

THE ECONOMIC EFFECTIVENESS OF SEED PRODUCTION IN WINTER WHEAT

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Abstract. *The plan is for production and multiplication of the institutionalized seed. The process of transition of agriculture towards the market economy generates new and complex problems regarding both seed production and the access of small and medium-sized agricultural exploitations to high-quality seed, considering its high price. There are two phenomena, which reflect in the dynamics and evolution of the price of agricultural products (including wheat), and reaches its highest right before the new crop. The calculations regarding the production and multiplication of the seeds of a certain cultivar of winter wheat is a compulsory procedure, as seed production follows a specific methodology and technology, genetically explained.*

Keywords: institutionalized seeds, high-quality seeds, winter wheat, agriculture.

INTRODUCTION

The reorganization and modernization strategy of Romanian agriculture requires elaboration of specific programmes regarding the production and use of seeds with high biological value, a condition for the real integration into the highly competitive agriculture that characterizes the European Union. Along the years, the agricultural products market faced two main phenomena: the accumulation of excedentary stocks, over the amount necessary for personal consumption of the producer- depending on timing, good/bad years etc.; and the lack of yield absorption capacity of the direct or indirect consumers. These two phenomena are reflected in the dynamics and evolution of the price of agricultural products (including wheat), which reaches its highest right before the new crop, this leading to controversies between producers and consumers, who tend to offer lower prices.

The main causes of this permanent crisis, increased by inflation, irrespective of the yield level, are: the Ministry of Agriculture not getting involved into the regulation of the market; the lack of organization of agricultural producers and the lack of a self-financing mechanism for managing the excedentary stocks; the lack of a compulsory legal background, based on contractual relationships between producers and consumers, which would be able to create a balance between the rights and obligations of the yield users and producers; the insufficient use of inputs (certified seed, chemical fertilizers, herbicides, pesticides, irrigations); big loss while harvesting the wheat, mainly in small farms, and mainly because of lack of herbicides; the use of uncertified seed, from previous yields, on large surfaces in small-sized farms.

The decrease in the total wheat offer occurred because of lack of organization and technology and only partly because of climatic conditions. All these factors lead to very low effectiveness on large surfaces.

The ratio final stocks/total usage is of great importance in estimating the prices; the lower its value is, the more likely an increase in the wheat price becomes. The big fluctuations of this ratio made it very difficult to estimate the prices generated by the market economy.

MATERIAL AND METHOD

In order to increase the economic effectiveness of seed production at institutionalized stages it is necessary to know, up to a certain extent, the needed amount of seed for each stage.

Seed production goes, for most grain crops, through three phases (Table 1): producing the pre-base I (PB I) and pre-base II (PB II) seed within the research departments of the agricultural research institutes and stations; producing the base seed (B) within the production sector of the agricultural research stations and farms belonging to agriculture universities; multiplication of the certified seed (SC I and SC II), which is done within seed production specialized units and authorized production farms. (Savati and Muntean jr., 2002; Haș, 2006).

There are a few elements that need to be known before starting to make up the seed production plan: the cropping plan of the farms for the species and cultivar that are considered for seed production; the sowing norm (kg/ha) for initiating consumption-oriented crops, respectively for sowing at different stages along the seed production process; the planned net yield for each phase of the process (kg/ha); the net yield results by reducing the gross yield with about 20-25%, the difference resulted from seed conditioning; the reserve stock to be created for different stages of the seed production process; the average production/ear, which is necessary for determining the number of descendants in the selection field and the number of elite plants that need to be extracted.

Table 1
Necessary elements for creating a base seed production and multiplication plan for the winter wheat cultivar

Phases in seed production	Density (pl./m ²)	Sowing norm	Planned net yield (kg/ha)	Reserve Fund (%)
Commercial crop	600	200	-	-
SC I	500	200	3,000	-
SC II	450	175	3,200	25
B	400	160	3,600	25
PB I	300	120	3,200	30
PB II	200	75	2,000	-

RESULTS AND DISCUSSION

The necessary amount of seed for each phase of the seed production process is calculated by multiplying the surface to be sown and the sowing norm. In order to calculate the surface to be sown for obtaining the needed quantity, the necessary amount of seed is divided by the planned net yield.

