CIS region	Decreased interest in growing, more extensiveness and lower yields which lead to a lower total production in the Danube region	Significant
Crisis in the EU and the crisis of euro	Decrease in investments and consumption, and thereby demand, especially for the more expensive goods possessing quality labels, such as GM FREE products	Medium
Bad macroeconomic situation in Serbia which devalues dinar	Competitiveness and export of the domestic soybean would increase, yet the profit will fall	Low

There is no doubt that in the following period there will be market irregularities. However, their influence on the global level is small, yet increasing, which makes these irregularities become localized on the Serbian market. This implies that some market irregularities in Brazil, Ukraine, EU, etc., may influence the price and market in Serbia, but not so much as decisions which are not market friendly, which are made in the region and especially in Serbia.

Conclusion

Market irregularities, either domestic or external (more frequent) will never cease to exist, but they would not be able to influence the direction in which the market is heading, but only the creation of shorter (more frequent) or longer market anomalies which would have positive (more frequent) or negative impact on the market and the prices of soy and soybean meal in Serbia.

IX. EXPECTED CHANGES

There are numerous influences which impact the effects of liberalization of the Law on GMO. Sum of the strength of influences and the behavior of individual stakeholders in the market chain would define the overall effects. Therefore this section includes the analysis of the predictions pertaining to the behavior, should the environment change. These conclusions were arrived at by analyzing the facts, experiences of others and through the interviews with the major stakeholders in the market, assuming that there would not be major oscillations in the market

(extremely bad years, prohibitions unrelated to the market, etc.) and that the stakeholders would behave in a logical way. Furthermore, certain assumptions were tested in a verification workshop, in which representatives of different market chains presented their expectations.

IX.1. Volume of Import of GM Soybean Meal

The assumption is that harmonization of the Law on GMO with the regulations of the EU and WTO would enable Serbia to import and use GM soybean meal for the nutrition of animals, as this is allowed in all the countries in the world, as well as in the EU. In this way a possibility will be created for GM soybean meal to be imported, which does not imply that this would definitely happen, since this may be prevented by either market related factors (inexistence of the economic interest), or factors unrelated to the market (gentlemen's agreement of the stakeholders in the market chain as is the case in Switzerland, administrative barriers in implementing the law, etc.). However, in case this should happen, and liberalization is allowed, the volume of import needs to be assessed. Whether GM products are going to be imported, and what would be the volume of this import depends on different factors, some of them operating as impetus to the import, while some other hindering it.

Importing impetuses:

- On the demand side - wish to lower the prices among the livestock

breeders, feed producers and meat processors.

- On the supply side – wish to make profit by trading in soy is present among importers and exporters
- The deficit of soybean meal, especially in the case larger quantities of domestically produced soybean meal and soy (directly or in different products) are exported
- Distrust in the system of controlling GMO during the import – “Is that other soybean meal really GMO FREE?”
- A year of “poor” production

Importing thwarters:

- Expensive transport
- A good year with high productivity
- Serbia is self-sufficient when it comes to soy and soybean meal production, all the while having the prices which are higher than the global ones. This implies that there is a buffer of lowering the domestic prices in the case of increased import
- Great competition and highly adaptable extruders’ owners who have room to lower their price and would not disappear that easy, but rather attempt to continue with their work even in the conditions of unfavorable prices

- Situation in the Serbian market allows for the control over the price and import, so that the price may be intentionally lowered in case there is a signal that the import will occur

- In case there is no export (which can become a realistic option in case the trend of falling prices should continue) domestic prices would need to become lower due to the great surplus product resulting from such high productivity
- The lack of capacities for the purchasing of soybean meal at futures, or at par
- Administrative cost of the control of the imported GM soybean meal
- Increase in negative perception of GM products and
- Labelling of the products containing GMO
- Education of the producers to increase the use of GM FREE products

It is indisputable that the greatest impetus for the import would be price difference which is influenced by a number of factors, but also the interest of each individual stakeholder in the market chain, as well as of the certain groups of stakeholders in the market chain.

IX.2. Occupying the Market with GM Products

To what extent would either of these impetuses or thwarters be activated will depend on individual business decisions and vary from sector to sector. Thereby each sector is analyzed separately and behavior of the stakeholders in the market chain is being assessed.

