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Economic Evaluation of Intensive Growing of Selected Crops

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Anotace

Předložený příspěvek na téma „Ekonomické hodnocení intenzivního pěstování vybraných plodin“ se zabývá ekonomickým zhodnocením pěstování vybraných plodin řepky ozimé, pšenice ozimé a cukrové řepy v Agro Žlunice a.s., kde jsou využívány intenzivní pěstitelské technologie. Dosahované výsledky jsou srovnávány s výsledky v rámci České republiky, které představují průměrné hodnoty pro uvedené plodiny. Agro Žlunice a.s. se nachází v řepařské výrobní oblasti v okrese Jičín a hospodaří na 1902 ha zemědělské půdy, z čehož je 1742 ha orná půda. Rozhodující předmět podnikání zde tvoří rostlinná výroba, živočišná výroba a ovocnářství. V příspěvku se hodnotí intenzita a ekonomika pěstování řepky ozimé, pšenice ozimé a cukrové řepy v letech 2010, 2011 a 2012. Řepka ozimá je z tržního hlediska důležitou plodinou pro vybraný podnik i české zemědělství. Při vhodném pěstování výrazně přispívá ke kladnému hospodářskému výsledku. U pěstování pšenice ozimé z hlediska konkurenceschopnosti je důležité snižování technologických vstupů, které nevede k poklesu výnosu a má prokazatelný ekonomický přínos při posuzování nákladů na jednotku produkce. Příznivá ekonomika pěstování této plodiny je dosahována, jak při intenzivní pěstitelské technologii v daném podniku, tak i za průměrných podmínek pěstování. Základním předpokladem, zda pěstovat cukrovou řepu, je možnost podniku dodávat tuto suroviny ke zpracování ať už pro výrobu cukru či bioetanolu. Tato plodina v uvedeném podniku i v rámci celostátním vykazuje příznivou rentabilitu. Dosažené pěstitelské i ekonomické výsledky podniku Agro Žlunice a.s. při využívání intensivních pěstitelských technologií jsou příznivější v porovnání s průměrnými výsledky za celé odvětví zemědělství.

Poznatky prezentované v článku jsou výsledkem řešení výzkumného záměru MŠM 6046070906 „Ekonomika zdrojů českého zemědělství a jejich efektivní využívání v rámci multifunkčních zemědělskopotravinářských systémů“.

Klíčová slova

Řepka ozimá, pšenice ozimá, cukrová řepa, hektarový výnos, náklady přímé, realizační cena, tržby, provozní zisk, rentabilita.

Abstract

The submitted paper on the topic: “Economic Evaluation of Intensive Growing of Selected Crops” deals with an economic evaluation of growing of selected crops – winter oilseed rape, winter wheat, and sugar beet in Agro Žlunice a.s. where intensive growing technologies are used. Reached results are compared with results in the framework of the Czech Republic which represent average values for the mentioned crops. Agro Žlutice a.s. is situated in sugar beet production area in district Jičín and it farms on 1902 ha of agricultural land of which 1742 ha is arable land. A decisive subject of business here is plant production, animal production, and fruit growing. In the paper, an intensity and economics of growing of winter oilseed rape, winter wheat, and sugar beet in 2010, 2011 and 2012 is evaluated. Winter oilseed rape from a market view-point is an important crop for the chosen enterprise and Czech agriculture. In suitable growing it significantly contributes to a positive economic result. In winter wheat growing, from a view-point of competitiveness, it is important to reduce technological inputs which does not lead to decrease in yield and has provable economic benefit in evaluation of costs per a production unit. A favourable economics of growing of this crop is reached both in the intensive growing technology in the given enterprise, and within average growing conditions. A basic presumption whether to grow sugar beet is a possibility of the enterprise to supply this raw-material for processing either for sugar or bio-ethanol production. This crop in the mentioned enterprise and in the nationwide framework shows a favourable profitability.

The reached growing and economic results of the enterprise Agro Žlunice a.s. in use of intensive growing technologies are more favourable in comparison with average results over the whole sector of agriculture.

Pieces of knowledge introduced in this paper resulted from solution of an institutional research intention MSM 6046070906 „Economics of resources of Czech agriculture and their efficient use in frame of multifunctional agri-food systems.

Key words

Winter oilseed rape, winter wheat, sugar bet, yield per hectare, direct cost, realization price, revenues, operational profit, profitability.

Introduction

In the framework of plant production in the Czech Republic, cereals, oil plants and row crops belong among decisive groups of crops. An economic evaluation is focused on one significant crop of each group. It is dealt with winter oilseed rape, winter rape, and sugar beet. The Czech Republic ranked after the accession in the European Union among the biggest European rape growers. A large-area growing of the best line and hybrid varieties was a base of a very good quality of domestic raw material in which there is a big interest abroad.

