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SOYBEAN DEMAND OF ORGANIC AND CONVENTIONAL FARMS IN LUXEMBOURG

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Abstract: To face the Luxemburgish ambitions to reduce soybean imports, soybean demand of Luxembourg was assessed for organic and conventional agriculture and separately for ruminants and monogastrics. In SoyMAX, soybean demand according to the common feeding practices was calculated and in SoyMIN, soybean demand was calculated according to a reduced soybean input in the feeding ration. In SoyMAX the demand in Luxembourg for soybean extraction meal is 29.182t and 16.940t in SoyMIN. Including a national soybean production, a soybean autarky of 29,8 % could be reached. Concerning organic monogastric ration, soybean extraction meal demand could be reduced from 304 t to 245 t. Cultivation organic soybean in Luxembourg could come to a soybean autarky of 54 % for organic monogastric sector. There exist different ways to reduce soybean imports. Nevertheless, to establish a national soybean production the whole chain needs to be build up including a processing facility and a national protein strategy is needed to develop a holistic strategy for Luxembourg.

Introduction: All over Europe there are ambitions to reduce soybean imports from overseas, also in Luxembourg, which signed the “European Soya Declaration”. Currently 100% of soybean demand of Luxembourg is imported and the actual amount of soybean demand is not known. In organic agriculture, soybean is mainly used in monogastric feed, and only in small quantities also for ruminants (RU). Organic soybean is difficult to get and expensive. Considering this additionally to the socio-environmental issues inherent to soybean imports from overseas, especially from South America, alternatives are needed, especially for monogastrics (MO). The aim of this study is to calculate the actual soybean demand for Luxembourg separate for organic (ORG) and conventional (CON) agriculture as well as separately for MO and RU to be able to discern alternatives to the current soybean imports.

Material and methods: Data of livestock was provided by the “Service d’économie rural” of the Ministry of agriculture of Luxembourg for 2018. Livestock was separated by animal category MO and RU and by ORG or CON management. For the calculation of the soybean demand two variants were calculated: SoyMax– soybean demand of 2018 according to the common feeding practices in Luxembourg (expert interviews were conducted); SoyMin– soybean demand of 2018 according to a reduced soybean input in the feeding rations, always meeting animal’s nutritional demands. Demand of soybean extraction meal (SoyEX) per animal and year and per animal category and year was derived from SoyMAX. For

facilitation, it was assumed that for CON 44 % soya extraction meal and for ORG an equivalent deoiled, toasted soya was used. From this the demand of soybean was calculated. As soybeans contain 20 % oil, the demand of SoyEX was multiplied per 1,25. For national soybean cultivation a yield of 2t/ha was assumed based on first soybean field trials conducted in Luxembourg. Out of a literature review reduced soybean feeding rations were extrapolated to determine SoyMin and the above described parameters were calculated accordingly.

Results: In the SoyMax variant, the SoyEx demand for RU is 20.724 t (ORG 51 t; CON 20.674 t), equivalent to 25.905 t of soybeans and 12.953 ha national cultivation area (Table 1). In the SoyMin variant, a potential reduction of soybean demand of 58,5 % was calculated (15.150 t soybeans; 7.575 ha in Luxembourg). For MO, a total of 8.458 t (ORG 304 t; CON 8.154 t) SoyEX demand was calculated in the SoyMax variant, corresponding to 10.573 t soybeans and 5.286 ha in total; and 380 t soybean demand and 190 ha in ORG. In the SoyMin variant, total SoyEx was reduced by 45,6 % to 4.820 t (ORG 245t), corresponding to 6.025t soybeans (ORG 306t) and 3.012ha nationally (ORG 153ha).

Table 1: Demand of SoyEX, demand of soybeans and soybean cultivation area for MO in 2018 for the SoyMAX variant.

Animal category	Total	OR	CO	O	C	O	CO	O	CO	O	CO
		G	N	R	O	R	N	R	N	R	N
	Number of animals			Demand SoyEX ¹		Demand SoyEX ¹		Demand Soybeans		Soybean cultivation area at yield of 2t/ha	
				kg per animal and year		t per animal category and year		t		ha	
Pigs	91.74	892	90.8	56	28	50	7.2	63	9.01	31	4.5
	5		53		0		11		3		07
Piglets under 8kg ²	10.26	37	10.2
	6		29								
Piglets 8-30kg ³	19.24	250	18.9	.	46	.	87	.	1.09	.	54
	1		91				8		7		8
Fattening pigs 30kg ⁴	56.14	514	55.6	.	99	.	5.5	.	6.91	.	3.4
	7		33				29		1		56
Sows	6.091	91	6.00	.	13	.	80	.	1.00	.	50
			0		4		4		5		2
Laying hens	101.3	16.2	85.1	9	10	15	86	18	1.08	94	54
	76	13	63			0	4	8	0		0
Freyers ⁵	21.47	15.1	6.36	7	12	10	79	13	99	65	50
	1	05	6			4		0			