Pig Farmers may stimulate the import

Profitability of meat production depends on many different factors. Production costs which are complex in their own right, are going to increase each year since they would need to

incorporate all the costs of respecting environment protection regulations, labelling, as well as all the costs inherent in respecting the wellbeing of the animals.

Pork and poultry producers are the biggest domestic users of soybean meal, regardless of whether they directly produce their feed, or buy feed concentrate. Thereby their decision whether to transition to GM soybean meal would largely influence the level of import.

Table 11: Whether pork producers would transition to GM soybean meal?

Types of producers	Expectations and reasons
Large scale farms connected to the processing facilities	<ul style="list-style-type: none">• The decision will be taken on the level of the company and would be strictly implemented• It is expected for the price oriented companies to immediately transition to GM soy, while quality oriented companies would initially have the strategy to use GM FREE products, or to segregate their products, while the final decision will be left to the market and would depend on the price difference between these two types of soy.
Commercial pig farmers aiming at price competitiveness	<ul style="list-style-type: none">• As a rule they buy soy for extruding facilities and they practice homemade silage, so their consumption of soybean meal is not significant• Most of those who use soybean meal in the first place would transition to GMO
Pig farmers who produce high quality pigs for known buyers	<ul style="list-style-type: none">• The farms who maintain long term partnerships with some of the processors and who as a rule produce high quality meat on their nucleus farms would reach this decision in cooperation with their partners. These decisions would primarily depend on meat processors and their readiness to segregate and label their products
Small scale farmers producing for their own needs and local market	<ul style="list-style-type: none">• They predominantly use their own feed or buy feed concentrate, and their consumption would depend on the decision of animal feed producers• As a rule, they opt for the cheapest feed concentrate

The factors which would additionally decrease the use of GM soybean meal in pig farming include:

- Ignorance of what a standardized product would involve – would pig buyers pay the premium in case GM FREE soybean meal was used, or would they pay a lower price in case the pigs were not fed GM FREE soybean meal exclusively. Thereby, a fear would be present that a lower price would be received, or that the product would be harder to sell in case it turns out that the standard of the product implies that the animals were fed only GM FREE soybean meal.
- Assessment of individual producers that change in the price is insufficient to justify the change of the partner (soybean meal influences the price by some 20%), so if the difference in price between GM and domestic soybean meal is 10%, then the price of animal nutrition is less than 5% lower, or in other words it participates in the total price with just few per cents, so it is assumed that this would not be enough to motivate the change of partners.
- The biggest soybean processor in Serbia has long and complex trading and partnership relations with many of the pig farmers, especially with those who also engage in crop husbandry
- Possibility to be easily certified as GM FREE meat production, which

many of the producers would want, believing that their meat would achieve a higher price

- Certain meat producers would opt to buy GM FREE soybean meal due to the campaign against using GM products
- Probable campaign which would accompany the purchasing of GM FREE soybean meal, warning that facilities will be contaminated through the use of GM soybean meal and that this might result in losing some future market
- Production of pigs still has enough room for profit in spite of the higher costs (using GM FREE soybean meal) – an average purchase price in the last eight years has been around 1,6 EUR while the cost price has been 1,25.

Conclusion

Even though cheaper imported soybean meal might be introduced in the market, not all the producers would rush to buy it.

Extrusion would remain to be the first option for as long as it exists, for the producers of broilers and eggs

More than any other group of producers, egg producers are pressured by low prices. Big competition, especially in certain parts of the year, forces them to sell eggs at quite low prices, so they often try to cut their price by any means available. Therefore, they were the first

to accept the inferior quality extrusion products, and this would be the very reason that they would be the first to introduce GM soybean meal. Their survival on the market with simultaneously keeping higher prices is possible only if they obtain some quality label for their eggs, which might stimulate consumers to pay a higher price for them. Such labels do exist (organic), yet they are not often resulting from the process of certification, but instead occur due to the wish of the producers to emphasize one characteristic of the production (wellbeing of animals, eco, bio, etc.). These producers will use GM FREE feed offered primarily by extrusion facilities, but also domestic GM FREE soybean meal, since their target group are the consumers who have a special attitude towards food.