From an economic point of view, growing of oilseed rape has a double effect for management of agricultural enterprises:

- direct – a production and sale of rape seed,
- indirect – as a foregoing crop it increase yield of cereals (an interrupter of cereal succession), improves soil structure by which it influences nutrition management in the soil (Baranyk, Fábry at al., 2007).

A correct crop rotation system is cheapest and economically the most efficient, biologically and ecologically the most correct intensification measure in winter oilseed rape growing. Oilseed rape has an importance also as weeding plant. An influence of oilseed rape on soil structure is very significant (Vašák at al., 2000).

A success of rape growing is considerably dependent on a care which a grower gives to its nutrition. In nutrient consumption, rape is ranked among very demanding crops. An above-ground bio-mass takes for a good yield 4 t per hectare following amount of basic nutrients: 208 – 236 kg of nitrogen, 160 – 200 kg of potassium, 120 – 152 kg of calcium, 44 – 72 kg of phosphorus, 16 – 24 kg of magnesium, 48 – 64 kg of sulphur (Balík, 2007).

From a market viewpoint, one of the most important plants for Czech agriculture is winter oilseed rape. Seed of winter rape is a very demanded and appreciated commodity in a long term. Rape in reasonable, economical growing significantly contributes to creation of a positive economic result and stabilizes economic situation of enterprise.

The cultivation of oilseed rape poses no particular problems for its good adaptability to different soil and climatic conditions (Zegada-Lizarazu, Monti, 2011). Besides the market use itself rape significantly influence its preceding-crop and economic efficiency of other plants, mainly of cereals. Thereby, its importance for Czech agriculture significantly increases at time of narrowed cropping patterns. Rape growing from economic view-point has a double effect for management of agricultural enterprises. A direct, understand production and sale of rape seed, and an indirect, rape as preceding crop increases yield of cereals and improved soil structure by which it influence nutrient management in soil. Rape growing is a very demanding and costly business and requires very good knowledge. A perfect knowledge of growing technology is important, but the same importance is given to knowledge of economic problems, especially cost items. Foe business economics it is fundamental a financial result of economic activity. Security of positive operating results can be reached the best by optimization of production for given growing conditions (Baranyk, Fábry et al, 2007).

Winter wheat is in the Czech Republic the most important field crop grown approximately on a quarter of arable land. It belongs among so called cash commodities which positively influence economy of most agricultural enterprises. It is grown practically in all production areas. For comparison, the largest wheat producer and consumer in the world is China where wheat is widely distributed from the Arctic to the equator and from lowlands to highlands (Jing-Jong, Guang-Sheng, Xing-Hua, 2012). Favourable profitability rate is

reached above all in site conditions of sugar beet, maize, and partially also grain production area, even if a certain part of food wheat production came, mainly in the last years, also from potato production area, and its growing was generally profitable (Křen, 2001).

Winter wheat is the most demanding cereal regarding preceding crop because it substantially changes soil environment and qualities important both for the growth of plants, and for the creation of yield and quality. In choice of preceding crop it is necessary to take into account conditions of the production area, requirements of varieties, and the final use of production. The best preceding crops are clover, legumes, oil crops (winter oilseed rape), and vegetable – organically fertilized crops (Zimolka et al, 2005).

Fertilization, above all by nitrogen, can influence more or less creation of growth and thereby also the final effect – the yield and quality of grain. With yield around 6 t of grain and approximately the same yield of straw, about 144 kg of N, 30 kg of P, 108 kg of K, 24 kg of Ca, and 12 kg of Mg is drawn from the soil (Vaněk et al., 2007).

In minimization technologies of wheat growing it is possible to save labour which reduces costs. Also costs for fuels and use of machines, which have a smaller number of passages, are lower. However, in minimization technologies we have to count on higher costs for liquidation of weeds by the help of herbicides. Costs for herbicides will than show themselves in the total costs (Horák, 2005).

Economic reasons play the main role in every business, in the current agriculture they lead to narrowing of assortment of grown crops, to a simplification of cropping pattern, an enlargement of area under crops in which minimization technology secures achievement of comparable yields. A permanent rise in a diesel price, but also a labour price increases differences in costs among conventional technologies using in various rate minimization elements (Hůla, Procházková, 2008).

Sugar beet is the most productive crop of temperate zone and in our territory has been grown to a greater extent already for 180 years. Sugar beet belongs among stabilizing crops of our fields. In recent two years, yields of sugar beet moved at a high level in the Czech Republic. The year 2011 enrolled in history of sugar industry as record when average yields of our growers converted to 16 % sugar content exceeded a border 70 t/ha. Sugar beet succeed also in 2012 when yields with 16 % sugar content at average moved again above 70 t/ha. However, there were obvious large differences among areas. While growers in Bohemia harvested at average roughly 80 t/ha of tubers, in Moravia yields fluctuate between 50-70 t/ha in dependence on weather course. A ten-year average of the Czech Republic amount approximately 61 t/ha (Honsová, 2013). In comparison with other crops sugar beet is not characterized by self-regulated, but only compensatory ability, due to which the average weight of plant corresponds in a certain extent to a land area which the plant keeps at disposal during its life (Pulkrábek et al., 2007).

