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# FINANCING AGRICULTURAL DEVELOPMENT IN SERBIA: OPPORTUNITIES AND CHALLENGES<sup>1</sup>

Finansiranje razvoja poljoprivrede u Srbiji:  
prilike i izazovi

## Abstract

This paper overviews the opportunities and risks of Serbian agriculture's development with the special accent on its financing. We take into account its impact from macroeconomic, social, and individual business perspective, and lay it in context European Union (EU) agricultural policy and changes in Serbian trade policy in line with Stabilization and Association Agreement (SAA) implementation. After discussing the current situation and key characteristics of Serbia's agriculture, we narrow down the research, through identification of dual nature of Serbian farming by locating trends in large-scale agriculture and giving a picture of small-scale agricultural sector using LSMS survey database provided by World Bank. After describing main risks of agricultural business and policy objectives and instruments, the main novelty is a detailed case study of a corn producing farm in Serbian lowland with different financing scenarios. We illustrate previous insights on challenges, risks and policies into a coherent system, by using data along the period from 2008 to 2013. The main conclusions include that major improvement in net cash inflows stem from improvements in cultivation technologies of mercantile corn, relatively significant improvements in average net cash flow are reachable with insurance from drought. Irrigation technology may reduce yield volatility, but initial investments are financially unsustainable with regular commercial loans. That is why which is why we suggest shifting to higher value crops, such as seed corn, should be considered in case of installation of irrigation systems. In such a case, even commercial loans

may become a suitable way of financing of investment. The main overall message from the analysis calls for holistic approach in formulating policies aiming to enable sustainable rural development, competitiveness and appropriate financing of output growth amidst rapid global changes and European integrations.

**Key words:** *agriculture, financing, Serbia, competitiveness, EU integrations, farm case study*

## Sažetak

Ovaj članak ima za cilj da prouči mogućnosti i rizike za razvoj srpske poljoprivrede, sa specijalnim akcentom na aspektu finansiranja. Sagledava se značaj poljoprivrede iz makroekonomskog i socijalnog ugla kao i iz perspektive pojedinačnog proizvođača, sve u kontekstu principa poljoprivredne politike Evropske Unije kao i promena u srpskoj trgovinskoj politici u skladu sa primenom Sporazuma o stabilizaciji i pridruživanju (SSP). Nakon predstavljanja aktuelne situacije i ključnih karakteristika ovog sektora, predmet istraživanja se sužava kroz osvrtnje na dualnu prirodu srpske poljoprivrede, odnosno opis trendova u intenzivnoj poljoprivrednoj proizvodnji, s jedne strane, i stanja u ekstenzivnoj proizvodnji u okviru domaćinstava, koristeći se statističkom obradom podataka iz Ankete o životnom standardu domaćinstava (LSMS) Svetske banke. Nakon pregleda osnovnih rizika za poljoprivredni biznis i ključnih elemenata poljoprivredne politike, glavna novina ovog rada je detaljna studija slučaja proizvođača kukuruza u ravničarskoj oblasti sa više alternativnih scenarija koja uključuju i način finansiranja. Ujedno se, prethodno predstavljeni rizici, izazovi i politike koji se odnose na poljoprivredan biznis, ovim putem ilustruju u okviru realističnog modela u kojem su primenjeni podaci iz perioda od 2008. do 2013. Glavni zaključci studije slučaja upućuju na to da je najveći rast neto gotovinskih priliva ostvariv kroz unapređenje agrotehničkih mera uzgajanja merkantilnog kukuruza, kao i da se relativno značajan rast prosečnih neto gotovinskih priliva u ovom periodu mogao dostići uz osiguranje od suše. Sistem navodnjavanja može smanjiti volatilnost prinosa, ali su inicijalna ulaganja finansijski

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neodrživa sa uobičajenim komercijalnim kreditima. Zato se, u slučaju ugradnje zalivnih sistema, sugerše prelazak na uzgajanje useva sa većom dodatom vrednošću po jedinici površine, kao što je, u našem primeru upotrebljen semenski kukuruz. U tom slučaju, čak i komercijalni krediti mogu biti odgovarajući način finansiranja ove investicije. Glavna poruka koja proizilazi iz ovakve analize je usmerena na potrebu sveobuhvatnog pristupa u formulisanoj politici koje bi omogućile održivi ruralni razvoj, konkurentnost i finansiranje rasta proizvodnje, u uslovima promena u globalnom okruženju i evropskih integracija.

**Ključne reči:** *poljoprivreda, finansiranje, Srbija, konkurentnost, EU integracije, studija slučaja poljoprivredne proizvodnje*

## Introduction

Agricultural sector has a traditional importance within the Serbian economy, so that it is often regarded as an area of great potential. Apart from its importance in providing food security for the local population and its social, developmental and political impacts on securing well-balanced regional development, it also has very important economic implications.

Currently, agricultural sector has large importance within the Serbian economy, underlined by its large share in total employment (i.e. 19%), GDP (10%, or app. 15% with food processing included), and exports (6%, or app. 17% with processed food included). It is also one of rare major net exporting sectors, with trade surplus increasing almost every year since 2004 (surplus attained EUR 210 million in 2013, against total trade deficit of EUR 4.5 billion).

The key economic potential resides in its export capacity, which may help increase GDP, and lead to balancing of the traditionally large trade deficit. Also, given that food prices' share in Serbian consumer price index attains app. 37% (as of 2013), a higher yielding agricultural production might reduce inflationary pressures.<sup>2</sup>

However, the rising net exports have been result, to a large extent, of soaring global prices since 2007. Namely, world food prices have been rapidly rising in recent years, driven mostly by the increasing global population, changing eating habits in emerging economies, and especially by the soaring production and demand for biodiesel [12]. On the other hand, the market was relatively protected with

import tariffs, while the effects of liberalization require a deeper analysis by types of products. It is because the foreign markets, such as the EU, where Serbia exports most of its agricultural products, except for direct protection measures, have numerous standards that are needed to be met.

Another challenge faced by all agricultural developing economies is their dual nature, underlined by large differences between the relatively unproductive small scale farms, and rapidly developing industrial agricultural sector. Among the largest Serbian companies<sup>3</sup>, most of large investments were registered in agri-food complex in recent post-crisis period.

Agriculture is a business that bears many risks and has a long history of policy measures and trade protection in developed countries, while Serbia has relatively limited budget for support of agriculture. An especially difficult task for policy makers is to take into consideration that agricultural development needs to satisfy at least two aims at a time: to increase production through intensification and industrial agriculture, and to provide a decent life of rural population and prevent new unemployment and depopulation of countryside (rural areas).

Hence the sector faces a number of risks and weaknesses, while the recently presented draft of national Strategy for agricultural development is overly comprehensive, and may be lacking precision. One of the key weaknesses of the agricultural sector is its under financing in comparison to other sectors, as only 4.7% of total loans to companies relate to agricultural loans. Although the agricultural business is generally perceived as risky [12], the share of non-performing loans (NPL) to companies in agriculture business is at 15.2% comparing to significantly higher share of non-performing loans to companies being at 26.1% (as of end September 2013). However, the financial sector has recently started to see the agricultural sector's favorable potentials and to consider land as good collateral. Thus new lending is significantly directed towards agricultural businesses, as the agriculture's development gap is being increasingly perceived as one worth financing.

<sup>2</sup> As it was the case in 2013, when inflation dropped to record low at 2.2% yoy, mostly due to effects of a bountiful agricultural season in that year.

