# Analysis of socioeconomic indicators of rural properties in Nova Esperança do Sudoeste – PR

# Análise de indicadores socioeconômicos de propriedades rurais de Nova Esperança do Sudoeste – PR

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**ABSTRACT**
The income generation in the agricultural and cattle raising activities is intrinsically linked to the economic, social and environmental aspects. In this sense, seeking to understand the generation of income, we studied eight rural properties in the municipality of Nova Esperança do Sudoeste - PR, relating quantitative indicators of Gross Product (GP), Intermediate Consumption (IC) and Agricultural Income (AR). This analysis used the variables produced by the extension project and discipline Rural Property Planning which is practiced in academic and social environment in the agronomy course of the Federal Technological University of Parana, Dois Vizinhos Campus, whose methodology is divided into three main parts: diagnosis, rural planning and feedback to rural producers. In this context, it was used information about the production systems of the properties mostly focused on dairy production, agricultural area, PB/ha, CI/ha, RA/ha and two indexes calculated by contrasting the indicators (RA /CI $_{(ha)(ha)}$) and (RA / PB $_{(ha)(ha)}$). In this analysis, we noted different income generation strategies, differentiated by the degree of investment with inputs, where in general, the properties that invested more, obtained a better return, with exceptions in which the gross wealth produced was not consistent with the amount invested, generating economic inefficiency of the activity.

**Keywords:** Investments, Agricultural income, Production systems.

## 1 INTRODUCTION

Over the years Brazilian agriculture has undergone intense transformations. In the state of Paraná, in the Southwest region, a sharp process of modernization of agriculture occurred in the 1970s, including family farming, changing the strategies of income generation (SAVOLDI; CUNHA, 2010).

According to MAPA (2019) family farming is considered the internal arrangement of the work of the rural property, which is shared by the family members themselves, and the main income-generating source of the family is through the farming activity.

Given this statement, it is possible to affirm that the success of a rural property is based on the efficient and intelligent use of the productive factors available, in order to extract the maximum economic yield from the rural space, and make the rural property efficient in its agricultural activities.

For this, the importance of rural management tools is denoted, which help the rural producer in the more efficient and rational use of available resources in the environment in which they live, in order to promote a lasting rural management and see the rural property as a business, and not just as a mere rural space (QUEIROZ, 2014).

In this sense, aiming to measure the economic and productive efficiency, this study makes use of quantitative indicators that allow analyzing the economic, social and productive aspects of the selected agricultural production units. Thus, the socioeconomic indicators summarize in a summarized and structured way the efficiency of production factors for the generation of family income (WAGNER ET AL., 2010).

Therefore, the main context is to analyze the rural socioeconomic indicators, being them the Gross Product per hectare (GP/ha), Intermediate Consumption per hectare (IC/ha) and Agricultural Income per hectare (AR/ha) of eight rural properties of the Linha Gavião community in the municipality of Nova Esperança do Sudoeste - PR, whose production systems are focused on dairy cattle and grain production. We sought to understand the relationship between gross production, intermediate production costs, with the net wealth produced, inferring whether the intensification of the use of inputs in a given production system generates greater or lesser economic efficiency of the properties.

## 2 MATERIALS AND METHODS

The methodology employed in this study is carried out by virtue of the extension project called Rural Property Planning, developed in an academic context at the Universidade Tecnológica Federal do Paraná, Campus Dois Vizinhos, Paraná.

The extension project is developed in line with the discipline of the 9th period of the curriculum of the Bachelor's Degree in Agronomy, also called Rural Property Planning. This curricular unit is offered on a mandatory basis for students of the course, and aims to insert the students in real field situations, where they develop, as a group, a complete study about an

Agricultural Production Unit (APU), and at the end of the work they make a report presented to the rural producer about the proposals thought and worked on during the course about what can be improved on the properties.

The discipline of Rural Property Planning is practiced in partnership with the IDR - PR (Rural Development Institute of Paraná) since the year 2016. In 2019, the extension project was created and linked to this discipline of the Agronomy course. In this period to date, more than 100 rural properties have been studied in the Southwest region of Paraná.

Briefly, the project is divided into three main phases, where the first phase is composed of the application of a diagnosis with the rural producers. The second phase is composed of the planning of the properties themselves, containing proposals, actions and activities on rural properties. All proposals are evaluated by a panel of specialist professors in the agronomic area and rural extension technicians, whose suggestions are added for the improvement of the work. And the third and last phase is composed of the final presentation of the projects to the rural producers and their families, through an event called Feedback to Rural Producers.