The yield structure is composed of:

- a number of plants per hectare
- a weight of tubers
- an amount of sugar in a tuber (Hřivna et al., 2004).

Sugar beet is an important cash crop. From a view-point of economics of its growing, decisive is achievement of appropriate yield in standard quality. The yield and quality of sugar rape is created during the whole vegetation and a significant role is plaid here by agri-ecological factors: course of weather, conditions of the site, a level of agronomical activity etc. One of possibilities to influence significantly the yield and quality of production is an application of controlled nutrition. Fertilization with nitrogen and other macronutrients is decisive. However, sugar beet also a plant very well responsive to extra-root nutrition. Therefore, also "leaf fertilizers", eventually growth substances can be used successfully (Hřivna, Pecková, 2013).

Sugar beet is highly nutrients intensive crop; therefore it is possible to grow it only on fertile land with sufficient fertilization. Nevertheless, we can secure the right nutrition of sugar beet by a suitable combination of fertilization with manure and mineral fertilizers. Dosage of nutrients for sugar beet are determined in a system based on soil analyses on operative determination of spring nitrogen reserve in soil, and on plant analyses (Vaněk et al., 2007).

In a high yield of biomass sugar beet takes also a huge amount of nutrients from the soil. However, any luxury uptake of nutrients (it is an intake higher than must) is harmful; it deteriorate economy, and especially it complicates processing to sugar.

So, the fertilization is above all the matter of optimization, finding of the best combination between favourable and undesirable effects of fertilizers (Chochola, 2004).

The most suitable organic fertilizers are manure and compost. Recently, a green fertilization has been used. A manure dosage is about 40 tonnes per hectare. However, the term of ploughdown is always more important than the dosage. The most suitable for conversion of manure and for creation of soil structure is ploughdown in September. Slurry with straw is a suitable organic fertilizer, if it is applied equally in the same terms as manure (Pulkrábek et al., 2007).

The economic position of Czech producers related to the most considerable commodities of Czech agriculture through 2 indicators, profitability without supports (R–S) and profitability with supports (R+S). There was proved that profitability R+S in the period I was positive for most plant commodities while it was negative for most animal commodities. In connection with the membership of the CR in the EU, agricultural supports significantly increased for nearly all commodities as the consequence of applying the Common Agricultural Policy (CAP) on Czech agriculture. Therefore, there were monitored in the period II important positive changes of the indicator R+S for most commodities. For the average of the Czech Republic, there were obtained the following values of R+S in the period I, resp. period II: wheat 2.6%, resp. 24.9%, barley 27.7%, resp. 39.8%, rapeseed –18.0%, resp. 23.4%, sugar beet 9.1%, resp. 41.4%, potatoes 10.5%, resp. 2.5% (Foltýn, Kopeček, Zedníčková, Vávra, 2009).

An aim of the paper is evaluation of intensive growing of crops of an agricultural enterprise Agro Žlunice a.s. in comparison with average results within the Czech Republic. The work focuses on selected crops: winter oilseed rape, winter wheat and sugar beet. These crops are the third most important cash crops for the mentioned farm and other agriculture enterprises in the same natural conditions which significantly contribute to achievement of positive economic result. The paper contains an evaluation of growing level in 2010, 2011 and 2012.

Materials and methods

As a resource of supporting data a business registration on plant production is used, as well as economic data obtained from internal annual reports of the enterprise and registered operating results. For comparison of results of Agro Žlunice with results of the Czech Republic, information from statistics provided by the Ministry of Agriculture of the CR and the Institution of Agricultural Economics and Information Prague (IAEI) was used.

A detailed analysis of natural and economic results is elaborated over the whole economic years 2010, 2011 and 2012. Regarding to recording economy over calendar year, a term calendar-economic year is used also for evaluation of results in the plant production. The paper shows cost calculations for growing of evaluated crops. An influence of intensification factors is investigated in details in the form of costs for seeds, fertilizers and plant protection.

Efficiency of growing of selected crops is evaluated on base of comparison of costs and achieved revenues from sale. The economic result of growing of winter oilseed rape, sugar beet, and winter wheat is expressed in the form of operational profit, i.e. a profit before interest and taxation (EBIT).