<sup>3</sup> Those that reached position among the 500 largest Serbian companies (ranked by business revenues), analyzed in NIN's Top 500 publications, published in 2012 and 2013 [9], [10].

The aim of this paper is to review the opportunities and challenges of agricultural development in Serbia both from macroeconomic perspective and individual business perspective. First, we present main opportunities for increase in agricultural output and value added. Further on, we describe the current situation and dual nature of Serbian farming by presenting (a) recent business trends and financial performances of large-scale industrial-style agriculture companies as well as (b) a picture of small scale agricultural holdings and their way of production, income generation, and living standards obtained from the statistical analysis of the World bank database from LSMS survey conducted in Serbia in 2007. The third section gives an overview of the main risks that agricultural production is facing and basic strategies to manage these risks. The fourth section provides main elements of agricultural and trade policies that are relevant for Serbian agricultural competitiveness. The main novelty of this paper is the analysis presented in the fifth section, where we model several scenarios of corn production including alternative financial arrangements and investments in productivity increase. The model results, based on actual data on inputs, outputs and prices along the observed period of six years from 2008 to 2013, provide a good base for evaluation of alternative scenarios. Our main contribution, besides previously overviewing opportunities and challenges for development of agriculture in Serbia in the context of increasing market and political integration of Serbia into the EU, results from the case study analysis. The main messages from the calculation of cash flow in corn production are that major improvement in net cash inflows stems from improvements in cultivation technologies of mercantile corn, while relatively significant improvements in average net cash flow are reachable with insurance from drought. Irrigation technology may reduce yield volatility, but initial investments are financially unsustainable with regular commercial loans, which is why we suggest shifting to higher value crops, such as seed corn, in case of installation of irrigation systems. Finally, we summarize the conclusions in the last section of the paper. The main overall message from the analysis calls for holistic approach in formulating policies aimed at enabling sustainable rural development, financing and competitiveness amidst rapid global changes and European integrations.

## Production gaps in Serbian agriculture

In order to reap full economic benefits from it, Serbian agriculture needs to bridge the large production gap, which may be decomposed into at least five sources.

Firstly, according to the 2012 Agricultural census, as much as 8% of total agricultural land, or app. 420,000 ha, remains non-utilized, due to social, economic or infrastructural reasons, with only 65% of agricultural land actually used for agricultural production (3,4 million ha), with the rest being covered by forests, ponds and other land (1,5 million ha).

Moreover, the agro-technical measures are often sub-optimal in terms of utilized inputs and cultivation techniques, machinery is often outdated (average tractor is almost 20 years old). Meanwhile, more advanced and more costly practices could significantly increase yields.

Apart from below-potential utilized agricultural area (UAA) and suboptimal agro-technical measures, the production itself is highly exposed to weather-inflicted shocks, such as droughts, as the total irrigated land covers only 100,000 ha, or as little as 3% of the total UAA (against 20% in Greece and Italy, 13% in Spain, 7% in Netherlands, 6% in France, and 3% in Hungary), causing significant volatility in yields.

Another reason for low productivity is fragmentation of agricultural land, with average holding covering only 5.4 ha, which dampens potential scale effects in farming. However, land enlargement and production intensification may be confronted with high rate of employment and decent life standard of rural population. Thus, although highly desirable from output volume perspective, a quick rise in agricultural productivity could provoke a rise in unemployment, given the large share of agricultural employment in Serbian small-scale less productive farms.<sup>4</sup>

Finally, Serbian agricultural production is relatively dependent of low value-added crops, such as corn, while moving up the value chain would require diversification of crop production and larger share of cultivation of higher value added crops (such as various types of industrial

<sup>4</sup> As a way of tackling this issue, some researchers advocate for a stronger presence of farming co-operatives, as to address both the challenge of limited scale economy effects and the aforementioned social challenges [7], [8].

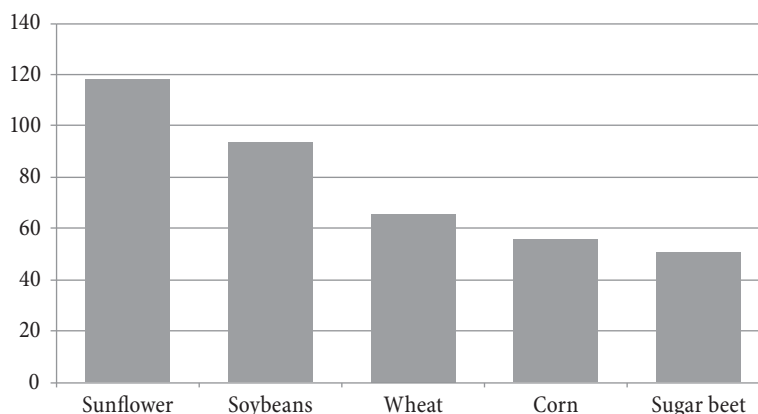
crops) as well as increase in livestock breeding, meat and dairy production. Besides, a successful agricultural sector may serve as a resource base for the higher value added activities, i.e. food processing industry, where even current capacities are underutilized – according to the Draft of the Strategy of agricultural and rural development [6] rate of capacity utilization in food processing industry is at 65% (as of 2011).

Bearing the previously stated in mind, we underline at least two issues: (i) smaller actual yields in comparison with countries with similar geo-climatic potentials, and (ii) significant production volatility, depending on the weather conditions (e.g. see Figure 1 and Figure 2).

### Dual nature of agriculture and implication for its development and financing

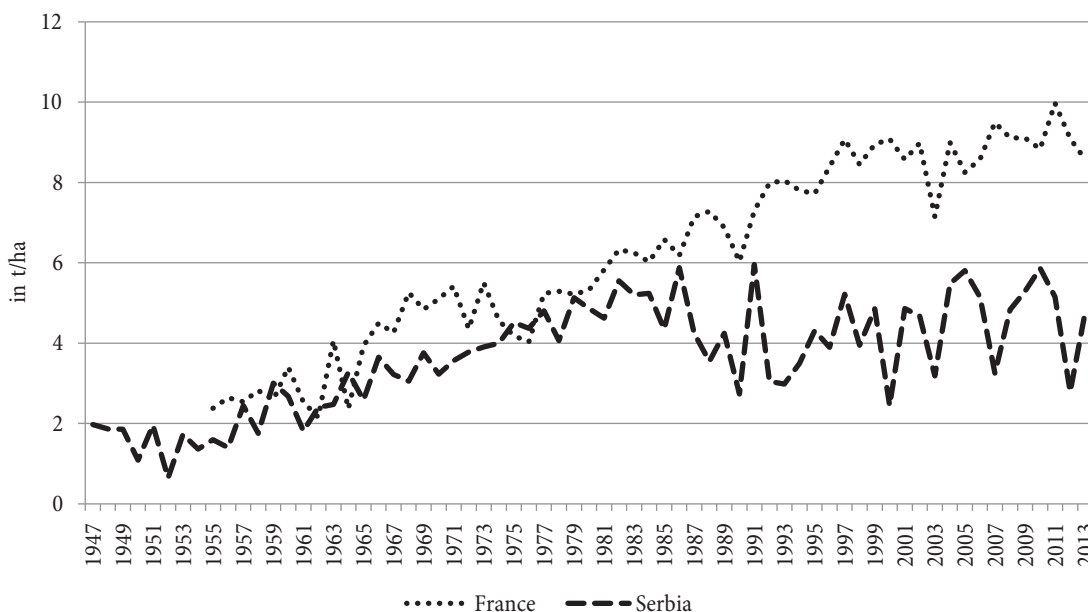
The recent rise in net exports is principally driven by the small number of large agricultural farms, with the overwhelming majority (92%) of smaller farms falling behind. This is because 92% of farms are small scale, mostly family-run properties using sub-optimal production technologies that are unable to reap benefits of the economy of scale effects. As shown in Figure 3, average farm size is 5.4 ha, but only 1% of all registered farms have more than 100 ha of land (see Table 1).