Given the above, the socioeconomic indicators used in this study were collected in the first semester of the year 2022. Information was collected from eight farms in the municipality of Nova Esperança do Sudoeste - PR, containing socioeconomic indicators, including Gross Product, Agricultural Income and Intermediate Consumption, used in this analysis.

The explanation of such indicators used to support the study is presented according to Lima et. al (1995), discussed below:

- Gross Product (GP): This value includes all the production sold, consumed, or stored by the rural producer in the last agricultural year.
- Intermediate Consumption (IC): This value includes all the inputs used in the production of the property, and various expenses related to the production systems.
- Agricultural Income (AR): This value integrates the net wealth that actually remains to the rural producer, discounting all the expenses that were used in the production process.

Thus, to determine the efficiency of agricultural production units, we will use previously calculated indexes that relate the socioeconomic indicators presented. In this way, we will use the variables and relative characteristics of the farms used in this study, which will contrast the production systems, effective amount of agricultural area in hectares (UAA), Gross Product per hectare (GP/ha), Intermediate Consumption per hectare (IC/ha), and Agricultural Income per

hectare (AR/ha). All of these indicators will be divided by UAA to relativize the area differences between one and another production unit. Therefore, it is necessary to emphasize that not always the landowner who has the highest UAA and BP will obtain the best economic efficiency of the property.

Thus, intending to determine the economic efficiency of rural properties, it will be used the socioeconomic indicators presented to determine comparatively, two relative numeric indexes. These values will contrast the net income obtained per unit of area of rural properties, with the amount invested and returned from agricultural activities. Thus, the higher these ratios are, the better efficient are the properties.

In the first index, the objective is to determine the rate of return for each real invested, which can be summarized as the profitability of agricultural activities performed on the farms. Therefore, the index will be the ratio between the agricultural income per hectare (AR/ha) and the intermediate consumption per hectare (IC/ha) multiplied by 100.

In sequence, the other calculated index will seek to establish the effective profit rate of rural properties, after discounting all expenses and costs, being attributed in this case as the profitability rate. To obtain the value, the index will be given by the ratio between the Agricultural Income generated per hectare (AR/ha) by the Gross Product per hectare (PB/ha), multiplied by 100, generating the percentage value of effective profit.

## 3 RESULTS AND DISCUSSION

In this sense, to measure the economic efficiency among the different production systems and within a system itself, with different levels of production intensification, expressed by the high value of intermediate consumption, in the properties of Nova Esperança do Sudoeste - PR, table 1 contains the relevant information.

The farms will be presented by group nomenclature, referenced by their certain numerical sequence, followed by the main activity they perform, and the UAA (Utilized Agricultural Area) in hectares. Then, the values of the socioeconomic indicators Gross Product per hectare (GP/ha), Intermediate Consumption per hectare (IC/ha), and Agricultural Income per hectare (AR/ha), used to determine the two economic efficiency indexes, will be presented.

Table 1 - Socioeconomic indicators of the farms

| Grupos | Grupo 1 | Grupo 2 | Grupo 3 | Grupo 4 | Grupo 5 | Grupo 6 | Grupo 7 | Grupo 8 |
|---|---|---|---|---|---|---|---|---|
| Atividades | Leite | Leite | Grãos/leite | Leite | Leite | Grãos/leite | Leite | Leite |
| SAU (ha) | 11,14 | 12,2 | 40,73 | 24,32 | 7,75 | 8,4 | 18,13 | 33,79 |
| PB/ha (R$) | 17.310,59 | 87.624,59 | 23.989,54 | 19.539,47 | 40.877,42 | 5.355,59 | 22.238,28 | 6.778,78 |
| CI/ha (R$) | 12.309,88 | 54.001,94 | 13.980,77 | 9.631,11 | 25.655,13 | 1.378,92 | 17.432,15 | 2.110,36 |
| RA/ha (R$) | 4.828,38 | 25.247,76 | 3.680,42 | 9.293,58 | 14.677,38 | 1.526,19 | 3.511,00 | 4.642,34 |
| RA(ha) / CI(ha) (%) | 39 | 46 | 26 | 97 | 57 | 111 | 20 | 220 |
| RA(ha) / PB(ha) (%) | 28 | 28 | 15 | 48 | 36 | 28 | 16 | 68 |

Source: Prepared by the authors, 2022.

It is worth noting that all groups have the milk production system as their main source of income, with group 3 and 6 adding grain production to the system.