Characteristics of the enterprise

The joint-stock company Agro Žlunice, a.s. came into being on the 6th of October, 1998. The company domicile is Žlunice, the region Jičín. The enterprise has been found for indeterminate duration.

Žlunice is situated in altitude 250 meter above the sea level. The company manages in the area of rape production type. A soil type is pararendzina on terraced broken stones and gravel sands from acid material. The soil is slightly acid to neutral; a content of phosphorus is 71 mg.kg^{-1}, of potassium 173 mg.kg^{-1} and of magnesium 147 mg.kg^{-1}. A climatic region: BZ – mild warm area, mild dry, with mild winter. The average yearly air temperature is 7 – 9 ^{o}C in this area and the average yearly rainfall totals 500 – 600 (650) mm (in the vegetation period /i.e. April – September/ is 380 mm. The site is plane.

The acreage of agricultural land on which Agro Žlunice, a.s. manages, is 1902 ha, of it 1742 ha is arable land.

The main subject of enterprise is agricultural production including purchase of non-processed agricultural products in the view of further processing and sale. Other subjects of enterprise are repair and production of agricultural machines, fruit growing, bee-keeping and others. Plant production is focused on growing of cash crops like: winter

wheat, winter oilseed rape, pea, sugar beet, spring and winter barley.

Results and discussion

Development of areas under crops and yields per hectare

Areas under the monitored crops develop with growing tendency in the enterprise Agro Žlunice a.s. because winter oilseed rape, winter wheat and sugar beet are significant crops for the farm. They take a considerable part of arable land. In 2012 it was 60 % of the area. A similar development is shown also by areas under crops of from the nationwide perspective.

The enterprise uses a traditional growing technology in growing of winter oilseed rape. A medium-deep ploughing is suitable with an immediate adjustment in order to disintegrate arising clods. If the preceding crop, eventually course of vegetation allows, a part of this procedure is stubble ploughing. A "chemical stubble ploughing" with Roundup is costly (use mainly in minimization technology of establishment of stands) and postpones sowing of rape. It liquidate above all the first wave of weeds, however, usually other application of herbicides and graminicides is necessary.

The used growing technology is characterized by higher amount of inputs in production – a number of treatments of plants against diseases and pests where moreover the second growth regulation appears. At the same time also higher dosages of mineral fertilizers are applied here – higher intensity of nitrogen fertilization in amount of c. 210 kg/ha.

Growing technology

In terms of variety composition of winter oilseed rape, in 2/3 hybrid varieties are used like for example NK Petrol, NK Linus, Sherpa and a rest of line variety like ES Bourbon, NK Smart.

In winter wheat growing, a stubble ploughing is carried out according to a preceding crop.

A depth of ploughing moves in a range of 25 – 28 cm, or a shallow soil cultivation is used.

NPK is used for autumn fertilization, a regenerative fertilization in early spring, and other fertilization with a preparation DAM 390 during spring. The total dosage of nitrogen moves in amount of 190 – 200 kg/ha. Herbicidal and insecticidal protection runs during autumn part of vegetation and continues according to the state of growths during the spring and in next period of vegetation. Also a growth regulation against lodging is carried out. For growing varieties of foods wheat are used like Pannonia, Genius, Magister and others.

Growing of sugar beet is prepared by application of organic manure on stubble after cereals in a dose 40-50 t/ha which is ploughed under. Ploughing is carried out in depth 30-35 cm. In spring before sowing, nitrogenous, phosphate and potash fertilizers are ploughed under. Leaf fertilizers are applied during vegetation we well as herbicidal treatment. From a varietal composition, Pohoda, Viktor, Talenta and others are used.

In 2012, they succeeded to harvest already increased area under winter oilseed rape, from 358 ha. The acreage of winter wheat has been moving always in range 505-580 ha in recent years while area under sugar beet has been increased by c. 70 ha. The increase in areas has been influenced by growing of sugar beet determined for bio-ethanol production.

Regarding to favourable climatic conditions, by a choice of quality varieties and intensive growing technology higher yields were always achieved in the enterprise Agro Žlunice a.s. in the monitored years than averages of the Czech Republic show. A record yield of winter oilseed rape 5.59 t/ha was reached in the economic year 2011 which represented a double of the average CR yield which was at the level 3 t/ha. A decrease in yields of sugar beet in 2012 was caused by a high sum of rainfalls at the beginning of vegetation. In the same year, deep frosts affected an area of 50 ha under winter wheat which caused