Figure 1: Average yield by product in Serbia in % of average yield by product France, in 2013



Source: Statistical Office of Serbia, Eurostat

Figure 2: Average yield in corn production in Serbia and France, 1947-2013



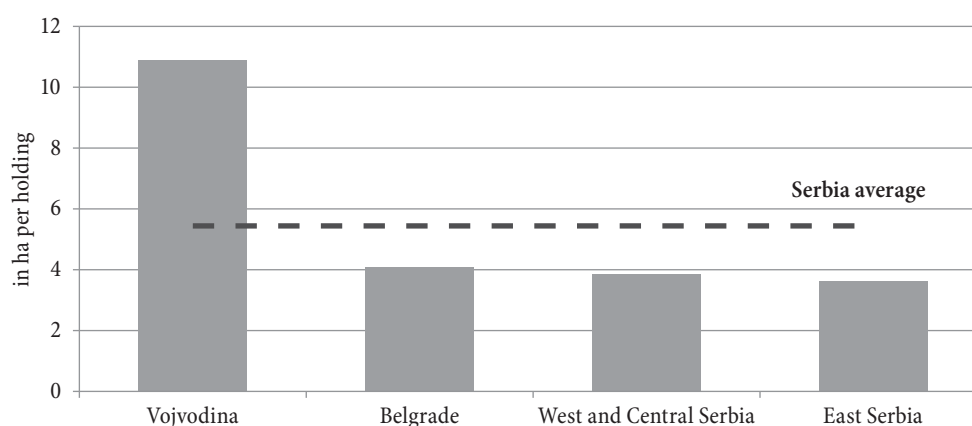
Source: Statistical Office of Serbia, Eurostat

**Table 1. Agricultural holdings by size categories\***

Agricultural holdings by size categories*	Small	Medium	Large	Total
Number of holdings	579,965	45,342	6,245	631,552
Utilized agricultural area, in ha	1,486,955	825,013	1,125,458	3,437,426
	in %			
Number of holdings	91.8%	7.2%	1.0%	100.0%
Utilized agricultural area	43.3%	24.0%	32.7%	100.0%

\*Small farms occupy 0-10 ha, medium 10,01-50, large 50,01 and more

Source: Statistical office of Serbia, Agricultural census 2012

**Figure 3: Average household size, in ha**

Source: Statistical office of Serbia, Agricultural census 2012

### Overview of living standards of rural non-intensive agricultural production

For the purpose of this overview, we used the latest available dataset provided by the World Bank from Living Standards Measurement Study (LSMS), which was conducted in 2007, with aim to explore ways of improving the type and quality of household data collected by statistical offices in Serbia, and thus to foster increased use of household data as a basis for policy decision-making. The survey consists of representative sample for Serbia including 5,557 households, of which 41% are agricultural households.<sup>5</sup>

<sup>5</sup> Which makes Serbia a country with one of the highest shares of agricultural population in Europe (also see [17, p.9]).

We provide a breakdown of surveyed agricultural households and obtain the following statistics on presence of small farming and the role of agriculture in household income generation. A half of households farm only for their personal use (i.e. the so-called subsistence farming), while the other half obtain some part of their income through selling the products at market. Even within the latter group, a small minority (7% of all agricultural households) obtain all of their income exclusively from agriculture, and thus can be truly regarded as market participants, while the rest acquire a part of their income from social benefits, pensions or wages (see Table 2).

**Table 2. Agricultural households: income, size and land ownership**

	Share of households in total agricultural households	Average monthly income, in EUR per household	Average household size	Average number of adults (18+)	Average number of children	Average used arable land, in ha
Without any income (only farming for own needs)	11.9%	0.0	2.9	2.5	0.4	1.4
Income from wage, pension or social benefits and farming for own needs	37.8%	310.4	2.8	2.4	0.4	1.1
Income from selling of own agricultural products only from farming	50.3%	451.3	3.7	3.0	0.7	3.8
both sources of income (farming and wage/pension/social benefits)	6.8%	271.4	3.8	3.1	0.7	5.3
Total	43.5%	479.2	3.6	3.0	0.6	3.6
Total	100.0%	345.2	3.3	2.7	0.5	2.7

Note: 2006 average monthly net wage in Serbia amounted to 260 €

Source: World bank LSMS Serbia, 2007



Serbian small scale farming is thus characterized by numerous elderly households in remote areas, which operate with outdated machinery and techniques. Average size of agricultural households is 3.3 members (against average of 3.1 for all households), with an average used farm surface of only 2.7 ha (4 ha in Vojvodina, 2.3 ha in Central Serbia). Out of the agricultural households, a majority of 85% doesn't cultivate the whole arable land surface that they own, mainly due to economic and socio-demographic reasons (elderly households), and to smaller extent, technological reasons (see Table 3).

**Table 3. Reasons why the household did not cultivate the total used arable land**

Crop rotation	2.5%
Lack of financial means	19.7%
Lack of workforce	28.8%
Lack of equipment	13.9%
Economic instability	23.4%
Other reasons	11.7%

Source: World bank LSMS Serbia, 2007

Agricultural households' standards of living remain relatively modest in comparison with their urban counterparts. Namely, minimal wage for which a person living in an agricultural household would accept to work for is net EUR 200 on average (EUR 250 for non-agricultural household population, as of 2006), while about

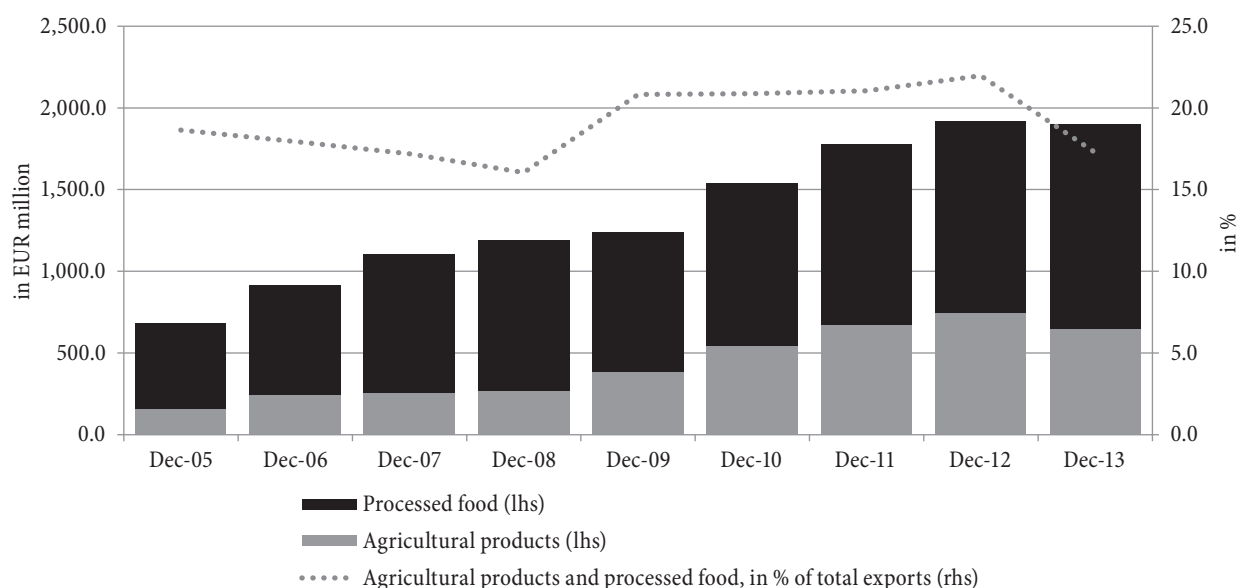
8% of agricultural households live under the poverty line (defined as household monthly consumption at less than EUR 110), versus 6.5% with non-agricultural households, according to LSMS data.