Sum (ORG./CON.)	30	8.1	38	10.1	19	5.0
	4	54	0	93	0	96
Sum Total	8.458		10.573		5.286	
¹ SoyEx: Soya extraction meal 44% for CON and equivalent deoiled, toasted soybean for ORG						
² Demand negligible						
³ Number of litters per year (CON.) = 2,35						
⁴ Passages per year (CON) = 2,85						
⁵ Passages per year (CON) = 7,6; ORG = 4						

Total SoyEx demand for Luxembourg in 2018 was 29.182 t in the SoyMAX variant and 16.940 t for SoyMIN. This would correspond to a soya cultivation area in Luxembourg of 18.239 ha for SoyMax and 10.587 ha for SoyMIN. In overseas a yield of 3 t/ha is more realistic, so 12.159 ha of soybean are currently cultivated overseas to meet the soya demand of Luxembourgish animal husbandry, with a calculated reduction potential to 7.058 ha.

Discussion: Luxembourg is importing currently 100 % of its soybean demand, meaning around 29.000 t. The potential of reducing soybean imports by reducing soybean in feed rations was calculated to be 42 %. The alternative reduced soybean rations are just an example and one of many different possible rations. Nevertheless, reducing soybean in feed rations always means considerable changes of feedings in the different animal categories and thus in the whole farm production system. In laying hens sector, reducing soybean means to turn away from a standard feed mixture to a complexer alternative feed mixture or to make an own mixture. Nevertheless, it is obvious, that in Luxembourg the highest reduction potential is in the RU sector, since cattle and dairy cows are the main national sectors. Due to the domination of permanent grassland (ca. 50% of agriculture area; SER, MA - Service d'Economie Rurale, Ministere de l'Agriculture, de la Viticulture et du Developpement Rural, 2016), the highest optimization potential is in this domain. So, for cattle fattening soya could be reduced if in parallel corn silage would be reduced in the ration and focus would be laid on grass silage (Ettle et al., 2011).

Beside the possibility of reducing soybean imports by reducing soya in feed rations, soybean could also be cultivated in Luxembourg, which is reasonable on ca. 50% of the Luxembourgish crop land (31.500 ha), according to pedo-climatic conditions. In Luxembourg, farmers have in general a crop rotation of 3,9 elements (Zimmer et al., 2016). In a survey farmers stated that they would integrate a new crop such as soybean in there rotation as an additional element (Zimmer et al., 2016). So, if every second farmer on the 31.500 ha would cultivate soybean in a 5-element-crop-rotation, the cultivation potential of soybean would be 3.150 ha. Assuming a yield of 2 t/ha, an equivalent of 6.300 t soybeans and 5.040 t SoyEX could be produced, which would correspond to a soya autarky of 17,3 %. Reducing soybean in feed rations (SoyMIN 16.640 t) and cultivating soybean in Luxembourg could increase soya autarky to 29,8 %.

Regarding the situation of MO in ORG, the actual soybean demand is 340 t SoyEx, resp. 380 t soybeans. This equals a national production area of 190 ha. Arable land in ORG agriculture counted 2.648 ha in 2018 (Eurostat, 2019). With the same assumption as previously elaborated, 133 ha would be available under ORG conditions and 265 t of soybeans could be produced, which correspond to an equivalent of 106 t of deoiled and toasted soya. Thus, a soya autarky of 39 % in the ORG MO sector would be possible. Additionally, reducing soybean in feed rations (ORG SoyMIN 245 t) an autarky of 54 % would be feasible.

In conclusion there is a huge potential to increase soya and thus protein autarky in Luxembourg. Ways to reduce soybean imports are diverse. However, to establish a national soybean production the whole chain needs to be build up including a processing facility. For ORG, first incentives to build up such a chain have been launched in the project "Soya made in

Luxembourg”, where stakeholders around the national organic laying hens sector set up a structure for national soybean production for organic laying hens feed. This project could act as a case study to build up a national soybean production chain. Furthermore, a national protein strategy is needed to develop a holistic strategy for Luxembourg.

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References: Etele, T., Obermaier, A., Weinfurter, S., 2011. Untersuchungen zum Einsatz von Grassilage in der Bullenmast.

Eurostat, 2019. Organic crop area by agricultural production methods and crops (from 2012 onwards). URL <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>

Schreiter, R., Damme, K., 2017. Legehennenfütterung Einsatz heimischer Futtermittel Fütterung schnabel-unkupierter Legehennen, LfL Information. Bayerische Landesanstalt für Landwirtschaft (LfL).

SER, MA - Service d'Economie Rurale, Ministere de l'Agriculture, de la Viticulture et du Developpement Rural, 2016. Die luxemburgische Landwirtschaft in Zahlen 2016. Serv. Econ. Rurale Minist. Agric. Vitic. Dev. Rural 32.

Zimmer, S., Liebe, U., Didier, J.-P., Heß, J., 2016. Luxembourgish farmers' lack of information about grain legume cultivation. Agron. Sustain. Dev. 36. <https://doi.org/10.1007/s13593-015-0339-5>

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