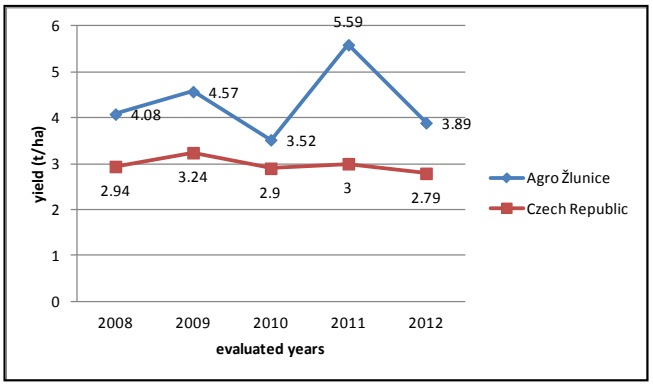
Year/crop	Winter oilseed rape	Winter wheat	Sugar beet
2010	306	542	230
2011	303	576	248
2012	358	507	257

Source: own processing

Table 1: Development of acreages of Agro Žlunice a.s. (ha).

a decrease in yield in this crop.

Graphs 1, 2 and 3 compare yields of particular crops of Agro Žlunice a.s. with average yields achieved in the Czech Republic throughout the period of 5 years. From the graphic expression it is obvious a higher level of crop growing intensity in the evaluated enterprise in comparison with average values over the whole agriculture.



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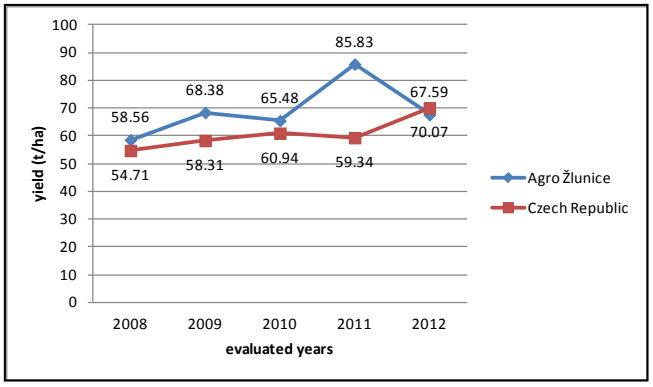
Graph 1: Comparison of yield averages in winter oilseed rape in the period of five years (t/ha).



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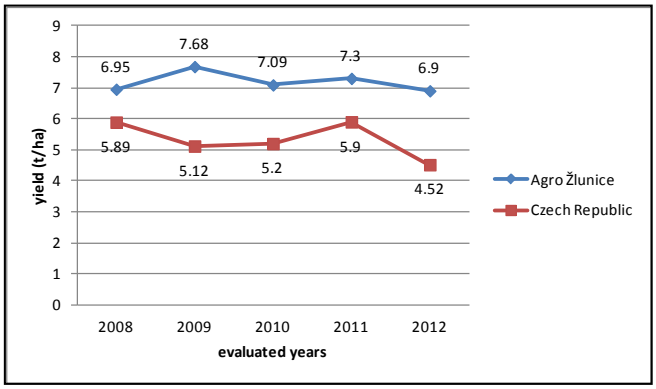
Graph 2: Comparison of yield averages in sugar beet in the period of five years (t/ha).



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Graph 3: Comparison of yield averages in winter wheat in the period of five years (t/ha).

Cost for crop crowing

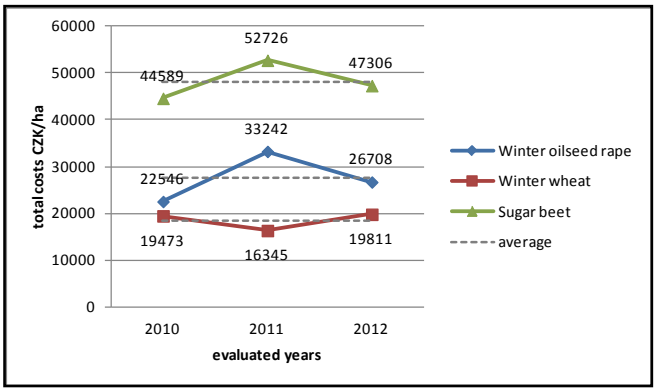
Cost represents a consumption of production factors which is financially expressed. A significance of their monitoring is unquestionable because costs in the form of various indicators show demandingness of production and thereby in some extent also a presumption of competitiveness of products. The cost monitoring is carried out for particular crops which represent calculation sections. Particular cost items are ranked according to a general calculation figure which enables to catch correlative cost items. These particular items are further classified into: Seed consumption, Fertilizer consumption, Consumption of chemical protective means, Transport charges, Field works and other services, Insurance of operating property, Administrative enterprise expenses, Production expenses of plant production, Tractor works, Combined works.