**Overview of intensive agricultural production with the largest Serbian companies**

Large scale, intensive agricultural activity has been rapidly developing in recent years. This is driven by heavy investments financed by borrowing, IFI support or from own funds. Besides, in recent years there was reported a growing number of examples of vertical integration, i.e. moving the activity along the value chain into food processing and/or trade, and increasing regional market integration. These companies were the key drivers of the growth in agricultural products' and processed food' exports in recent years (see Figure 4).

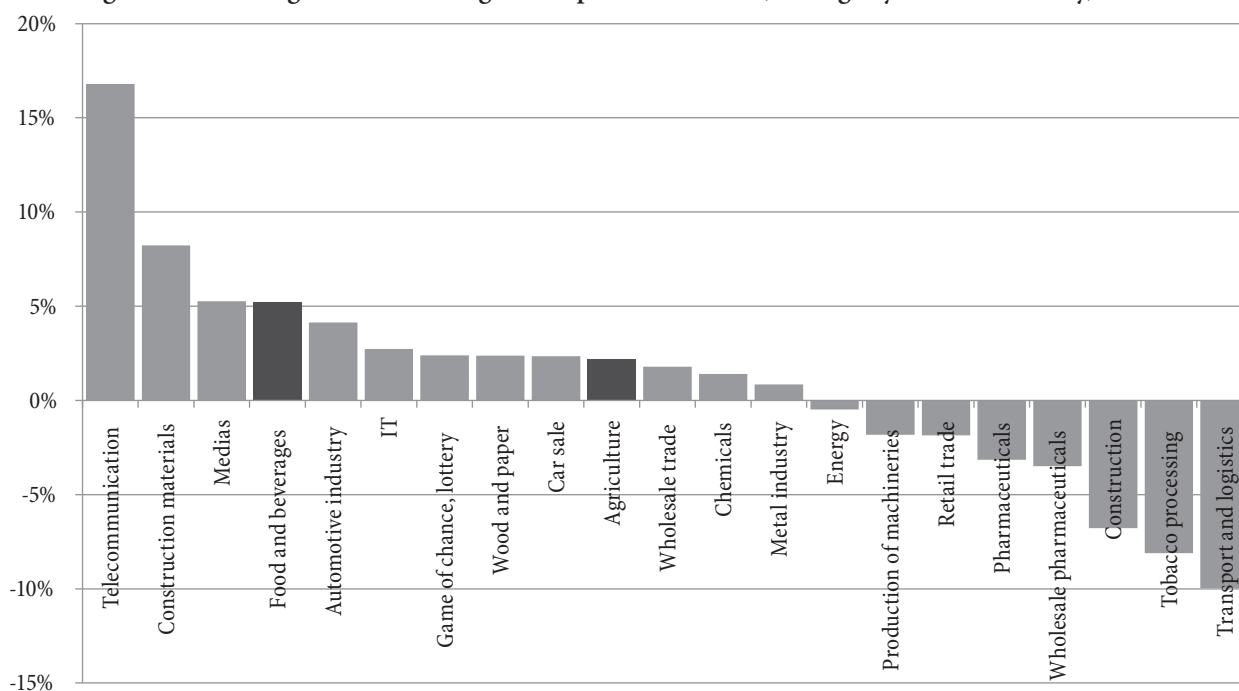
According to NIN's TOP 500 [9], [10], in the period between 2010 and 2012, the closely related agricultural and food processing sectors had above average profitability indicators (see Figure 5), all with a steady rise in number of employees. Moreover, the relative importance of Serbian agri-complex companies keeps increasing, as suggested by their rising number within the 500 largest Serbian companies – there were 108 in top 500 in 2012 (22% of total) up from 83 in 2011 (17%).

**Figure 4: Agricultural products and food exports**



Source: Bloomberg, Statistical Office of Serbia

Figure 5: EBT margin of the 500 largest companies in Serbia\*, average by sector of activity, in 2012



Note: EBT (Earning before taxes) margin represents ratio between pre-tax profit and operating revenue

\*Ranked by the size of operating revenues in 2012

Source: Serbia Business Registers Agency

## The risky nature of agricultural business

Agricultural production is associated with various risks and these risks are often interconnected. Six types of risk are generally considered, according to their source [13]. First is production risk, concerning variations in crop yields and livestock production, affected by a range of factors: weather conditions, climate change, pests, diseases, as well as management of natural resources such as water. Second are price and market risks associated mostly with variability in output price, but also with variability of input price and integration in the food supply chain (with respect to quality, safety, new products etc.). Third group are regulatory risks connected with the impact of changes in agricultural policies (e.g. subsidies, regulations for food safety and environmental regulations) or trade policies. Fourth category of risks is technological risks associated with the adoption of new technologies. Fifth group of risks may be categorized under financial risks resulting from different methods of financing the farm business, subject to credit availability, interest and exchange rates, etc. Finally, there are human resource risks, associated with unavailability of personnel.

Among these types of risks, production risks (yield volatility) and price volatility are usually considered the most important by farmers [14]. Both of these are expected to increase. On one hand, there appears to be an increase in occurrence of extreme weather events, possibly due to climate change, which will negatively affect yields [12], [13]. On the other hand, long-term supply/demand imbalances are possible worldwide, due to structural factors: increased protein intake demand – driven by population and income growth – combined with scarcity of water (due to pollution and increased meat consumption that requires more water), arable land and energy.<sup>6</sup> While somewhat offset by increasing yields and GMOs, the supply demand/ imbalances combined with weather events are likely to lead to tight stocks and increased price variability.

Output price variability is probably one of the biggest contributors to the overall risk in agricultural business. It arises due to the biological lag inherent in agricultural production. Obviously, producers must make production decisions months (even years for some crops) before they have a product to sell (i.e. before the actual crop prices are known). During this period, output prices may change

<sup>6</sup> For more details, see [12]

dramatically in response to shocks in supply and demand. This may put farmers in a difficult situation, if commodity prices decrease dramatically during the production and marketing cycle. Due to low elasticity of both supply and demand, the responses to price shocks are slow. Since 2005, food and above all – cereals commodity prices have become correlated with crude oil prices as oil has become not only the input in agricultural production but also an alternative to food, as subsidized biofuel production has raised the opportunity cost of selling crops for food (see Figure 6).