Conclusion

Price oriented producers of broilers and eggs would continue to buy feed from extrusion facilities for as long as they are price competitive, and they would subsequently transition to GM soybean meal, while for the producers of quality labelled eggs the first option would be extrusion, followed by GM FREE soybean meal.

Animal feed producers lack a clear strategy and they would base their decision on the price difference

The price of animal feed demonstrates exceptional elasticity, meaning that in the case a certain type of feed is any cheaper, farmers would decide to use it. Furthermore, the farmers are easy to change their supplier as the product is

highly standardized. Additionally, animal feed producers have an interest to decrease their price in order to increase their share on the market at the expense of the farmers who make animal feed on their own. This implies that only one producer who seeks to have competitive prices and therefore begins to use cheaper GM soybean meal, is required for all other producers to have a great interest to follow suit.

On the other hand, controlling the production process of animal feed is very hard in the context in which GM products are present, and it significantly inflates production costs. So the fear of contaminating one's production facilities with GM soybean while the market still might refuse GM products, however cheap they may be, or even the possibility that situation pertaining to the prices might eventually change, leave enough space for the animal feed producers to think well before introducing GM soybean meal into their facilities.

Animal feed producers generally pursue a few different strategies:

- I. Manufacturers who would persistently insist on GM FREE products, either due to their own beliefs about harmful nature of such products, or belief that such approach is strategically good in the long run. The manufacturers, who do not largely use soybean meal, but primarily extruded soy mixtures, would be more ready to adopt this option.
- II. Manufacturers who would seize their opportunity to cut down their cost

price as soon as the cheaper GM soy feed is introduced on the market.

III. Manufacturers who would monitor the situation on the market and would wish to hold on to their GMO FREE status for as long as possible, but who would start using GM soybean meal should the market dictate so. Here we need to distinguish between two sub-strategies: the first consisting of the producers who would segregate their products (large scale manufacturers with separate facilities), and the second of those who would entirely transition to GMO.

The most prominent would be the third category. They would have to endure the greatest challenges during the bad years when they would be under pressure to make good strategic decisions which would take into account not only their short-term, but also long-term interests.

Conclusion

Animal feed producers lack clear strategy and they would base their decisions on the price difference and behavior of the other participants in the market. Only a small number of them would insist on GMO FREE strategy.

Milk producers would switch to GM soybean meal, should it become available on the market

Of all the producers, milk producers would probably be the easiest and fastest to transition to using GM soybean

meal. The reasons should lie in the following:

- Commercial milk producers have big farm as a rule, and they calculate their costs quite precisely, so they would be able to make cost savings regardless of how little soybean meal they use in their feed mixtures
- Soybean meal is used in a small percentage in the overall nutrition of cows
- Consumers are less sensitive to GMO in milk than in meat
- Control of the process and segregation of the product would prove to be quite expensive for the producers.

Conclusion

Milk producers would definitely switch to GM soybean meal, should it become available on the market and be cheaper.

Meat processors realize the potential inherent in labelling their products as GMO FREE, yet they are under the pressure of competition and low purchasing power of the consumers

The situation is dire for the meat processors in Serbia since they are immensely pressured by the competition on the one hand, and low purchasing power and the constant fall in the number of domestic producers on the other. In such environment, those processors which are price oriented have

more success than those oriented towards quality. The solution for this second group of processors is either to enter the lower price category, or to introduce quality labels for the products which would be appreciated by a small number of consumers who possess means and wish to buy superior quality products. Entering the lower price category is significantly harder and more uncertain in the long run. Therefore, the majority of the quality oriented processors would opt to add value to their products through introduction of quality labels. This will include using meat of the animals fed with GM FREE soybean meal. In this respect, there is no doubt that these processors' initial strategic decision would be to either have an entirely GM FREE product range, or to segregate their products. To what extent would this option remain sustainable under the additional pressure of the market, would depend on the business vision and capacities of each individual processor.