The graph 4 shows total costs for particular crops over the monitored period and an arithmetic mean of these costs per 1 ha of growing of the monitored crops is calculated. The highest total costs in winter oilseed rape were expended in 2011 (33 254 CZK/ha) and vice versa the lowest in 2010 (22 546 CZK/ha). The average cost of the three monitored seasons amounted to 26 549 CHK/ha. The highest costs in winter wheat were spent in 2010 (19 473 CZK/ha) and the lowest in 2011 (16 345 CZK/ha). The average cost amounted to 17 785 CZK/ha. In sugar rape, the highest costs were spent in 2011 (52 726 CHK/ha) and vice versa the lowest 2012 (33 573 CZK/ha). The average cost amounted to 43 629 CZK/ha)

The table 2 shows a cost structure of particular crops. Values are recounted in CZK/ha and a share of cost items is expressed. The biggest part of spent costs is created by direct material costs. Growth of costs in seed depends on a structure of purchased seed (e.g. winter oilseed rape – a share o hybrid and line varieties and representation of novelties on the market).

The enterprise uses a higher growing intensity which is given by higher dosages of fertilizers and thereby also higher costs spent for them. Also a growing commodity prices has a big influence and thereby also directly proportionally growing price of fertilizers. Without chemical protective means it is not possible to secure the required quality and quantity and a goods health state of plants.

The group" labour costs" includes tractor works and work of self-propelled loaders. In impossibility of direct determination of labour costs these items are included in the productive overhead. The most important item of the group "other costs" (costs of auxiliary works) is property insurance. In the structure of total costs the item "overhead costs" takes a considerable share. It includes productive overhead and administrative expense. The productive overhead represents mainly costs for depreciation of multipurpose buildings and machines (sowing machines, sprinklers, machines for soil preparation) and other costs arisen in production which were not able to classify to particular crops grown in plant production. The administrative expense is given by an appropriate share of costs connected with administration and organization of the enterprise. Overhead costs are included in costs of particular calculation sections by the help of scheduling units. It is possible



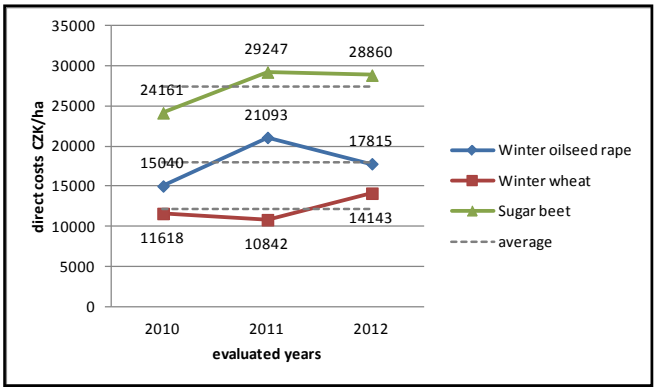
Source: own processing

Graph 4: Total and average costs of Agro Žlutice a.s. in monitored crops (1ha).

Indicators/crops in years	Winter oilseed rape			Winter wheat			Sugar beet		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Direct material costs in total	12 922	18474	16292	9974	10422	13043	16811	21286	21790
	57.30%	55.60%	62.30%	51.20%	63.80%	64.40%	37.70%	40.40%	45.20%
of it: Seeds	1691	1722	1530	2158	1848	2110	5495	5802	5507
	13.10%	9.30%	9.20%	21.60%	17.70%	16.20%	32.70%	27.30%	25.30%
Fertilizers	5127	6885	6931	4437	5369	6818	2034	2998	4315
	39.70%	37.30%	42.70%	44.50%	51.50%	52.20%	12.10%	14%	19.80%
Chemical means	6104	9867	7831	3379	3205	4115	9282	12486	11968
	47.20%	53.40%	48.10%	33.90%	30.80%	31.60%	55.20%	58.70%	54.90%
Other direct costs and services	2118	2619	1523	1644	420	1100	7350	7961	7070
	9.60%	7.90%	5.80%	8.40%	2.60%	5.40%	16.50%	15.10%	14.70%
Total labour cost	1949	2716	1454	1651	356	573	4031	4026	4006
	8.60%	8.20%	5.60%	8.50%	2.20%	2.90%	9%	7.60%	8.30%
Other costs	3246	3116	2300	2490	1817	1995	5673	4871	3983
	14.30%	9.30%	8.80%	12.80%	11.10%	9.90%	12.50%	9.20%	8.20%
Overhead costs	2311	6317	4559	3714	3321	3525	10724	14582	11370
	10.20%	19%	17.50%	19.10%	20.30%	17.40%	24.10%	27.70%	23.60%
Total costs/ ha	22546	33242	26128	19473	16345	20236	44589	52726	48219
Total costs/ t	6405	5947	6716	2747	2239	2933	681	614	713

Source: own processing

Table 2: Development and structure of costs of particular crops in Agro Žlunice a.s. in evaluated seasons (CZK/ha, %).



Source: own processing

Graph 5: Total direct costs in particular crops in the monitored period.

to set them according to harvest areas in the plant production.