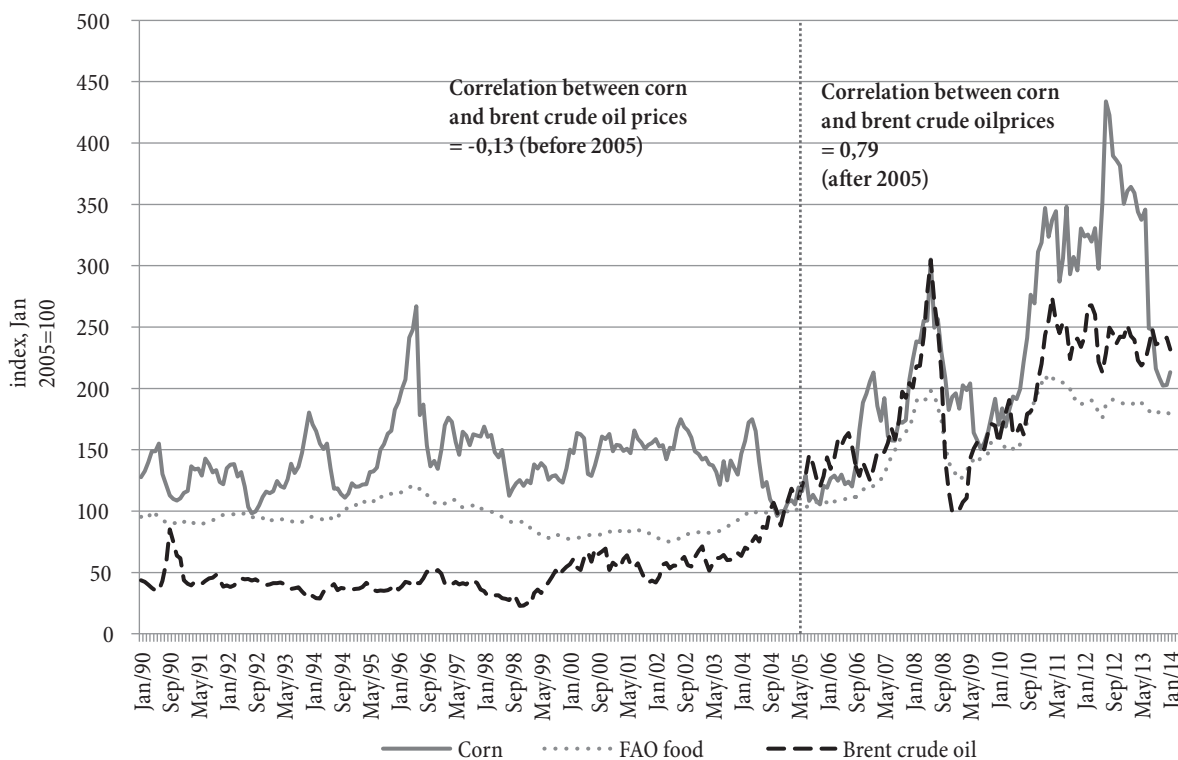
Objective of risk management in agriculture may be various depending on agent in an economy. Some agents may focus on stabilizing food prices, other directly on stabilizing farmers' incomes. Price volatility is a concern both at the macro level of governments (e.g. trade bill and inflation) and at the micro level, for producers and consumers. For example, a drop in commodity prices during growing season is negative for farmers but tends to benefit consumers. Nevertheless, producer's objective should, besides profit maximization, take into account its income stabilization in the longer run including reduction in yield and price volatility. This objective has effects on

investments in agriculture, because higher prices and income volatility increase risk premium, which decreases the rate of agricultural investments and growth.

Apart from being categorized according to their sources, risks can be classified according to the frequency of the occurrence of negative events and the magnitude of their impact. This kind of risks classification is directly related to risk management practice that may be applied.

Risks associated with frequent events which do not cause large losses, such as "normal" fluctuations in prices and production, are managed on the farm. Risk management starts with decisions on the farm and at the household level: which outputs to produce, how to allocate land, which inputs and techniques to use. Diversification of activities on and off-farm normally contributes to reducing risk. The level of the farmer's integration in the food supply chain also affects the degree to which the farmer is impacted by price volatility. Vertical integration – when the farm controls a commodity across two or more levels of activity – typically reduces risks associated with a variation in quantity and quality of inputs (backward integration) or outputs (forward integration). Vertical integration is more common in the livestock sector

Figure 6: Food price, corn price and fuel price, index, January 2005=100, 1990-2014



Source: FAO, Bloomberg



(integration backward into feed manufacturing) or in the fresh vegetables sector (integration forward into sorting, assembling and packing). Another example of farm risk management strategy is accumulation of financial reserves. General government policies, such as support for agricultural production or social and health protection, provide support in mitigation of this kind of risks.

Events which are infrequent but lead to severe damage to a whole region (e.g. floods, droughts or disease outbreaks) typically fall under the catastrophic layer for which some insurance products may help but usually a high public involvement is necessary. Between these two extreme layers, there are risks with moderate loss probability and severity. These risks are well manageable by some market solutions as insurance, futures, contracts in production and marketing.

Strategies to mitigate risk may be classified into risk transfer (production contracts, futures), risk pooling (insurance, cooperatives), and diversification in production (different activities or different crops). Different risk categories also require different providers: banks, insurance companies, governments or public private partnerships, and some risks are best managed on the farms by the farmers themselves.

The risks associated with agricultural production represent an important case for public policy involvement targeting, among other objectives, also income stabilization of agricultural producers. Hence, public policies in agriculture have usually much complex set of objectives and instruments.

## Policy effects on development and competitiveness of agriculture

Competitiveness of one country's agricultural and food production is directly related to agricultural policy and trade policy differences with regard to its trade partners. However, rising of local agricultural production competitiveness is not the only goal of agricultural policies worldwide as agriculture plays a more complex role in a society, as mentioned in introductory section.

The major part of Serbian agriculture and food export is directed to the EU (see Table 4). Referring to the EU trade and agricultural policy is relevant for assessment of the competitiveness of Serbian agriculture. Moreover, an overview of the Common Agricultural Policy which is one of the major components of common EU budget is an excellent illustration of the complexity and evolution in time of objectives, principles and instruments of such a policy. The EU policy is also relevant from the perspective of Serbian integration path toward EU membership (candidate since 2012).

The initial case for the Common agricultural policy (CAP) dating back to the period of constitution of EEC in the late 1950s laid in the argument that a possible failure to absorb a high rate of labor exit from agriculture would cause a relative and perhaps absolute decline in agricultural income for a (then) substantial part of the population, which would destabilize society and in any event not be socially acceptable. Another political driver to create CAP at the time was the wish of EEC6 countries to be largely self-sufficient after the war experience of hunger and food

**Table 4: Geographical distribution of Serbian agriculture products and food export**

		2004	2005	2006	2007	2008	2009	2010	2011	2012
Imports from Serbia, in % of total	World	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
	EU27	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3
	CEFTA	7.9	8.2	9.5	12.3	15.9	17.3	16.9	14.2	15.2
	Russian Federation	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.4	0.4
	Turkey	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
Serbian export destinations, in % of total exports	World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	EU27	54.9	54.1	48.6	51.7	41.0	47.8	48.5	51.0	51.8
	CEFTA	39.1	36.7	36.8	40.4	52.3	46.0	42.9	40.0	38.3
	Russian Federation	2.0	2.2	3.0	3.8	3.8	3.2	5.6	6.2	6.0
	Turkey	0.2	0.2	0.3	0.2	0.1	0.2	0.5	0.3	0.2

Source: UNCTAD

Note: During the whole period, the constant sample of CEFTA countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Moldova, Montenegro) was used

shortages. These main cases justified main objectives of the agricultural policy but with time its instrument became inappropriate which caused a several waves of CAP reform. The three principles underlying the CAP are a single product market, European Community preference (that is, protection) and financial solidarity among the Member States. The five main objectives of CAP are: increase in agricultural efficiency, market stabilization, supply security, reasonable prices for consumers and fair standard of living for farmers where the last one was paramount among five objectives. CAP has undergone several waves of reforms starting from 1992 driven by the EU budget quarrels on the overall size of expenditures, trade conflicts due to export subsidies and World Trade Organization (WTO) driven liberalization pressures, CAP intrinsic regulatory failures and a need to pay more attention to rural development [11, p. 235]. These reforms have in general increased market orientation toward agriculture while providing income support and safety net mechanisms for producers, improved integration of environmental requirements and reinforced support for rural development.

