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## THE EFFECTS OF INPUT SUBSIDIES ON FIELD CROP PRODUCTION IN SERBIA<sup>1</sup>

*Petar Munćan, Dragica Božić<sup>2</sup>*

### Summary

*Since 2007 input subsidies given out by the government in support to field crop and vegetable production has had the greatest share in the agricultural budget of Serbia. The principal goal of input subsidy programs, as measures of agricultural support, is primarily the promotion of productivity and competitiveness of field crop production. The employment of optimal agricultural practices stimulated an increase in the use of mineral fertilizers, declared seeds, etc. At the same time these measures were noted to raise both output and quality of agricultural products including farmers' income. The implementation and importance of these measures has so far not been attracting sufficient attention and therefore the objective of the study was to analyze the effects of input subsidies on the economic position of production of some major field crops (wheat, corn, sunflower, soybean, sugar beet) on family farms owning 6-20 hectares of arable land and focused on field crop production in 2007-2011 in the plain regions of Serbia.*

**Key words:** input subsidies, field crop production, family farm, economic position

**JEL:** Q18

### Introduction

The agriculture of Serbia plays the key role in the overall economic development of the country as indicated by the principal macroeconomic indicators (the share of agriculture reached approx. 20%, 10% and more than 20% in employment, GDP and the total export respectively). However, despite its significant role there has been a lack of support to agricultural producers in the past. The 8% share of agricultural in the total budget at the time of its adoption in the 1990s (Bozic et al., 2003) dropped to less than 3 percent. Insufficient support was accompanied by frequent changes in the type and mode of agricultural policy measures. This contributed greatly to farmers losing confidence and feeling insecure.

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Since 2004 there have been some principal system changes in the mode of implementation of the governmental monetary assistance. Namely, cash subsidies were given out to registered family farms (RFF) only. In addition, measures of support were significantly modified (Božić, Bogdanov, 2006). Since 2007 the system of (direct) payments per hectare or per animal has been employed. In the structure of financial means intended for financing the market and price policy, the share of input subsidization in agriculture accounts for nearly 70% of the agricultural budget of Serbia which makes us incomparable to the EU structure or that of the neighboring countries (Bogdanov et al., 2008). Our country was noted to turn back the policy of support to input subsidization, which characterized our neighboring countries (Hungary, Croatia etc.) in the 1990s (Božić et al., 2009). The production and economic effects in the production of field crops in Serbia were noted to lag behind compared with the countries having similar production resources at disposal (Hungary, Croatia) which justifies input subsidization as a means to give out direct support to field crop production. On the other hand, knowing Serbia's status as a potential candidate for EU accession, the EU and the WTO impose the need to abandon this practice.

In Serbia the Law on Agriculture and Rural Development (Official Gazette of RS, no. 41/09) was adopted in 2009. It presents a regulation framework for agricultural and rural development policy measures in Serbia. The types of incentives included in the regulation are: direct, market and structural incentives.

In order to provide expectancy, stability and consistency of agricultural policy in 2013 was adopted the Law on Incentive for Agriculture and Rural Development (Official Gazette of RS, no. 10/13). This Law regulates types and modes of utilization and conditions required when accomplishing rights on incentives, as well as Register on incentives of agricultural and rural development. The regulation includes the following incentives: direct payments, rural development incentives and special incentives. The decision on the amount of financial means, types and maximal amounts for certain incentives is made by the government for each budget year and according to the above mentioned regulations and the Regulation governing the budget of the Republic of Serbia. In addition to input subsidies, direct payments included premiums, incentives for production (both crop and livestock) and credit support. Fuel and/or fertilizers and/or seeds subsidies are paid off at a minimal total amount of 6.000 RSD per hectare for the same land area for which the owner accomplishing his rights on basic incentives (in the some amount).

The objective of the analysis was to determine the share of input subsidies in the production value achieved, the proportion of variable costs covered and the way input subsidies contributed to the increase of gross margin per hectare of some major field crops on 6 to 20 hectares family farms in the plain regions of Serbia in 2007-2011.

### **Research method and data source**

Data of the Ministry of Agriculture, Forestry and Water Management and the Ministry of Finance were of principal interest in the analysis of the structure of the agricultural budget and measures of support to crop production in Serbia. Due to the lack of adequate statistical data for undertaking a comprehensive analysis of the impact of input subsidies on the final

outcome and results of crop production in Serbia, a questionnaire was used as well in order to investigate mutual relationship. In 2007-2011 the questionnaire used included 65 family farms primarily focused on field crop production in the plain regions of Serbia (Vojvodina, Mačva and Stig). Five major field crops (wheat, corn, sunflower, soybean and sugar beet) grown in 1999-2008 on approx. 82% of the family farms' arable land (Bošnjak, Rodić, 2010) were included in the study. In Serbia family farms are by far the largest producers of field crops accounting for approx. 88%, 73%, 65% and about 50 % of the total corn, wheat, sunflower, soybean and sugar beet production respectively (Božić, Munćan, 2007).