The graph 5 shows items of direct costs (seeds, fertilizers, chemical means and other direct costs). There is obvious inter-seasonal increase of direct costs which is connected with a growing price of inputs (seeds, fertilizers and so on). Further the graph indicates average values of these costs over the monitored season in particular crops. The other direct costs and services includes costs for transport charges, field works (combine harvest), aerial works, ground rent and services. The ground rent has a big influence on costs for growing because it still increases. The rent moves in at intervals 1 550 – 2 950 CZK/ha/year according to BPEJ (Evaluated Land Ecological Unit).

Table 3 compares direct material costs of the enterprise Agro Žlutice a.s. with average direct costs of enterprises of a sample monitored by

Indicator/ crop	Rape Agro Žlunice	Rape CR average	Wheat Agro Žlunice	Wheat CR average	Sugar beet Agro Žlunice	Sugar beet CR average
Seeds	1691	1423	2158	1032	5495	5533
Fertilizers	5127	4219	4437	2980	2034	3418
Chemical means	6104	5486	3379	2381	9282	7351
Total material costs	12922	11128	9974	6393	16811	16302
Other direct costs	2118	2407	1644	2396	7350	7402

Source: own processing, IAEI Prague

Table 3: Comparison of direct costs in Agri Žlunice a.s. with CR average in 2010 (CZK/ha).

Indicator/crop in years	Rape			Wheat			Sugar beet		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Costs (CZK/ha)	22546	33242	26128	19473	16345	20236	44589	52726	48219
Costs (CZK/t)	6405	5947	6716	2747	2933	2542	681	614	713
Yield (t/ha)	3.52	5.59	3.89	7.09	7.3	6.9	65.48	85.83	67.59
Price (CZK/t)	7742	11145	12397	4391	2993	3252	1018	795	954
Evaluation									
Revenue /ha (CZK/ha)	27252	62301	48224	31132	21849	22439	66659	68235	64481
Operating profit (CZK/ha)	4706	29059	24364	11659	5504	2203	22070	15509	16262
Operating profit (CZK/t)	1338	5198	6263	1644	754	319	337	181	240
Rate of cost return	20.90%	87.40%	93.30%	59.80%	33.70%	10.90%	49.50%	29.50%	33.70%

Source: own processing

Table 4: Evaluation of economics in Agro Žlunice a.s. (CZK/ha, CZK/t).

UZEI Prague. For comparison, the year 2010 was chosen; it was the most economically beneficial year in the monitored period. From the table it is evident a use of intensive inputs in Agro Žlutice a.s. which positively shows in the achieved yields in the monitored crops.

Evaluation of economics of growing

In evaluation of efficiency we take into account spent expenses (inputs) and achieved yields (revenues from sale). The results is revenue (CZK/ha), operation profit (EBIT) in CZK/ha, and a production return rate (%). An aim of the enterprise is achievement of operating profit in crop growing (Table 4).

The biggest price increase was caused by a high demand for commodities in winter oilseed rate and winter rape in the last three years. The high demand was invoked on base of a lower crop against foregoing years.

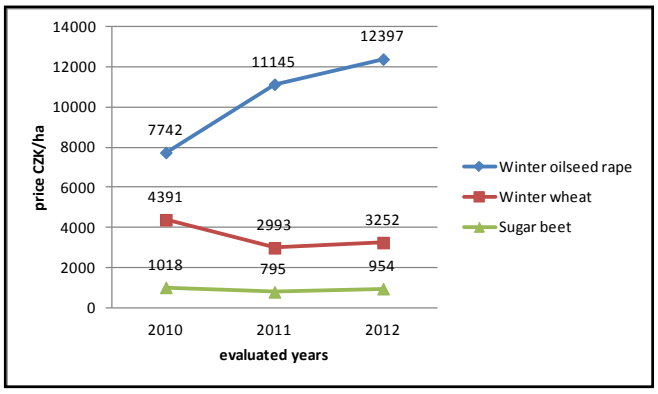
Revenues of the enterprise Agro Žlunice a.s. were highest in winter oilseed rape and in sugar beet in 2011 which was caused by record yields in these crops. In winter wheat the highest revenues were reached in 2010 because this commodity was successfully sold for a bargain sale price. A possibility to use storage spaces and waiting for the highest possible sale price showed favourably.

A steady high yield together with fixed price secures to the enterprise achievement of a continual operating profit from sale of sugar beet. The return rate is influenced by the yield and the price in the monitored commodities.

The following graphs 6 and 7 shows a development of realization prices of the monitored crops and also a development of operating profit in the enterprise Agro Žlunice a.s. in the monitored period.

