EFFECT OF LEVELLING ON THE ENERGY BALANCE OF MAIZE CROP FOR GRAINS

PRIOTEASA ALINA MARILENA[1], OLARU LIVIU AUREL[1*], GRECU FLORINA[1], VASILESCU CARMEN OANA[1]

[1]Faculty of Agronomy,University of Craiova, alinapri76@gmail.com

**Corresponding author: liviu.olaru.dtas@gmail.com*

Key words: levelling,* maize crop for grains*, energy balance

ABSTRACT

Maize is recognized as a plant that greatly harnesses the allocated factors-the insurance with water and mineral fertilization-, bringing a substantial energy intake especially in the context of rational crop revolutions.

From the point of view of fertilization, maize producing a large amount of plant substance at the surface unit, consumes high amounts of the main nutrients, which is a plant ,, voracious by excellence "and which responds promt to applied, but necessary water should be ensured at the appropriate time.

The energy analysis in the case of maize for grains has shown high energy values produced in both cases concerning the location of culture-non-ivelate and even on ground level.

INTRODUCTION

In maize, as with other cultures, levelling resulted in a decrease in production from non-ivelate highlighting the extremely slow process of restoring the productive potential of the left-wing psamosoils.

MATERIAL AND METHOD

At the basis of the calculation of the energy balance, we used the methodology used by the Institute of Agricultural Economics within A.S.A.S. Bucharest (Teşu I, and Baghinschi V. 1984; Zaharia M., 1981).

In order to analyse the efficiency of the experienced factors, due to the fluctuation of prices, it was chosen to use the energy criterion that is as universal as the value one without having momentary influences of negative or positive costs.

Maize (*Zea mays* L.) is a field crop that is cultivated worldwide. In Romania, the maize is the most important crop, both as surface and yield obtained (Bonea, 2016; Bonea and Urechean, 2017).

In this case, the energy produced and consumed in agriculture was assessed on the basis of a system of indicators specific to this kind of analysis, following the crops and at the level of each production factor assigned within the technological processes.

The calculation was made by determining:

the total energy produced in Mcal / ha;
the energy consumed in Mcal/ ha;
the energy balance, in Mcal / ha;
the energy yield.

The average energy yield on an unlevelled and levelled ground:

energy consumption in Mcal/ kg product.

RESULTS AND DISCUSSIONS

On non-standard terrain, the increase in production resulted in appreciable amounts of energy from 14751 Mcal/ha as obtained at the mineral unfertilized variant at 33924 Mcal/ha in the case of the maximum dose of applied fertilisers, the plants reacting to the FA Another.

The amount of energy consumed has shown values from 1550 Mcal/ha to 8472 Mcal/ha depending on the levels of the allotted factor, fertilisers.

In this situation, the energy balance also recorded values that increased from 13201 to 25452 Mcal/ha.

The energy efficiency presented high values compared to the culture previously analyzed by the autumn barley, but which decreased from the blank (mineral unfertilized) variant which presented the value of 9.52 to the one that received the maximum dose, namely 4.00.

The average energy efficiency in non-zero conditions recorded the value of 6.54.

The calculation of energy consumption in Mcal/ha to 1 kg product (maize grains) showed increasing amounts as the volume and value of the allocated factor increased from 0.41 to 0.98 Mcal/kg product. Under the levelling of the ground, the corn reacted negatively by diminishing the produced production and implicitly by the amount of energy produced although the mineral fertilization factor was the same.

The energy produced presented values from 9426 to 21660 Mcal/ha and the consumed one increased as a result of the leveling work recording from 2059 Mcal/ha to the witness variant at 8841 Mcal/ha corresponding to the variation with maximum fertilization.

The energy balance recorded lower values (almost halfway from the maize culture on normal non-road land) from 7367 to 12819 Mcal/ha.

The calculation of the energy efficiency indicated lower values in the previous half from 4.58 to 2.45 and the average on the leved factor was 4.62.

Much higher energy consumption, steadily increased from 0.86 to 1.60 Mcal/kg of corn grains obtained.

CONCLUSIONS

The grain corn has been harnessing the allocated factors, so that energy production has shown the highest values in non-standard conditions.

The energy efficiency has experienced a steady decline with increasing doses of fertilizers (which are energointensive), in both levelling and unlevelled culture conditions.

The energy consumption Mcal/kg in maize grains recorded on the allocated factors indicates the lowest values compared to the autumn barley.

The energy values presented in the grain corn confirm that this culture is profitable, plants grow in less appropriate agri-technical conditions, and when allocating factors to the level required by the culture technology, the volume of energy produced is high and that of energy consumed is reduced.

BIBLIOGRAPHY

1. Bonea D., 2016 - *The effect of climatic conditions on the yield and quality of maize in the central part of Oltenia*. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series, Vol. XLVI(1): 48-55.

2. Bonea D., Urechean V., 2017 - *Study on the selection for drought tolerance of some semi-late maize hybrids cultivated at A.R.D.S. Simnic*. Annals of the University of Craiova - Agriculture, Montanology, Cadastre Series, Vol. XLVII(1): 41-49.

3.**Tesu I. Si Baghinschi V.**, 1984 - *The energy and agriculture-Methodology of*

calculation and analysis of energy efficiency in agriculture. Editura Ceres, Bucharest

4. Zaharia M., 1981- *Calculating energy consuptionand drawing up the energy balance for wheat crops*, Vegetable production magazine – Cereal crops and tehnical plants nr. 10, Bucharest

Table 1

The balance sheet and energy efficiency in the corn crop for grains.

Variant	Production Kg/ha	The energy produced Mcal/ha	The energy consumed Mcal/ha	Energy balance Mcal/ha	Energy efficiency	Randament energetic mediu	Energy consumption Mcal/kg product
Psamosol Unleveled							
$N_0P_0K_0$	3762	14751	1550	13201	9,52	6,54	0.41
$N_{50}P_{30}K_0$	6446	25275	3015	22264	8,39		0.47
$N_{100}P_{30}K_0$	7363	28870	4244	24626	6,80		0.58
$N_{150}P_{60}K_0$	7999	31364	5605	25759	5,60		0.70
$N_{200}P_{60}K_0$	8558	33556	6806	26750	4,93		0.79
$N_{200}P_{60}K_{40}$	8652	33924	8472	25452	4,00		0.98
Psamosol Leveled							
$N_0P_0K_0$	2404	9426	2059	7367	4,58	4,62	0.86
$N_{50}P_{30}K_0$	3766	14766	3329	11437	4,43		0,88
$N_{100}P_{30}K_0$	4539	17797	4614	13183	3,86		1,02
$N_{150}P_{60}K_0$	5199	20382	5977	14405	3,41		1,15
$N_{200}P_{60}K_0$	5440	21330	7175	14155	2,97		1,32
$N_{200}P_{60}K_{40}$	5524	21660	8841	12819	2,45		1,60