Data with regard to family farm size, equipment, machinery, agricultural practices, production technology, production structure, yields, cost prices of the crops grown, input and purchase prices of some inputs, etc. were sampled using the questionnaire in order to compute the production value, variable costs and gross margin for the analyzed lines of crop production on the investigated family farms. Farms up to 20 hectares, which make up to 62% of the total number of registered family farms in Serbia, were included in the analysis.

### Input subsidies to crop production

Measures of input subsidies to crop production focus on reducing production costs and increasing farmers' income. Since 2007 the share of financial means for subsidizing inputs for both field crop and vegetable production (per hectare) has been the greatest in the agricultural budget. In 2010 the share accounted for 59% of the total agricultural cash support in Serbia. Input subsidization as a means to agricultural support intends to promote productivity and competitiveness of agricultural production. In addition, these funds were noted to stimulate optimal employment of agricultural practices increasing the use of fertilizers, declared seeds and etc., and in this way fostering output and quality of agricultural commodity production. During the period of investigation there was a 75% increase of the amount of input subsidies to field crop production, subsidized inputs such as mineral fertilizers, fuel and declared seeds included (*Table 1*).

**Table 1.** Input subsidies for field crop and vegetable production in Serbia (in 2007-2011)

Year	Subsidy for field crop and vegetable production			
	RSD		EUR*	
	RSD/hectare	Index (2007=100)	EUR/hectare	Index (2007=100)
2007.	8.000	100	101	100
2008.	10.000	80	126	125
2009.	12.000	150	135	134
2010.	14.000	175	146	145
2011.	14.000	175	133	132

\* Calculated at average annual current of National Bank of Serbia.

Source: Specify regulations of the Ministry of Agriculture, Forestry and Water Management for the investigated years (Official Gazette of the RS, no. 67/07, 29/08, 12/09, 17/09, 36/09, 7/10, 53/10, 59/10, 67/10, 39/11 and 58/11).

This type of subsidy may be considered quite demanding, namely farmers are expected to register at the National Register of Farms, be owners of about 0,5 to 100 hectares of arable land suitable for field crop and vegetable production and be in the possession of an official

legal account for input purchase. Since 2009 these farmers have also been required to apply membership at the Serbian Pension and Disability Insurance Fund and pay all the pension and disability insurance taxes for the preceding year.

The impact of input subsidy on producers may be analyzed from the increased gross margin due to the decreased variable costs. Due to lower cost prices this could potentially mean a greater competitiveness of the Serbian field crops on the international market. However, the fact remains that agricultural support to field crops in competitive countries is much higher (Croatia 330 to 500 EUR per hectare depending on the field crop grown; Hungary approx. 480 EUR per hectare) which makes the Serbian field crop producers less competitive.

### **Input subsidies and economic position of field crop producers**

Serbian producers are regularly exposed to market instability due to the constantly changing agricultural policy measures. On the other hand, consumers are forced to tolerate the inadequate structure of supply and high prices of final commodities of the food processing and food production industry (Munćan et al., 2010). The frequent changes on the market with regard to some major agricultural commodities and inputs for agricultural production represent the main feature of the Serbian agriculture today. Thus, producers are frequently exposed to financial risks as a result of either sudden or unexpected price declines of their products or rising costs of the inputs required. The reasons for the frequent price changes are mostly drought, small and insufficient supplies, unstable domestic currency rates. However, the main impacts may be attributed to the unstable world market and agricultural commodity prices.

In relation to family farms suppliers have the monopoly position to ensure the necessary inputs for agricultural production. Inputs are individually purchased and therefore there is no discount when purchasing greater quantities. Inputs are mostly bought at a local trader and prices are usually much higher compared with wholesale input prices. In addition, due to the seasonal inflow of financial means (harvest and picking) inputs are either bought when needed or at a later time (Todorović, Munćan, 2009). The possibilities of self-financing family farms in Serbia are very low. One of the reasons being the low agricultural labor productivity contributing to the low rate in the creation of additional values. On the other hand, lack of both investment capital and structural adaption was found facing the agriculture of transitional countries (including Serbia) preparing to access the EU. The insufficiently developed and unstable financial market is the main reason for such incidences (Božić et al., 2009).