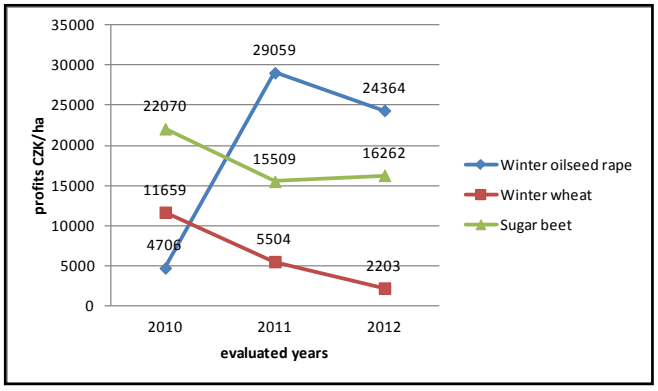
Table 5 compares revenues, prices and yields per hectare in the enterprise Agro Žlunice a.s. with averages reached in the CR.

From comparison of data, higher yields, higher realization prices and higher level of revenues in all



Source: own processing

Graph 6: Development of realization prices in Agro Žlunice a.s. (CZK/ha).



Source: own processing

Graph 7: Operating profit in Agro Žlunice a.s. (CZK/ha).

Indicator/ crop	Rape Agro Žlunice	Rape CR average	Wheat Agro Žlunice	Wheat CR average	Sugar beet Agro Žlunice	Sugar CR average
Revenues from sale of products CZK/ha	27252	22208	31132	18210	66659	44120
Realization price CZK/t	7742	7658	4391	3502	1018	724
Yield per hectare t/ha	3.52	2.9	7.09	5.2	65.48	60.94

Source: own processing, IAEI Prague

Table 3: Comparison of direct costs in Agri Žlunice a.s. with CR average in 2010 (CZK/ha).

monitored crops in Agro Žlunice a.s. are evident as well as their better evaluation than the mentioned CR averages are.

The company Agro Žlunice a.s. chooses carefully its customers and takes into account a solvency, a payment discipline, and catchment area of trade and manufacturing capacities in closure of contracts. The main consumer of mercantile winter wheat and winter oilseed rape is the company ZZN Polabí which takes c. 70 % of these two commodity production. An exclusive customer of sugar beet is a sugar refinery TTD Dobrovice.

Conclusion

The most important crops included in the cropping pattern in the agricultural enterprise Agro Žlunice a.s. are: winter oilseed rape, winter wheat, and sugar beet. Similarly this also applies for other

agricultural enterprises in comparable natural conditions. Therefore, these crops have been grown on a considerable part of area in the nationwide measure already for many years. In 2012, the evaluated enterprise succeeded to harvest already increased area under winter rape seed oil, it was from acreage 358 ha. The acreage of winter wheat has moved always at intervals 505-580 ha in recent years, which is given by the cropping pattern. Recently, the area of sugar beet has been increased. It was dealt with 70 ha within the last ten years. This increase was influenced by growing of sugar beet determined for bio-ethanol production.

Agro Žlunice a.s. manages in favourable climatic conditions of rape production area, therefore they achieve above-average high yields in comparison with the average of the Czech Republic. The results are amplified by intensive agronomical practices of growing and a selection of quality varieties in the monitored crops. A record yield was reached in winter oilseed rape in 2011. It amounted to 5.6 t/ha which was almost double of the average CR yield, i.e. 3 t/ha. The highest yield of winter wheat was achieved in 2011, 7.3 t/ha. This yield was by 1.4 t/ha higher than the CR average was in this year. Similarly also sugar beet reached the highest yield 85.8 t/ha in this year. The CR average yield was at the level of 59.3 t/ha.

The enterprise Agro Žlunice a.s. shows higher costs for the monitored crops against the sample of enterprises. It is caused by use of intensive agronomical practices of growing of agricultural crops and by a selection of quality varieties. The biggest part of spend expenses are represented by direct material costs. It is dealt with use of higher doses of fertilizers and preparations for plant protection which leads to high expenses spent for them. Also the growing price of commodities has an influence and thereby also directly proportionally growing price of fertilizers and pesticides.

The revenues of the enterprise Agro Žlunice a.s. were highest in 2011 in winter oilseed rape and in sugar beet. It was caused by record yields and a very favourable realization price of these commodities. The highest revenues in winter wheat were reached in 2010 because they succeed to sale this crop for the highest realization price. A possibility to use storage spaces and waiting for the highest possible sale price showed favourably.

The return rate of grown crops is influenced by the reached yield, spent costs, and the realization price of the monitored commodities. The plant production of the enterprise Agro Žlunice, a.s. reaches favourable results in all above mentioned areas, therefore the growing of evaluated crops was cost-effective and profitable in the whole monitored period. The enterprise achieves also a higher value of operating profit in the evaluated crops in comparison with the average over the whole sector.

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