6 Rapeseed vs. sunflowers and soybeans- How do oilseeds compare on-farm economically?

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Introduction

In many parts of the world, at the farm level there used to be little to no competition between rapeseed and other oilseeds, such as sunflowers or soybeans. However, in a growing number of regions growers actually have such a choice. Due to improved breeding and new varieties, more sites are becoming suitable for new crops – e.g. soybeans in Canada - plus, growers are becoming aware of new options they didn't have in the past due to political and market restrictions.

As economic framework conditions become tighter for crop production, it is worthwhile to better understand the strengths and weaknesses of these oilseed crops from a grower's perspective. Then it will be possible to draw conclusions regarding future trends in crop acreage. Therefore the authors decided to run case studies[7] to evaluate the on-farm competitiveness of rapeseed vs. competing oilseeds for *agri benchmark* farms in Canada, Hungary and Ukraine.

The key questions to be addressed are:

(1) How do the three crops compare on-farm in terms of profitability?

(2) Are there any major differences regarding working capital needs? And if so, does that change the likelihood that growers will prefer one crop over another?

(3) Are there any other non-monetary factors, such as rotational benefits or liabilities that will impact grower's preferences for either of the crops?

In order to have a solid basis to answer these questions, the 3-year average data (2012-2014) will be used. With regard to the last question, expert opinions from growers and advisors will be referred to.

The section is organized as follows: First, the individual results from each of the three case studies will be presented. Since structural conditions and business models differ significantly within the farming population in Hungary and Ukraine, there are two farms included in each of these case studies to represent the different farm structures. Finally, the results will be compared across all farms and we will draw some conclusions. More graphs illustrating both the statistics cited here, as well as the farm economics, are available here: http://www.agribenchmark.org/cash-crop/sector-country-farm-information/oilseeds.html.

[7] The authors are grateful for financial support for this project from the Canadian Canola Growers Association. Results from this research have been presented at the 2015 International Rapeseed Conference.

Oilseed production in Manitoba/Canada

Manitoba has seen a massive expansion in soybean acreage moving from almost zero in 2005 to about half a million hectares in 2015. However, while rapeseed acreage has gone down a bit in recent years, it is still by far the most important oilseed with about 1 million hectares.

The growth in soybeans is an "invasion" from the South, as soybean genetics have continuously been adapted from varieties coming from the major soybean-growing areas in the United States. The key drivers for this increase in acreage are: (a) breeders have developed varieties with a shorter growing period and (2) climate change extended the frost free season. Yield statistics indicate that rapeseed yields in Manitoba are approximately 2 t/ha and soybeans yields about the same.

The typical farm we are considering here is about 2,000 ha in size; and is located close to Winnipeg with an annual precipitation of about 500 mm. The planted crop shares are as follows: 45 % wheat (2/3 spring, 1/3 winter wheat), 35 % spring rapeseed and 25 % soybeans. Oilseed yield levels are slightly higher for this farm when compared to the provincial average; both crops are at about 2.5 t/ha. This advantage stems from the fact that this region is more favorable for crop production than other parts of the province. The tillage system is mulch seeding, which is a bit more intensive (one pass harrowing after harvest) than the no-till system applied in most parts of the Prairie Provinces.

Table 2 contains key economic data for the two crops (2012-2014 average). It appears that the overall profitability of soybeans compared to rapeseed was significantly higher: +100 USD/ha or 50 % more. Even more important is that in a relatively poor year such as 2014 with low crop prices and only moderate yields in rapeseed, the return to land[8] was negative for rapeseed (-50 USD/ha) while soybeans still generated a positive return to land of approximately 50 USD/ha.

[8] We define the term as follows: gross revenue minus total cost (excluding land cost).