Due to low competitiveness the monopoly position of the purchasers has enabled them to have a significant impact on market trends. Purchasers were found to dictate prices and deadlines for payments of agricultural commodities. For this reason family farm owners usually have no choice when defining sales conditions. Producers (although very few in number) who have their own storing capacities can postpone the final stage of their commodities, namely selling their produces. Later sales tend to increase their income. The rest of the producers are inclined to sell immediately after harvest when prices are substantially lower anyway (Bošnjak, Rodić, 2011). The fact that there is a substantial

number of small field crop producers has an unfavorable impact on market trends because of their inability to control the enormous quantities of food commodities on the market. The Serbian agricultural production focused on field crop production is known to be characterized by prominent competitiveness. Thus big producers can produce large quantities of field crops at lower cost prices in relation to small producers. When applied to all the categories of producers market prices are obliged to decline as big producers increase their production and for this reason small producers are at the risk of being displaced. Cooperation and mergence at the local, regional or national level seem to be the only solution. Considerable price disparities with regard to agricultural products and inputs were registered at the disadvantage of agricultural producers. In addition to the absolute level of product prices intended to cover production costs and ensure accumulation, external price parities i.e. relative relationship between field crop prices and input prices (seed, mineral fertilizers, fuel, etc.) are of special interest. External price parities of field crops and inputs required have aggravated the economic position of field crop producers, especially in 2008-2009.

Since 2009 there has been a sudden increase in the prices of field crops on the world market and eventually on our market as well. This contributed to the improvement of external price parities. In 2010 and especially in 2011 there was a significant improvement of the external price parities to the advantage of all the lines of field crop production. These points to a certain improvement of the economic position of the analyzed field crop producers (*Table 2*).

**Table 2.** External price parities of field crops and basic inputs

Product/input	Year				
	2007	2008	2009	2010	2011
<b>Wheat price = 1,00</b>					
Wheat seed	2.20	2.13	2.89	2.28	1.90
Min. fertilizers 15:15:15	1.81	2.10	4.67	2.71	2.00
KAN	1.38	1.17	2.50	1.64	1.30
Fuel	6.05	6.00	8.89	6.86	6.25
<b>Corn price = 1,00</b>					
Corn seed	117.14	381.3	484.6	286.12	227.86
Min. fertilizers 15:15:15	1.43	4.20	5.38	3.24	2.81
KAN	1.57	4.00	4.11	3.12	2.74
Fuel	4.75	12.53	10.25	10.14	8.31
<b>Sunflower price = 1,00</b>					
Sunflower seed	71.3	91.54	211.90	143.12	115.16
Min. fertilizers 15:15:15	0.67	1.21	2.51	1.41	1.26
Urea	0.73	1.15	1.89	1.04	1.14
Fuel	2.24	3.46	4.70	2.52	3.55
<b>Soybean price = 1,00</b>					
Soybean seed	1.45	2.15	2.23	2.06	2.10
Min. fertilizers 15:15:15	0.71	1.21	1.85	1.27	1.19
Urea	0.78	1.15	1.53	1.06	1.12
Fuel	2.53	3.46	3.42	2.82	3.46
<b>Sugar beet price = 1,00</b>					
Sugar beet seed	1784.1	1867.5	1853.3	1732.1	1754.3
Min. fertilizers 15:15:15	8.10	11.25	13.55	11.25	9.32
Urea	8.00	10.25	12.16	10.42	9.60
Fuel	26.61	32.16	37.54	30.00	29.67

Source: Author's computation using the questionnaire

According to (Ševarlić et al., 2008) there has been a chronic deficiency with regard to the effects of the realized measures of agricultural policy as the valid background for a better understanding of production profitability of some agricultural produces and the economic position of some categories of agricultural producers. In 2007-2011 the impact of input subsidies on the economic position of some major field crop (wheat, corn, sunflower, soybean, sugar beet) productions was analyzed on family farms (6-20 hectares) in the plain regions of Serbia. The effect of input subsidies on the economic position of the family farms in the study was analyzed by determining its share in the production value, coverage of variable production costs and the achieved gross margin of the field crop production lines studied (*Table 3*).

**Table 3.** Share of input subsidies to field crop production in the production value, variable costs and gross margin per hectare on family farms in Serbia (in %)

Elements	Year				
	2007	2008	2009	2010	2011
<b>Wheat</b>					
Share of input subsidies in production value	19,9	19,5	31,4	24,2	19,6
Share of input subsidies in variable costs	28,3	31,2	33,5	36,1	26,8
Share of input subsidies in gross margin	66,9	51,9	*	74,4	73,4
<b>Corn</b>					
Share of input subsidies in production value	14,1	22,4	23,7	20,9	14,7
Share of input subsidies in variable costs	21,8	25,5	26,9	27,4	22,4
Share of input subsidies in gross margin	39,7	*	*	89,4	42,5
<b>Sunflower</b>					
Share of input subsidies in production value	14,4	18,1	28,3	16,3	18,7
Share of input subsidies in variable costs	28,3	18,1	33,3	29,2	25,9
Share of input subsidies in gross margin	29,1	46,6	*	36,8	67,5
<b>Soybean</b>					
Share of input subsidies in production value	13,65	15,87	22,8	18,7	18,3
Share of input subsidies in variable costs	28,1	27,3	26,3	28,1	24,4
Share of input subsidies in gross margin	26,3	37,9	*	56,3	72,3
<b>Sugar beet</b>					
Share of input subsidies in production value	8,10	8,23	10,2	9,9	9,8
Share of input subsidies in variable costs	15,4	14,3	14,2	15,6	13,8
Share of input subsidies in gross margin	17,1	19,5	36,8	27,4	21,9