The last CAP reform is adopted in 2013 and concerns the next seven-year period. It was mainly driven by economic, environmental and territorial challenges [3, p. 2] implying that the EU agriculture needs to attain higher levels of production of safe and quality food, while preserving the natural resources that agricultural productivity depends upon. CAP consists of two pillars: first is market management and direct payments and second is rural development. The reforms concerned its instruments reflecting in the reduction of market interventions (quotas, subsidies and levies) to only 5% of total CAP expenditure while direct payments became the major source of support and most of them are decoupled from production (producer instead of product support). The most important element of the new CAP under this first pillar is the newly introduced "greening" payment: in future, 30% of direct income support for farmers will be granted only if they observe certain farming practices that are beneficial for the environment and the climate rewarding farmers in that way for delivering public goods (biodiversity, water quality and availability, air quality, landscape etc.).

The second pillar of CAP being rural development policy (absorbing about 80% of total CAP budget in 2007-2013 period) has remained untouched by the last reform. It is implemented through national and/or regional rural development programs. These last have to be built in more strategic approach based upon at least four of the six common EU priorities being: (1) Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas, (2) Enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and sustainable management of forests, (3) Promoting food chain organization, including processing and marketing of agricultural products, animal welfare and risk management in agriculture, (4) Restoring, preserving and enhancing ecosystems related to agriculture, food and forestry sectors, (6) Promoting social inclusion, poverty reduction and economic development in rural areas [3, p. 9].

Serbian trade policy is directly linked to competitiveness of own agricultural and food products. In that respect, the most important agreement for Serbia's agriculture is the SAA with the EU. Witnessed by some previous EU enlargements, agricultural producers face the most challenges on the way to entering the EU, but they also stand to profit the most from it upon obtaining full membership. Hence, the logic behind procedure of obtaining full membership is to shorten the period as much as possible, as prolongation of talks incurs additional costs for farmers. Namely, in the pre-accession period, a country needs to open its borders for the EU products and adapt to the EU strict standards. Precisely for this reason, most adhering countries strived to make the year of accession to the EU and year of trade liberalization coincide, as to avoid the situation in which they do not benefit from membership, but have no tariff protection. During this sensitive period, the EU provides some support (currently under so called IPARD<sup>7</sup> funds), but it is much smaller than the post-accession support under CAP. Serbia's liberalization with the EU effectively occurred in 2014, with the full implementation of SAA after six years of gradual reduction of tariffs, following Serbia's unilateral application of SAA. The average tariff on agricultural and food products is reduced to 2.49% from 22%, while the full membership negotiations have

<sup>7</sup> Instrument for Pre-accession Assistance in Rural Development

only started in 2014 with full membership unlikely to happen in years ahead and probably not in this decade. This time gap is particularly risky for the agricultural sector, especially with the current level of competitiveness, investment capacity and level of average compliance with EU standards. Moreover, Serbia found itself in a situation where it has liberalized its trade, without completing conditions for using any pre-accession (IPARD) funds envisaged to facilitate upgrade of level of rural development including attaining of the EU standards [17, pp.10-11].

Moreover, Serbian agricultural budget is limited in absolute terms and in a way also in relative terms. Namely, while EU's agricultural budget has been somewhat smaller relative to overall output than Serbia's in the past decade (0.5%-0.4% of GDP in EU against 0.7% of GDP in Serbia), share of agriculture in EU's GDP is substantially lower (1.6% of GDP in EU28, against app. 10% in Serbia)

In the past, Serbian agricultural policy was characterized by its unpredictability reflected in frequent changes of objectives and instruments, effectively nonexistent strategy

of agricultural development (in spite of having formal strategy in some periods in recent past), agricultural budget that is below the needs and that's smaller than the budget of competitor countries (per hectare, per farm, as a percentage of total state budget or as a percentage of GDP), uncertainty as to the size of agricultural budget, reactive instead of proactive development approach, undeveloped institutions some of which formally exist without operating in practice [17].

### Financing of agriculture business – A case study

For the purpose of an analysis and illustration of the farm business including financing aspect, we take here an example of a 100 ha farm in Serbian lowland area with high quality of soil. We alternate some technological and financial aspects of production using real technological inputs obtained from business insiders in terms of quantities, current prices as well as yields in the period from 2008 to 2013. We include subsidies that were

**Table 5: Assumptions of the model and alternative scenarios**

Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Average technology	Premium technology	Premium technology with insurance (no irrigation)	Premium technology with irrigation - Loan 10y, 7%	Premium technology with irrigation - Loan 5y, 10%	Planting seed corn - with irrigation -Loan 10y, 7%	Planting seed corn - with irrigation -Loan 5y, 10%
Sub optimal agro technical measures reflecting average cultivation method.	Optimal agro technical measures applied.	Insurance against drought, premium paid all over the period.	Irrigation system installed at 2,000 Euro per hectare at the beginning of the observed period.	Irrigation system installed at 2,000 Euro per hectare at the beginning of the observed period.	Stable selling price all over the period observed (800 Euro per Tonne).	Stable selling price all over the period observed (800 Euro per Tonne).
Medium quality seed planted and lower quality and quantity of fertilizers applied.	High yield hybrid seed planted and optimal quality and quantity of fertilizers applied.	Insurance compensation is received in 2012, 40% of insured amount.	Investment in irrigation system financed by loan with 7% p.a. interest rate and 10 years maturity.	Investment in irrigation system financed by loan with 10% p.a. interest rate and 5 years maturity.	Investment in irrigation system financed by loan with 7% p.a. interest rate and 10 years maturity.	Investment in irrigation system financed by loan with 10% p.a. interest rate and 5 years maturity.
Average yield in period 2008-2013 is 5.7 t/ha	Average yield in period 2008-2013 is 8.8 t/ha	Average yield in period 2008-2013 is 8.8 t/ha	Average yield in period 2008-2013 is 12 t/ha	Average yield in period 2008-2013 is 12 t/ha	Average yield in period 2008-2013 is 2.9 t/ha	Average yield in period 2008-2013 is 2.9 t/ha

Output sold in September (no storage) at current price on Novi Sad product market.

Installation of irrigation system provided necessary condition for planting of seed corn (higher value added product).

Size of the farm: 100ha, providing for scale economy in terms of machinery and labour cost.

No overhead farm cost allocation.

Received subsidies according to ruling scheme by each year.

Land is rented by 200 Euro per hectare all over the observed period.