There is no doubt that meat processors, especially those quality oriented, would largely influence with their strategies the amount of GM soybean meal imported, since:

- They would establish standard price for pork (premium for GM FREE, or "penalties" otherwise)
- They are the ones who communicate directly with the consumers in supermarkets
- They are able to give impetus to the GM FREE campaign

- They have relatively small costs of control, since they already segregate meat in their factories

Conclusion

Meat processors realize the potential inherent in labelling their products GM FREE, yet they are under the pressure of competition, low purchasing power of the consumers and the costs of product segregation. They can be the main link in the chain of GM FREE products.

IX.3 Increased Control Costs

The basic question when it comes to every monitoring and labelling system is its integrity required for it to inspire trust. If there is a reason not to believe in what a label indicates, then the level of trust in the system falls and it becomes worthless. Integrity of a system is in a direct relation to its capability to check the veracity of claims. It is just this integrity of systems that the interviewees in this Study have no belief in whatsoever. The most frequent question is: Who can guarantee that soybean meal is now really GM FREE? It is evident that the experiences which consumers have with food safety systems are negative. Distrust into entire system would hinder the possibility to segregate productions, as well as monitoring and labelling of GM or GM FREE raw materials.

Monitoring and Labelling of GMO

The only and most likely effect of the potential harmonization of the Law on GMO with the EU legislation would be

the possibility of importing GM soybean meal. The introduction of GM products into the Serbian market, once again in line with the EU legislation, but also in accordance with demands and expectation of the consumers, would have to be accompanied with the obligation to label animal feed (but not meat) in relation to the potential presence of GMO. In the case of introducing the obligation of labelling for GM ingredients, the fact must not be neglected that this would potentially increase production costs to those whose production cycle involves more than one ingredient which may include GMO. The producers would need to monitor the GM status of each ingredient with different suppliers, so this would require additional documentation and might prove to be quite inefficient and problematic, while it would certainly increase the costs.

Segregation and Monitoring of GM FREE products

The very process of segregation and monitoring of GM FREE products would be less demanding and complicated than in, say, Brazil, since products would not be monitored since the sowing, but from the time of import, processing and trade. Animal feed producers would have additional costs, both in the case they mandatory need to label GM products, and when wish to maintain their GMO FREE status. Increased costs would also be borne by soybean processors, since the risk of contamination would be augmented. Additional activities would include testing, separate storing, manipulation, transport,

labelling and preparation of additional documentation. Animal feed producers would have to introduce two separate production lines if they deal with both GM and GM FREE soybean meal, or to opt for the strategy of spatial or temporal segregation. They would probably need to specialize in either GM or GM FREE material in a production, or storage facility. Demand for GM FREE animal feed would determine economic profitability of each strategy.

The very labelling of animal feed would discourage some of the meat producers (small and medium scale producers) who have resistance towards using GMO, and some of the large systems with QM which would monitor the introduction of GM products into production. It is assumed that the costs of the organic production (which includes GMO FREE) would increase, since the risk would increase that the chains of soybean and animal products are contaminated with GMO.

In order to preserve the identity of GM FREE soybean, processors established a procedure for preserving the identity of GMO FREE origin (Identity Preserved (IP) program) which is controlled by certification houses.

Segregation and monitoring activities are implemented through a great number of written procedures during purchasing, selling and storing of GM and GM FREE products. Specific procedures are also undertaken when unloading GM FREE soy from ships. These are checked by an independent accredited inspector who verifies all doc-

uments, describes the entire process in his/her report and takes a sample for analysis. During the entire process of transport and transfer from one to another transferring machine or vehicle, these vehicles or belt conveyors should be used for GM FREE goods only, and be supervised at all times. In order to eliminate the remains of GM on the unloading elevators, it is usual practice to first manipulate a smaller amount of a GM FREE product in order for potential contamination to be washed off. According to the IP standard, all loading and unloading equipment needs to be examined before a delivery of a GM FREE product. Transport of these products from the importers to their clients (i.e. feed producers) is usually performed by trucks. There are procedures for loading/unloading of the trucks, including cleaning of the compartments and loading tools, compliance of the product and transfer of documents.

The system of identity preservation is not based on the testing of final product. Preservation of identity includes a system of standards, records and checks, which needs to be established throughout the entire process of production, harvest and manipulation of, as well as trade in certain products.