\* input subsidies greater than gross margin

Source: Author's computation using the questionnaire

Throughout the study the share of input subsidies accounted for 14 to 20% of the achieved production value of the field crops analyzed except for sugar beet where the share of input subsidies was less than 10%. In 2008 and especially in 2009 which was characterized by low prices of agricultural products and high external price disparities input subsidies accounted for 1/4 and nearly 1/3 of the production value of corn but also wheat and sunflower respectively.

During the analysis the share of input subsidies in variable costs was examined showing that about 30% of these costs were subsidized for most field crops except for sugar beet



where input subsidies was the lowest, namely approx. 15%. Also, there was a significant inequality with respect to the share of input subsidies in the achieved gross margin which was the lowest in the production of sugar beet (approx. 20%). In the case of other field crops it ranged from 25 to 60%. Input subsidies were noted to surpass manifold the achieved gross margin (wheat and corn) in years with prominent external price disparities.

In 2009 input subsidies to wheat producers was 5-fold greater than the achieved gross margin which helped cover a significant part of the fixed production costs. Finally the conclusion emerges that there is a high level of dependence of field crop producers on the granting of input subsidies as subsidy payments for production inputs given out by the government.

Measures of agricultural support intended to foster the use of agricultural inputs were found to improve the production of field crops with regard to input, structure and quality of the produces and eventually improve the economic position of field crop producers under the conditions of the ever-growing price disparities of agricultural products and input. The current agriculture policy measures and financial means intended for direct support to family farms need to be closely correlated due to our transition economy and the need to adapt to market economy (Bogdanov, Božić, 2005). This is the only way of ensuring the increase of farm income and contributing to income approaching non-agricultural regions, preserving natural resources, respecting and using comparative advantages of some regions in Serbia.

### **Conclusion**

The increase of variable costs of production and consequently the decrease of the achieved gross margin, i.e. the aggravation of the economic position of producers of some major field crops may be attributed to price fluctuations of field crop commodities and input cost increase, i.e. the ever-growing external price disparities during the period of investigation.

Measures of direct support, i.e. input subsidies of field crop production, as an agro-policy tool, were found to be simulative, especially to small producers who were noted to apply optimal agricultural practices (greater quantities of mineral fertilizers, declared seeds, etc.). This is expected to increase gross margin, i.e. improve the economic position of field crop producers.

Financial means of the agricultural budget intended for input subsidies (direct support) to field crop production are still insufficient and for this reason Serbia is unable to sustain competitiveness over a longer period. The amount of direct support to field crop production needs to be raised so as to allow Serbia to sustain and foster competitiveness on markets of the neighboring countries, potential EU candidates.

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## EFEKTI SUBVENCIONISANJA INPUTA U RATARSKOJ PROIZVODNJI SRBIJE

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### Rezime

*Od 2007. godine najveće učešće u agrarnom budžetu Srbije imaju sredstva namenjena regresiranju inputa za ratarsko-povrtarsku proizvodnju. Regresiranjem inputa, kao merom agrarne podrške se efikasno podstiče produktivnost i konkurentnost poljoprivredne proizvodnje. Stimuliše se sprovođenje optimalnih agrotehničkih mera, odnosno veće korišćenje mineralnih đubriva, deklarisanog semena i dr. Samim tim ova mera podstiče rast obima i kvaliteta poljoprivrednih proizvoda, kao i dohotka poljoprivrednih proizvođača. Kako od uvođenja navedenih mera u agrarno-političkoj praksi Srbije nije sagledavan njihov značaj, u ovom radu izvršena je analiza uticaja regresiranja inputa na ekonomski položaj proizvodnje osnovnih ratarskih kultura (pšenica, kukuruz, suncokret, soja, šećerna repa) na porodičnim gazdinstavima ravničarskog područja Srbije, veličine obradive površine do 6-20 ha, usmerenih na ratarsku proizvodnju u periodu 2007 – 2011. godina.*

**Ključne reči:** regresiranje inputa, ratarska proizvodnja, porodično gazdinstvo, ekonomski položaj.

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