Table 2: Key features rapeseed & soybeans CA2000RRV (Ø 2012 -2014)

	Rapeseed	Soybeans
Price (USD/ha)	460	430
Direct cost (USD/ha)	500	300
Seed	160	190
Nitrogen	150	10
Crop protection	100	50
Operating cost (USD/ha)	270	230
Return to land (USD/ha)	200	300
Liquidity needs (USD/ha)	700	500

Source: *agri benchmark* Cash Crop (2015)

Finally, it is obvious from the empirical findings that soybeans are far less demanding in regards to liquidity needs. While growers have to spend about 700 USD/ha for rapeseed, they only spend 500 USD/ha for soybeans.

Beyond these cost considerations of the two crops non-monetary factors are relevant. When compared to rapeseed, soybeans have the following advantages:

- Their production cycle within the year is different than rapeseed. Soybeans are seeded later and harvested later in order to help stretch out machinery use and avoid high workload periods.
- Soybeans can better cope with wet conditions, which is an important consideration in the region considered here.
- Soybeans are less prone to heating in storage, which is of some concern to growers in Manitoba.

On the contrary, soybeans have some disadvantages relative to rapeseed:

- Growers may need some special equipment (land rollers, special combine headers, etc.)
- Soybeans are more susceptible to early and late frost, which again is a relevant issue in Manitoba.

Conclusions for Manitoba

From the data presented here, it can be concluded that rapeseed will remain a core element of rotations in Manitoba, but soybean acreage will expand in the years to come. In particular, soybeans may expand quickly if crop prices diminish further because this will make it even harder for growers to obtain finance.

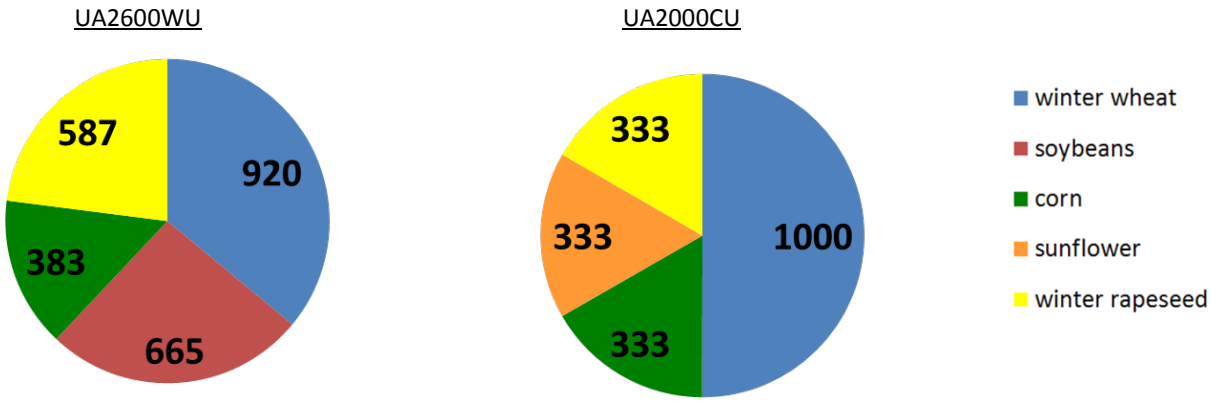
Another favorable condition for soybeans: So far the majority of output has been exported from the region, with respective negative impact on farm gate prices. Currently local processing facilities are under construction with anticipation of increased local consumption, and hence farm gate prices will go up – at least relatively.

Oilseed production in Ukraine – Holding farm vs. owner operations

Ukraine used to be a pure "sunflower" country – both soybeans and rapeseed are newcomers since the early 2000s. Still sunflowers account for about 5 million ha (approximately 65 %), while soybeans and rapeseed only cover approximately 1.5 million and 1 million ha, respectively. However, the average growth rates in acreage for the two crops are impressive: 18 and 24 %, respectively, between 2003 and2013. It should be noted that while it's not legal to produce GM soybeans, a significant portion of the output is indeed GM.

