



# TECHNICAL-ECONOMIC METHODS OF ANALYSIS AND OPTIMISATION OF ECONOMIC EFFICIENCY IN FORAGE CROPS

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**Abstract:** *Any agricultural activity aims at increasing economic efficiency and obtaining profit for the activity carried out. The geo-political, socio-economic and environmental context has diverging effects on agriculture. In Romania, grain maize occupies more than 30% of the cultivated area, alfalfa 4.5% and feed maize 0.6%. Given the importance of the livestock sector for food security, there is a risk, due to drought or other external factors, that farmers may not have enough feed for their animals and may therefore give up livestock farming. The study aims to provide a technical-economic basis for production costs and to compare the performance indicators of maize, feed maize and lucerne, economically important crops that would represent optimal solutions to ensure feed requirements in the livestock sector and contribute to "green and sustainable growth of economic activities".*

## • Introduction

This study contributes to knowledge by highlighting the economic benefits of silage maize, alfalfa and grain maize, highlighting the link between cattle farming and the need to expand the area under these crops, highlighting the dependence of regions and counties on cattle farming and the cultivation of these three crops, and defining the role of these activities in rural employment.

## • Material and method

The technology estimates were designed, for irrigated and non-irrigated production systems, using *the normative-constructive method*. Revenue and expenditure budgets summarise and allocate technology expenditure into variable and fixed costs. The income indicator has been calculated in several variants: income without decoupled direct payments, income with decoupled direct payments and income with coupled support. The summary indicators that compare the economic results for maize, feed maize and lucerne are revenue, production costs, profit and profit rate. Data are estimates for the production year 2023/2024.

## • Results and discussions

For the period 2007-2022, the area under forage maize increased on average by 0.7915 thousand hectares/year, the area under lucerne increased by 8.6074 thousand hectares/year, while the number of cattle decreased on average by 49.4 thousand head/year.

Cow, buffalo and heifer farming is present in every county. In this context, farmers can buy their own fodder or, if they do not own animals, increase their income, and those near livestock farms would be the most advantaged if they produce and market their production directly to livestock farms, thus reducing some technological costs (labour costs, harvesting and transport costs, etc.) and thus practising the activity efficiently.

**Grain maize** - The income with direct payments is 1418 lei/286 euro for non-irrigated maize and 1709 lei/344 euro for irrigated maize, with corresponding profit rates of 25.4% and 22.2%, which means that for every 1000 lei spent, 254 lei and 222 lei respectively will go into the producer's profit.

**Silage maize** - In the income + direct payments + coupled support variant, the profit rate reaches 31.9% or 33.8%, a variant that provides the producer with 319 lei or 338 lei for every 1000 lei invested in growing silage maize.

**Lucerne green mass** - In the income + direct payments + coupled support variant, the profit rate reaches 58.0% or 66.9%, a variant that provides the producer with 580 lei or 669 lei for every 1000 lei invested in growing alfalfa.

## • Conclusions

A comparison of income and expenditure indicators shows that none of the crops has a loss of income, but the degree of profitability is different.

- Farmers' incomes may increase if demand from livestock farms increases. In this context, farmers can improve their activity by making appropriate adjustments to production costs (reduction of material consumption, labour consumption, purchase of services, etc.) leading to cost reductions.

- Cattle breeding (ruminant animals) is found throughout the country, in every county of the country, mainly in the North-East, North-West and Centre regions. In this context, cattle breeding is the basic occupation for the rural population.

- Financial support to farmers for the expansion of alfalfa and silage maize areas contributes both to *green growth* and to *the development of a resilient, sustainable and competitive agricultural sector that will contribute to the development of sustainable agriculture*.