Analyzing the table, it is possible to see that group 2 differs from the other groups with milk production system for presenting higher intensification, understood here as revealing higher intermediate consumption per hectare (BP/ha) and the highest gross product per hectare (BP/ha), being, therefore, the most intensive in production and in expenditures for funding the activity.

Thus, it also presents higher agricultural income per hectare (AR/ha) than the other groups. This, however, makes the ratio (AR /CI$_{(ha)(ha)}$ ), 46%, lower than other less intensive production units. A result that was already expected given that intensification has as a consequence lower return per area. Likewise, the second index is similar to the others, or even lower than the properties with lower investment in production inputs. However, analyzing the absolute results, the Agricultural Income per land area responded positively to intensification, to the increase in costs, but decreases the margins of return invested and effective profit. Group 5 presents similar behavior to group 2, being properties with land area limits, whose solution is to intensify production.

On the other hand, when analyzing the production unit with the dairy system, with the lowest RA/ha, the lowest CI/ha, and the lowest PB/ha, the case of group 8, it can be seen that it presents a higher return on invested capital and consequently a higher profit percentage. However, the effective profit rate seems to be less sensitive to the costing values. When comparing group 01 and 02, we noticed similar rates between more or less intensive production units.

The two indexes: rate of return per capital invested (RA /CI$_{(ha)(ha)}$ ) and the affective profit rate, after discounting all costs (RA /PB$_{(ha)(ha)}$ ), in these two cases analyzed, are not good indicators for decision making, if viewed in isolation. We have group 8, with a less intensive system, with

low AR/ha, but with high rates of return. In this case, the family benefits from the extension of the area and not from the productive efficiency. And group 6, with area limits and non-intensive production, with a high rate of return on investment, but with low effective profit.

Therefore, it is concluded that other income indicators are needed to analyze income generation between production units with equal systems, but with different degrees of intensification, such as agricultural income per hectare itself. Group 7 is an example of productive inefficiency in relation to intermediate consumption. Possibly in this case there are technical problems of production, despite the expenses, which is approximately double what group 4 spends, but generates the same wealth, and the income per hectare is 1/3 of that of group 4.

In general, the Agricultural Income per hectare is a better indicator of productive efficiency, because it takes into account the productive and economic efficiency per unit of area, thus relativizing absolute numbers that can cover up productive deficiencies, especially if we use only the effective profit index.

## 5 CONCLUSION

The major paradigm of today's agriculture is to produce more and more on the same unit of land area. The intensification of production and the consequent increase in production costs must result in higher absolute values of income than non-intensification. To achieve this goal, it is essential to have a contribution of technologies in agriculture, used in all stages of agricultural production, which will require from the rural producer a rural planning and efficient management and specialized technical assistance (IZI AGRO MANAGEMENT, 2020).

Thus, it is clear that the two indexes used in this analysis indicate the economic efficiency of the farms and should be analyzed together, and never isolated, because even when they are higher, they do not mean sufficient income for the family.

Analyzing the theme, it is clear that there are situations in which income depends on land area and in other cases on productive efficiency.

# REFERENCES

**Agricultura Familiar**. Disponível em: <https://www.gov.br/agricultura/pt-br/assuntos /agricultura-familiar/agricultura-familiar-1#:~:text=Na%20agricultura%20familiar%20a%20gest%C3%A3o>. Acesso em: 30 ago. 2022.

IZI GESTÃO AGRO**. Gestão Financeira e Rentabilidade da Empresa Agrícola - Izi Gestão Agro**. Disponível em: <https://izi.agr.br/gestao-financeira-e-rentabilidade -da-empresa-agricola/>. Acesso em: 2 set. 2022.

LIMA, A. P. et. al. **Administração da unidade de produção familiar: modalidades de trabalho com agricultores**. Ijuí: Editora UNIJUÍ, 1995.

PAULA, G. B. **Rentabilidade e lucratividade: entenda a diferença e a importância deles**. Disponível em: <https://www.treasy.com.br/blog/rentabilidade-x-lucratividade -voce-sabe-a-diferenca/>. Acesso em: 1 set. 2022.

QUEIROZ, R. **Gestão da pequena propriedade rural.** Brasília: NT Editora, 2014.

SAVOLDI, A.; CUNHA, L. A. **Uma abordagem sobre a agricultura familiar, pronaf e a modernização da agricultura no Sudoeste do Paraná na década de 1970**. REVISTA GEOGRAFAR, v. 5, n. 1, p. 1–21, 23 jun. 2010.

WAGNER, S. A. et al. **Gestão e Planejamento de Unidades de Produção Agrícola**. 1. ed. Porto Alegre: UFRGS, 2010.