Coexistence

The principle of coexistence which assumes that GMO and GM FREE crops can be simultaneously grown, was introduced in the EU as early as in 2003 through the Recommendation of the European Commission 2003/556/EC. It was left up to the member states to

decide whether and in what way they would regulate this coexistence. Similarly, in Serbia, the state should, in line with its strategy, introduce different rules of coexistence, to significantly increase the costs and even discourage those who would decide to import and put GMO on the market.

Table 12: Assessment of the price premium per kilogram of product in € cents, for different standards (Van Gelder, J.W., Kuepper, B., Vrans, M. (2014))

	RTRS	GMO FREE	ProTerra	Organic
Box of 10 eggs	0.1*	3	4	8
Chicken 1.2 kg	0.2	7 (8)	8	16
Pork 1 kg	0.14		5	11
Beef 1 kg	0.18		7	14
Cheese 1 kg	0.1		3	7

▲
*€ cents

The assessment of the increase in value per kilogram of a product was calculated by the authors based on the expected premium per ton and amount of soy needed for the production of 1 kilogram of a product. For the RTRS soy, it is expected that the price of thus certified soybean would be higher by 0.3 - 0.9%, or 1.5 - 4\$/t. For the RTRS soybean meal, the premium in 2013 was 2 - 4\$/t. Premium for the ProTerra certified soy have been estimated at 20 - 25% (100\$/t), up to the maximum amount of 150\$/t. On average, 95% of the value of the ProTerra premium

is based on GMO FREE status, while the remaining 5% is the standard itself (5-7\$). The greatest assessed premium for GMO FREE is 140\$, which was the amount reached in 2013/14, yet in 2014 the premium was significantly lower. In the previous years, the premiums for organic soybean ranged 59-89% (averagely 300\$).

Conclusion

Introduction of GM soybean meal and putting it on the market in Serbia would result in the segregation costs for animal feed producers, the costs of labelling GM products and an increased risk in the process of certification of GM FREE soybean meal, since the risk of contamination will rise. There are a few options when it comes to the changes in the costs of certification: (1) the costs of certification will not increase, especially for the IP Programme, since all the procedures are already being implemented comprehensively, (2) certification will be implemented more carefully, the chain will be at risk of contamination and the risk will thus be increased that a portion of the product would not eventually be declared GMO FREE, (3) some "laidback and meaningless" version of labelling will be introduced at once, since all the stakeholders in the chain will be aware that the state has no capacities for monitoring.

Increased costs of GMO control can be significantly higher than the profit made through the price difference of domestically produced GM FREE soybean meal.

X. EFFECTS OF LIBERALIZATION

It is realistic for one of the following three options to be realized when it comes to the import of soybean meal:

- **Option 1:** the import of GM soybean meal does not occur or is minimal
- **Option 2:** the import of soybean meal peaks at 10-20% of the overall needs
- **Option 3:** the import of soybean meal significantly increases

Table 13: Effects of liberalization

Description	Preconditions	Effects on the market of soybean
Option 1: the import of GM soybean meal does not occur or is minimal	<ul style="list-style-type: none"> • Import premium for GM soybean meal is to be small, or at the expected level of 30EUR per ton • The price of soybean on the global market remains high so that Serbia is able to produce price competitive soy • Almost all of the stakeholders in the market chain decide to build their strategy on GM FREE products and stick to it • Major soybean meal retailers decide not to import due to a gentlemen's agreement, or their own interest/fear 	<ul style="list-style-type: none"> • Soybean producers have good prices • Due to the higher prices on the global market the export rises, but also the scope of processing soy in to soybean meal for the domestic market -Possibility of export of meat processed products and import of GM FREE soybean meal • Increase of the production to the level of self-sufficiency • The costs of control remain low • The price of soy for the producers remains higher than in the region
Option 2: the import of soybean meal peaks at 10-20%, or of the overall needs	<ul style="list-style-type: none"> • The price of soy on the world markets decreases still • Certain stakeholders in the market chain opt for import (retailers, meat or animal feed producers) • The price difference between domestic and imported soy is higher than the price of transport • Big consumers of soybean meal do not use GM soybean meal, but mainly those small price oriented producers 	<ul style="list-style-type: none"> • The interest of soybean producers to introduce quality labels increases • The price of soybean becomes equal with price in region
Option 3: the import of soybean meal significantly increases	<ul style="list-style-type: none"> • A significant decrease in the global price • The increase in export due to the lower price on the domestic market which would thereby fuel the import to provide for the missing quantities • Change of strategy by some major stakeholders and their decision to use GM soybean meal in their production chains 	<ul style="list-style-type: none"> • The price of soybean becomes equal with price in region • The production is slightly diminished • Extrusion is reduced • The export of soy by the retailers is on the rise