Table 2

Creating a base seed production and multiplication plan, at different stages of the seed production process, for the winter wheat cultivar

Stage	Phase	Calculation of the necessary seed amount and of the surfaces required for obtaining it	
Base seed multiplication on specialized farms or on seed plots of unspecialized farms	-	1. Planned surface for the commercial crops (ha)	80,000
	SCI II	2. The necessary amount of certified seed II, for sowing the commercial crops (t)	17,600
		3. Suprafața necesară loturilor semincere pentru producerea seminței certificată I (ha) The necessary surface of the seed plots for producing certified seed I	5,866.7
	SC I	4. The necessary amount of certified seed I, for sowing the seed plots II (t)	1,173.3
		5. The necessary amount of certified seed I, for the reserve fund (25%), (t)	391.1
		6. Total necessary amount of certified seed I, (t)	1,564.4
	Base	7. The surface of the seed plot for producing certified seed I (ha)	488.9
		8. The necessary base seed amount for sowing the certified I seed plots (specialized farms) (t)	85.6
		9. The necessary amount of base seed, for the reserve fund (25%), (t)	28.5
		10. Total necessary amount of base seed (t)	114.1
Pre-base II seed production by the production departments of research stations	Pre-base II	11. The surface of the seed plot for producing base seed (ha)	31.7
		12. The necessary amount of pre-base II seed, for sowing the seed plots necessary to produce base seed (t)	5.7
		13. The necessary amount of pre-base II seed, for the reserve fund (30%), (t)	2.2
		14. Total necessary amount of pre-base II seed (t)	7.3
	Pre-base I	15. The surface of the seed plot for producing pre-base II seed (ha)	2.3
		16. The necessary amount of pre-base II seed, for sowing the seed plots necessary to produce pre-base I seed, (t)	276
		17. The surface of the seed plot for producing pre-base I seed (ha)	1,138
Pre-base I seed production, by the agricultural research department	The selection field	18. The necessary amount of progeny I seed for sowing the selection field	10.4
		19. The number of plants to be harvested from the selection field	7,429
		20. Safety coefficient (25%)	2,476
		21. The necessary number of grains for sowing the selection field	9,905
		22. The number of elite ears to be used for sowing	275

In selection fields, it is not the surface that needs to be determined, but the number of ears that need to be harvested for obtaining the necessary amount of seed for sowing the pre-base I (PB I) field. This can be done if we know the average yield/ear, which can be found considering the cultivar traits related to the thousand kernel weight (TKW)- 38g, and the average number of grain per ear (36). If 1000 grains weigh 38g, then 36 grains from an ear weigh about 1.4 g. If we consider the surface likely to be cultivated with winter wheat in a county, which may be around 150,000 ha, out of which 80,000 ha with a certain cultivar only, then the necessary amount of seed can be calculated using the model presented in Table 2.

The calculations regarding the necessary amount of seed are made in relation with the surfaces to be cultivated in the next year. The quantities of seed that are commercialized by the authorized units can be reconsidered each year, according to the needs of the producers, expressed by the mean of their sales in the last 2-3 years.

CONCLUSIONS

The calculations regarding the production and multiplication of the seeds of a certain cultivar of winter wheat is a compulsory procedure, as seed production follows a specific methodology and technology, genetically explained. The methodological schemes are meant to maintain the genetic structure of a cultivar. The starting point in seed production is the individual plant. The criteria for choosing an individual plant or another are connected to the extent to which this plant is representative for the cultivar in its specific traits. Therefore, high quality seed is a basic initial phase in the crop technology and is the first and most effective way to increase productivity.

REFERENCES

1. Has, I. (2006). Producerea semințelor la plantele agricole. Ed. AcademicPres, Cluj-Napoca
2. Savatti, M. and L. Muntean jr. (2002). Caiet de lucrări practice la ameliorarea plantelor și producerea de sămânță. Ed. AcademicPres, Cluj-Napoca