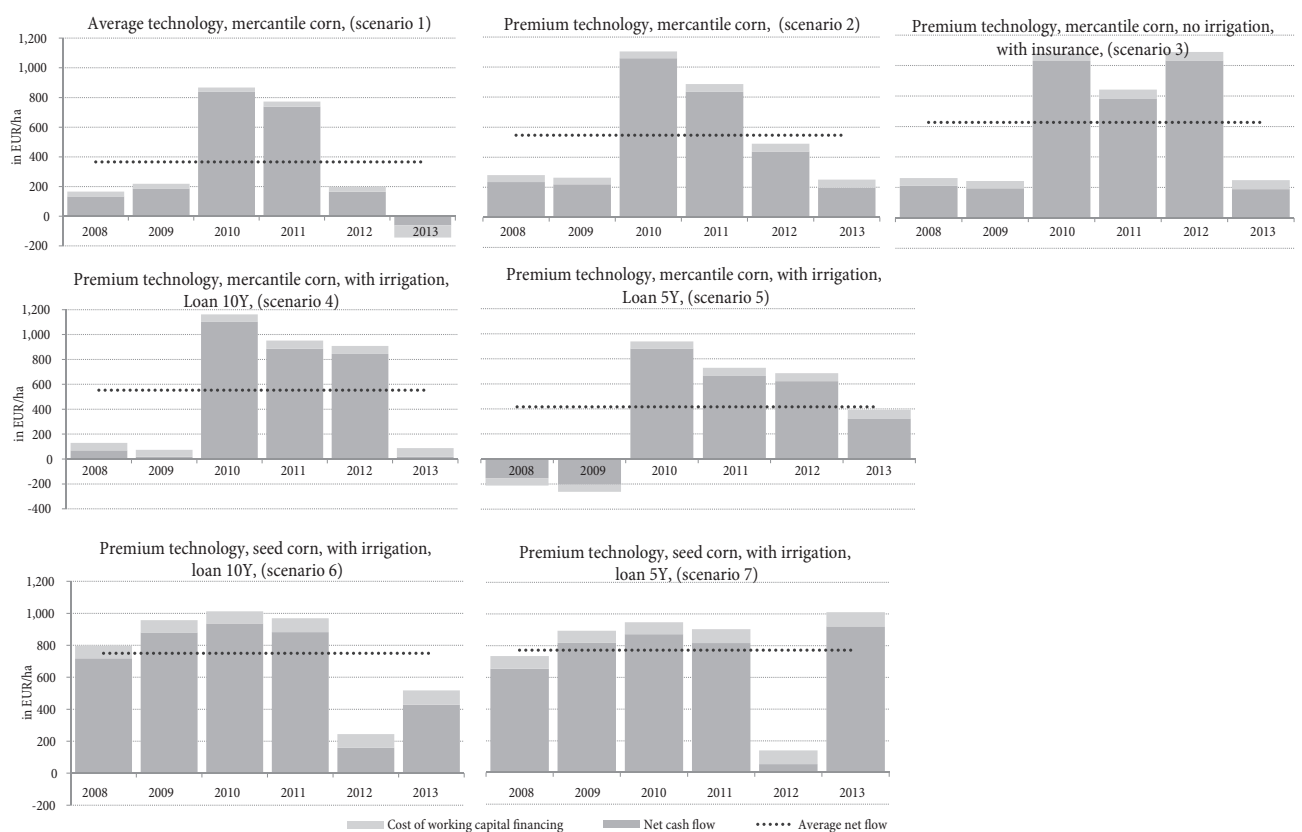
Production costs including (seed, fertilizer, protection, machinery rent, labor, fuel and water) are financed by working capital loan during 7 months from planting to harvest, with interest rate of 13% p.a.

effectively paid to farmers along this period according to the ruling regulation. We model the cash flow in seven different scenarios in order to illustrate the risks and opportunities from different technological and financial solutions for the same crop farm. The presented model is also illustrative from the point of competitiveness of the corn production in Serbia as selling prices applied in the model were following global price trend being even a little bit below prices from Budapest, Paris or Chicago market. Table 5 contains main underlying assumptions of the model as well as some information that help interpret the results such as average yield over the observed period while Figure 9 contains applied output prices as well as prices from international market for comparison needs.

The analysis of net cash flow in seven alternative scenarios leads to the following main messages (see Figure 7 and Figure 8 for illustration). First, the major relative improvement in average net cash inflow along the observed six years period may be attained by the improvement of cultivation technology in mercantile corn production i.e. passing from Scenario 1 to Scenario 2 by applying higher quality seed, more and better fertilizers,

protection measures, soil treatment and know how. Second, the average technology (Scenario 1) production became uncompetitive in 2013 when market prices decreased as it resulted in a negative net cash flow. Third, the average net cash flow gets additionally improved with insurance against drought (Scenario 3) as a significant drop in income in 2012 is compensated from insurance benefits repaying sum of annual net outflows on insurance premium along the observed period. Fourth, although yield varies from one year to another in each scenario, overall income volatility is mostly affected by market price volatility of output which is driven by world trends and registered a surge in 2010-2012 period and a drop in 2013. Fifth, investment in irrigation system decreases yield volatility. However, it implies a large initial investment and additional annual expenses on maintenance and fuel. We modeled two different scenarios of financing of the initial investment in irrigation system. All further scenarios suppose financing of irrigation equipment installed from the beginning of the observed period by an investment loan that is being repaid annually. In Scenario 4 and Scenario 6, we suppose a loan with fixed interest rate at

**Figure 7: Net cash flow by alternative scenarios in terms of technology and financing : mercantile corn and seed corn**

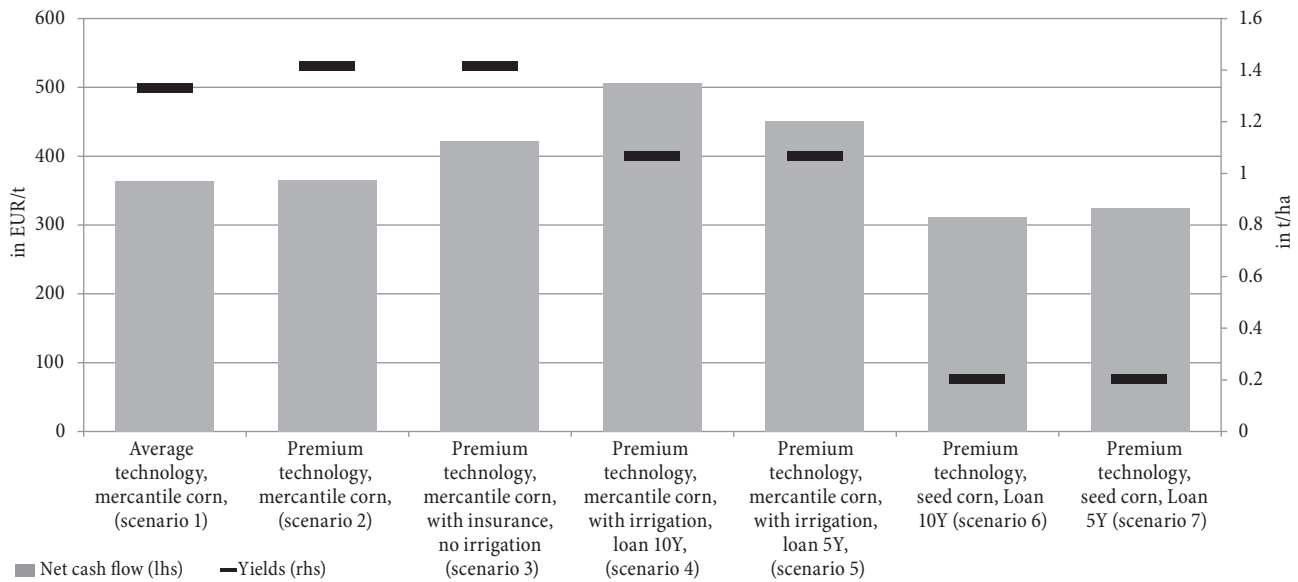


Source: Authors' calculation

7% and 10 years maturity. These are terms that are hardly obtainable on the market and are rather provided by some development or subsidized program. Alternatively, Scenario 5 and Scenario 7 assume irrigation investment financing by a rather commercial loan with 10% interest rate and with 5 years maturity. Both loans are hardly bearable for mercantile corn producer, though 10y loan repayment is resulting in positive net cash all along the period but with tiny net cash levels in three out of six years covered by the model. Nevertheless, irrigation is a precondition for many higher value added crops, and in order to stay