The most realistic is the second option, due to all the reasons comprehensively elaborated in this Study: starting from the decrease of global demand, increased production in the Danube region, the ways in which market chain in Serbia functions and is organized, demand by the related productions, competitiveness of our producers, worries

of the consumers, down to individual business plans and relations, i.e. irregularities on the domestic market...

The first option is also possible, in case the state decides to implement the strategy of the import obstruction, thus stimulating an agreement between the producers and retailers to maintain sta-

tus quo with an aim to promote predictability of the market.

The major challenge in the future would be the occurrence of a bad year in terms of production, which might re-

sult in moving on from the first to second option, or from the second to third. Therefore it is logical to conclude that the weather conditions would largely influence the behavior of the stakeholders in the market chain.

Table 14: Effects of liberalization

Description	On the market of soy and soybean products	On meat production	On the processing of meat products
Option 1: the import of GM soybean meal does not occur or is minimal	<ul style="list-style-type: none"> Due to the higher prices on the global market the export rises, but also the scope of processing soy in to soybean meal for the domestic market Decreased export of the soybean products Increase of the production to the level of self-sufficiency There is little interest for GMO FREE label, since it is assumed that all the domestic products are GM FREE The export products establish their label The price of soy for the producers remains higher than in the region 	<ul style="list-style-type: none"> The price of meat is higher than in the region A portion of the meat industry introduces a quality label The production of meat decreases at the expense of importing cheaper meat of GM fed animals The import of meat products continues The structure of meat producers changes - medium producers disappear 	<ul style="list-style-type: none"> Orientation towards imported meat A portion of the meat industry would capitalize on the fact that they use domestic meat and have higher quality, once quality labels are introduced Export of the meat products made of the meat of the livestock which was not fed GMO feed
Option 2: the import of soybean meal peaks at 10-20% of the overall needs	<ul style="list-style-type: none"> The interest of soybean producers to introduce quality labels increases 	<ul style="list-style-type: none"> Large scale farms of pigs and poultry transition to GM soybean meal Price oriented meat producers transition to GM soybean meal Quality oriented producers which possess processing capacities segregate their production 	<ul style="list-style-type: none"> Quality oriented processors make a strategy of monitoring and certification of products introducing quality labels
Option 3: the import of soybean meal significantly increases	<ul style="list-style-type: none"> Export of GM FREE products rise The production is slightly diminished Extrusion practically vanishes and those quantities are used to produce soybean meal in the production facilities The export of soy by the retailers is on the rise 	<ul style="list-style-type: none"> The production is increased for the purpose of export on the CEFTA market Some of the farms opt to try and receive quality labels Big farms follow the dictate of the price and always use cheaper soybean meal A portion of the meat industry introduces a quality label and values the fact that the livestock was not fed GM soybean meal - for the domestic market, but they also find export markets 	<ul style="list-style-type: none"> A portion of the meat industry would capitalize on the fact that they use domestic meat and have higher quality, once quality labels are introduced Higher production costs for the labelled quality products, due to the higher costs of segregation, monitoring and certification

XI. RECOMMENDATIONS:

Government of Republic of Serbia and Ministry of Agriculture and Environment protection

The Government has the opportunity to intervene by the policies and actions along the supply chain and to the privilege or deprived of the right one has, so the Government decisions must be thought out and based on the analysis, achieving the highest possible social, economic and environmental impact. Recommendations for policy makers include:

- Ensure EU and WTO integrations
- Harmonize the Regulations with European best practices respecting the interests of all producers and processors in the soybean and related supply chains
- Valorize GMO FREE status of Serbia by enabling adoption of quality an origin labels on food products
- Support and promote GM FREE Danube Soya quality standard which is officially allowed by the Ministry of Agriculture RS since May 2015, as well as labelling of food products according to this standard
- Support and promote actors in whole GM FREE value chain in Serbia
- Implement and promote and at national level the regionally har-

monized GMO-free labelling and control system of food products for the Danube Region which has been developed jointly under the Danube Soya Declaration in 2015

- Improve the phytosanitary system in order to gain the trust of processors in the GMO-free status of soybean meal
- Build and continuously improve infrastructure that will enable producers and processors have the ability to add value to their products in every segment of the market chain
- Facilitate competition and suppress monopolistic behavior all along the soybeans market chain and related products from supplying inputs to final sale
- Supporting research projects to assure high quality of GM-free seeds and soybean varieties in the region
- Support soybean production through subventions, like in EU countries

Producers and traders of soybean

Producers must look at his market, at what people want to buy, how much they are prepared to pay for it, and what quality they demand. Here price is the greatest barometer, the signal that indicates what is happening in the markets, not only in locally but in the whole region or even the world. To run a successful business, the farmer must

learn to interpret this barometer as skillfully as he reads the weather, as his fortune depends on both. To be able to improve his market position he should:

- Improve knowledge and information about soya production and marketing on local, regional and international markets
- Adjust investments on the base of market perspective and requirements
- Improve cooperation with processors and other farmers
- Integrate soybean in one of labeled retail chains of controlled quality and origin in Serbia and EU market (such as Danube Soya, GMO FREE...)

Processors of soybean

Processing industry should focus their activities on:

- Adoption and implementation of GMO FREE quality standard according to the needs of local and international GM FREE market (labelled meat, milk and eggs)
- Building long-term relationship with farmers and suppliers based on mutual trust and partnership
- Investment in processing capacities
- Improvement horizontal cooperation with other processors for achievement common objectives

Soybean users in food industry

Food industry should focus their activities on:

- Adoption and implementation of GMO FREE quality standard and food labelling in order to enable valorization of existing added values (products produced with/fed with GM FREE European soybean) through market visibility (the Ministry of Agriculture of RS recognized the importance of Danube soya labelling and officially support it since May 2015. Therefore, for the first time food producers have opportunity to label products with quality label with emphasis on GM FREE quality and European origin)
- Promotion of GM FREE quality of their products
- Building long-term relationship with farmers and suppliers based on mutual trust and partnership
- Investment in processing capacities

Retail chains and consumers

Retail chains communicate and transmit information from consumers to producers. Moreover, retail chains are owners of their private labels, with specific quality attributes. Therefore, retail chains have responsibility in market organization, establishment of balanced offer, adoption and promotion of quality labels, increasing of transparency and to allow consumers a freedom of choice.



Retailers should focus their activities on:

- Food products development labeled of GM FREE quality and controlled origin
- Insist on food safety and quality standards and discipline companies who are not complying with
- Continuous food quality improvement and labeling
- Promotion of GM FREE products

XII. ANNEX

List of participants in the development of Study "Effects of liberalization of Law of GMO on the soybean market in Serbia" and participants on verification meeting

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The project **"GMO-free Quality Soya from the Danube Region"** is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented in Serbia and Bosnia & Herzegovina by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The project's aim is to use the participation of both these countries in the Danube Soya Initiative (DSI) and their commitment to the Danube soya quality programme as a lever to increase the competitiveness of their agricultural economies. GIZ and ADA are supporting the international Danube Soya Initiative (DSI) to develop GMO-free and sustainable quality soya under the Danube Soya brand. The cooperation stabilizes, upgrades and extends existing soya production, usage and processing in Serbia and Bosnia & Herzegovina. Jointly with the GIZ Project "GMO-free Quality Soya from the Danube Region" DSI establishes and starts operating the regional Danube Soya Competence Center in Novi Sad. The main activities of this center are to develop training curricula, to generate and disseminate best practices in farmer training and soya production and to establish a demonstration farm network. These efforts aim to set up sustainable value chains and inclusive buyer-seller relations certified under the Danube Soya quality guidelines. In addition, ADA is supporting DSI to establish an efficient quality management and monitoring system throughout the chain of custody of certified Danube Soya.