In Ukraine, the analysis includes two typical farms. One is located in the West and is part of a large agro-holding (UA2600WU). The other farm is operating in the central region and is a top-performing farm managed by Western growers (UA2000CU), as well as supported by Western investors. Both farms enjoy the benefits from deep black soils, but UA2600WU receives a bit more precipitation (600 vs. 550 mm). The latter does mulch seeding, while the other runs a minimum tillage system.

Figure 16: Crops planted on UA2600WU and UA2000CU farms (ha)



Source: *agri benchmark* Cash Crop (2015)

The planted crop shares of the two farms are displayed in Figure 16. It appears that the holding farm has similar rapeseed and soybean acreage; which is the same on the Western farm for rapeseed and sunflowers. Furthermore, the Western farm is more "grain-driven" (+70 %) than the holding farm (50 %).

Table 3 contains key economic data for oilseeds at the two farms. The most important findings are:

(1) In terms of return to land, rapeseed outcompetes sunflowers by a margin of about 340 USD/ha, or by more than 50 %, on the top-performing farm.

(2) For the agro-holding farm, the two oilseeds have been about the same with regards to return to land (+/- 200 USD/ha). However, liquidity needs for rapeseed are more than twice as high as in soybeans.

(3) The holding farm treats soybeans much more extensive than rapeseed. This is true not only with regards to inputs (360 USD/ha vs. 170 USD/ha), but also for operating costs (420 USD/ha vs. 250 USD/ha).

(4) Given the fact that inoculants for soybeans are still far from being optimal for conditions in Ukraine, growers tend to use some nitrogen. Similar practices can be observed in Russia.

(5) Despite the fact that climatic conditions tend to be a bit better for the holding farm, rapeseed yields are rather low compared to the top-performing individual farm. When considering the use of nitrogen and crop protection this difference cannot entirely be explained by differences in intensity of inputs used. Together with low yields in soybeans, it is assumed that farm management and business strategy also play a significant role.

Table 3: Key features of oilseeds for UA2600WU and UA2000CU (Ø 2012 -2014)

	UA2000CU		UA2600WU	
	Rapeseed	Sunflowers	Rapeseed	Soybeans
Yields (t/ha)	4	3.5	2.7	1.7
Price (USD/t)	450	380	430	410
Direct cost (USD/ha)	380	330	360	170
Seed	30	60	50	65
Nitrogen	170	50	130	20
Crop protection	75	50	120	60
Operating cost (USD/ha)	400	360	420	250
Return to land (USD/ha)	940	600	200	180
Liquidity needs (USD/ha)	420	355	415	190

Source: *agri benchmark* Cash Crop (2015)

Non-monetary effects

Crop choices are influenced very often by factors other than profits. These factors have been considered for the two typical farms. On the holding farm (UA2600WU), when compared to soybeans, rapeseed has the following advantages:

- Rapeseed is a superior preceding crop to wheat when compared to soybeans. The yield penalty for wheat following soybeans is in the range of 1/ha because of later seeding times.
- Since rapeseed is sold to Western Europe markets, conditions and prices tend to be better than for soybeans, which are primarily marketed locally.

For the top-performing individual farm (UA2000CU), rapeseed is also the better preceding crop to wheat when compared to sunflowers, because harvest takes place earlier (approximate 5 % yield advantage for wheat).

Conclusions for Ukraine

Typical farm data suggest that under Ukrainian conditions, rapeseed is the best crop for top-performing growers, who operate high intensity systems. Rapeseed tends to yield better than sunflower, and prices have been better as well. In such an environment it can be expected that there is significant room for further growth of rapeseed acreage.

On the contrary, for holding farms it seems to be hard for rapeseed to compete against soybeans, especially if crop prices will further decrease, and thereby farm liquidity becomes an even more important criterion. Further, holding farms have systematic problems to improve technical performance (problems to incentivize and control operators). This is why corn as a more "industrial crop" is a more attractive option for them when compared to wheat. Since soybeans nicely fit into corn rotations – and not that well into wheat rotations – it can assumed that rapeseed will have even more problems to compete against soybeans on such farms.