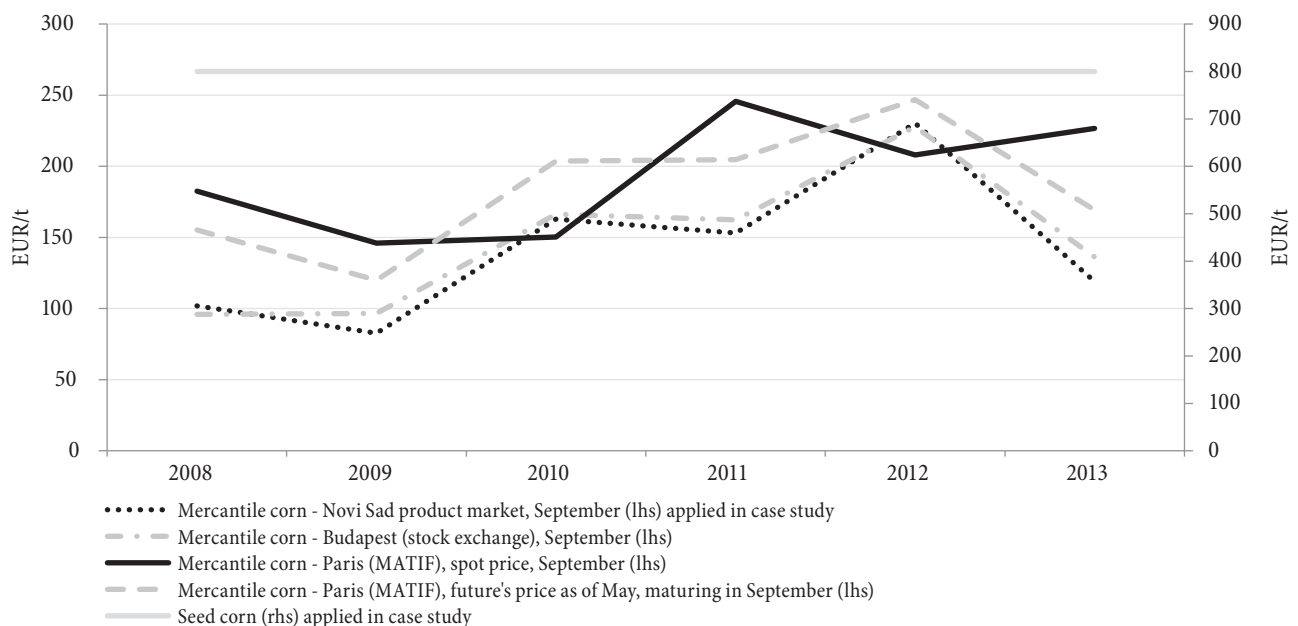
technologically close to other assumptions of the model, we suppose that the observed producer switches to seed corn production since the introduction of the irrigation system. The seed corn has much stable selling price and yield though the yield was somewhat lowered in 2012 drought season despite irrigation. Both scenarios assuming seed corn cultivation result in significantly higher net cash that any other scenario. In both Scenario 6 and Scenario 7, loan repayment is possible without causing illiquidity in any of the observed years. The last implication of this analysis is that irrigation system investment is worth and

Figure 8: Volatility of net cash flow and yield, by scenario, standard deviation 2008-2013



Source: Authors' calculation

Figure 9: Prices of mercantile corn and seed corn



Source: Authors' calculation

Note: Due to unavailability of data on market prices of seed corn, we apply the constant selling price corresponding to lower range along the whole period



bearable in terms of liquidity in the case of higher value added crops. The last holds even in the case of commercial loan terms. However, some easing of the financial burden to agriculture production by participating in risk premium and providing longer term financing may additionally support the competitiveness of produced crops.

It is worth to note here that typical producer in Serbia has no necessarily a free choice of switching to seed corn production, as apart from somewhat different planting technology, it requires previous agreement with purchaser of certified seed and as it is not traded on the commodity market. It is, however, used in this case study for an illustration of high value added crop planting. Similar results may be obtained using vegetables or fruits. These high value added crops are generally considered rentable and therefore used in practice on irrigated land fields.

### Concluding remarks and open issues

Serbia has a large agricultural sector, whose potentials are based mainly on high quality arable land, favorable continental climate and abundant labor. In order to reach its full potentials, Serbian agriculture needs to overcome its overall low level of productivity. Although a small number of larger producers is already able to compete and participate in global markets, as they have already reached critical size and have invested in technology, thus reaching high productivity levels, most agricultural producers' activity is characterized by old technology, undercapitalized production and low value added. The latter suggests a wide room for production gains, within a global market that is expected to grow in the forthcoming period [12].

Agricultural development and improvements in productivity represent a significant opportunity for Serbian economic prospects, but it should also represent a foundation for investments along the value chain into industry and services in order to provide sustainable economic development.

However, agricultural policy making process needs to aim double objectives. While it is important to stimulate large scale agricultural production and competitiveness, policy making also needs to take into account the importance of small scale farming for the social well-being, as very large

share of Serbian agricultural jobs are concentrated in small, relatively unproductive farms. This issue could partially be addressed by encouragement of co-operative farming, in order to facilitate higher competitiveness for market-oriented family farms, via effects of scale economy, direct access to markets and pooling of certain risks. However, this enablement needs better institutional framework.

Adequate well-designed policy approach is crucial given limited resources. In addition to creating the appropriate fiscal space, Serbia must build the institutional capacity for allocation of earmarked IPARD resources, as the recent experience from the new member states in the EU shows that insufficient absorption capacities of potential beneficiaries is one of the key reasons for underperformance of SAPARD (IPARD) programs [15].

A major challenge stems from almost complete liberalization of trade between Serbia and the EU starting from 2014, with the domestic agricultural sector losing tariff protection, while in overall it lacks level of standards of its European counterpart and enjoys a lower level of direct income support. In this context, a start of IPARD-based financing (which hasn't been utilized so far) is essential for maintaining and improving the level of competitiveness, but also a coordinated public and private investment cycle in technology, knowledge and infrastructure.

Agriculture is a risky business for individual producers – as we show on our case study of a corn farm – with risks mainly connected to price and yield volatility. Well understanding of these risks and their recurrence, is the key to their mitigation, but also represents challenge for the cash flow stability and repayments in case of external financing.

Investments in storage capacities, irrigation, specialization in crops, value chain integration toward higher value added products, investment in branding and marketing, improving the know-how and technology, insurance against disasters, as well as fulfillment of the ongoing ruling standards, are all necessary for development of the agricultural sector.

As self-financing of some of these investments may prove to be too heavy for individual producers, there is a large need for participation in risk mitigation by development agencies, specialized lines, IFIs and the state in order to decrease the costs of financing and



increase maturity of loans. Moreover, a coordinated shift toward higher value added products jointly with efforts in branding and marketing in international market may be a way toward more sustainable structure of agricultural output, able to provide much more stable cash flow and ability to bear higher investments financed even from commercial loans.

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