Oilseed production in Hungary – Traditional local farms vs. western producers

Similar to Ukraine, Hungary is a "sunflower" country: 0.6 million ha were harvested in 2014, but only 0.2 million ha under rapeseed and only 40.000 ha of soybeans. Given the rather small size of soybeans, the subsequent analysis will focus on rapeseed and sunflowers. Plus, sunflower acreage is still going up (+100.000 ha since 2010), while rapeseed acreage has decreased by about 50.000 ha since 2010. Statistics show that in western Hungary rapeseed yields are at about 2.6 t/ha while sunflowers yield roughly 2.4 t/ha.

Similar to Ukraine, crop producers vastly differ depending on their background and the business model they practice: Western farmers who moved to Hungary and invested in farming (see HU1500BA) tend to outperform traditional growers significantly (see HU1500BA_trad). For example, in the western part of the country they produce 3.6 t/ha or more in rapeseed, while the statistical average is 2.5 t/ha.

In Table 4, the respective economic data is compiled. The following results are important to note:

(1) For the traditional farm, the two crops do not significantly differ in terms of gross margins. Higher prices for rapeseed are offset by higher yields in sunflowers.

(2) On the top-performing Western farm rapeseed clearly outcompetes sunflowers by a margin of almost 400 USD/ha or more than 50 %. This is because rapeseed yields and prices are higher than in sunflowers while direct cost is almost the same.

Table 4: Key features of oilseeds for HU1500BA and HU1500BA_trad (Ø 2012 -2014)

	HU1500BA		HU1500BA_trad	
	Rapeseed	Sunflowers	Rapeseed	Sunflowers
Yields (t/ha)	3.6	3.2	2.5	2.7
Price (USD/t)	400	360	390	360
Direct cost (USD/ha)	550	560	500	460
Seed	60	80	50	70
Nitrogen	180	150	170	100
Crop protection	210	190	210	170
Gross margin (USD/ha)	890	570	480	460

Source: Hanse Agro (2015)

Conclusions for Hungary

The data presented here suggest that the top-performing Hungarian farm is way better off with rapeseed than with sunflower. This is primarily due to higher prices and higher yields for rapeseed. Therefore it seems that if more Western technology and know-how becomes adopted by Hungarian agriculture, rapeseed will benefit in terms of acreage and output.

For traditional producers the situation looks quite different: Here gross margins for the two crops are almost identical while direct cost is higher for rapeseed compared to sunflowers. This situation limits the potential for rapeseed acreage in this market segment.

Conclusions for on-farm competitiveness of oilseeds

Based on the analysis presented here the following conclusions can be drawn:

(1) The economics of oilseeds differ significantly with management skills and intensity levels: For top-performing growers in Hungary and Ukraine who use a lot of inputs in a sophisticated manor, rapeseed tends to be the most profitable oilseed. This implies that know-how and technology adoption may lead to more rapeseed production. However, it has to be kept in mind that as of today soybeans are less developed in these countries, both in terms of varieties as well as regarding inoculants. Also, growers are lacking experience in this particular crop.

(2) If local soybean varieties are available, as well as the know-how, soybeans would be very competitive vs. rapeseed. This rather strong position of soybeans in Canada – compared to the situation in Europe – can eventually be explained by the fact that rapeseed is only produced as a spring crop in Canada, whereas in Europe winter rapeseed is grown. The status “winter crop” implies a rather high yield level when compared to spring crops soybeans and sunflowers. Furthermore, in the Americas revenue from soybean breeding is much more attractive compared to the non-GM breeding in Europe. This is because the GM traits bred into varieties in the Americas allows breeders to recover their investments and to generate a higher profit.

(3) Again, in regions in which winter crops are being produced, there are strong rotational benefits from rapeseed when produced together with wheat.

(4) On the contrary, when corn is the first choice of growers, sunflowers and soybeans do not result in yield penalties in the subsequent wheat crop.

(5) In a situation in which liquidity and/or risks are important constraints, soybeans tend to be the better options for growers because they tend to be relatively low input crops and hence low cost.