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Economic Assessment of Neonicotinoids' Use Restriction on Sunflower and Maize Farms in Bulgaria and their Reaction

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1. Introduction

The use of **neonicotinoid pesticides** for the treatment of seeds is temporally interrupted from the European Commission with **Regulation 485/2013 from 1.12.2013**.

This concerns the use of three active substances from the class of neonicotinoids pesticides for treatment of seeds. This regulation aims to protect endangered population of bees in Europe.

The report's aim is to present the results of the analysis of economic losses for agricultural producers of sunflower and maize and their reaction as a result of the acting prohibition for neonicotinoid pesticides' use.

2. Research Methodology

- At the end of 2015 has been led a research for the impact of European prohibition on farmers in Bulgaria. The research was realized from an IAE team in collaboration with Syngenta Bulgaria Ltd.
- Survey of producers of sunflower and/or maize, with the gross margin management framework.
- The total respondents' number amounts 173 farms from 20 regions in the country. Their distribution per regions is irregular.

2. Research Methodology

- The predominant parts of interviewed farmers function on the territory of the biggest cereal-producing regions in Bulgaria (Pleven, Dobrich, Rousse, Silistra, Burgas and Vratsa).

- The total size of used agricultural area of farms is 260112 ha, which is 5,23% of all UAA of the country.

The analysis of economic losses is led in two aspects:

2. Research Methodology

The first aspect reflects the amount of missed incomes, due to collapsed areas, because of non-use of neonicotinoid pesticides. The elaboration of the economic assessment is based on the gross margin management framework.

For this approach have been used the following indicators:

- Value of variable costs (BGN/ha) for the sunflower and maize growing.
- Purchase price of sunflower and maize (BGN/t).

2. Research Methodology

The second aspect of the economic assessment is related to the additional costs, which producers have been forced to have costs for the reseeding, for alternative methods against the soil pests and for the increased sowing norm.

For the assessment of additional costs have been used the answers of the following two questions:

1. Which alternative methods and additional costs did you have in the period 2013-2015?
2. Which financial losses has the farm suffered from the restriction of neonicotinoids' use?

It should be keep in mind that subsidies received were not taken into account.

3. Results

Level of Gross Margin for not producing and marketing production average per farm, from collapsed areas (BGN)

| Region | Sunflower | | Index (2015 / 2013) | Maize | | Index (2015 / 2013) |
|--------------|-----------|-------|---------------------|-------|-------|---------------------|
| | 2013 | 2015 | | 2013 | 2015 | |
| Pleven | 2901 | 14036 | 4,8 | x | 17790 | x |
| Russe | 27823 | 49233 | 1,8 | 30523 | 41850 | 1,4 |
| Varna | 24794 | 17150 | 0,7 | x | 6491 | x |
| Dobrich | 32545 | 25718 | 0,8 | 16770 | 18821 | 1,1 |
| Burgas | 359 | 1791 | 5,0 | x | 219 | x |
| Vratsa | x | x | x | 11332 | 14595 | 1,3 |
| Average/farm | 15058 | 20122 | 1,3 | 17889 | 25088 | 1,4 |

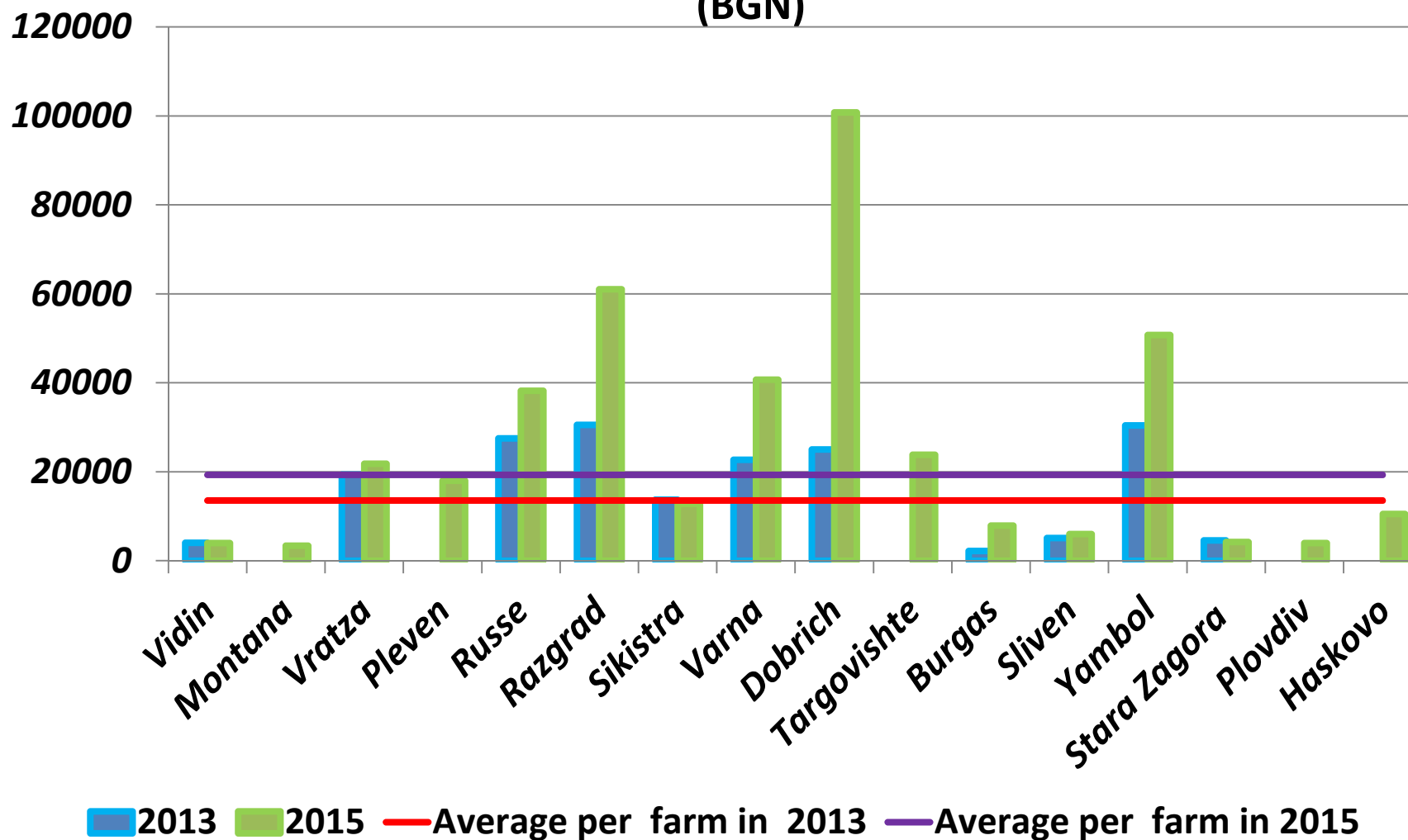
Source: Information from National Statistic Institute, empiric research and own calculations

3. Results

- ✓ The highest increase pace of missed incomes (GM) from collapsed areas is observed in the regions of Burgas and Pleven – respectively 5 and 4,8 times.
- ✓ In the most developed productive regions of sunflower, their absolute level remains very high in 2015 too. In the regions of Russe and Dobrich agricultural producers have the highest missed incomes in both 2013 and 2015.
- ✓ The increase of amount of missed incomes in 2015 against 2013 could be definitely explained by the higher share of treated areas in the first year in relation to the period after the introduction of the restrictive measure for neonicotinoid pesticides use.
- ✓ There is an inverse correlation of the level of missed incomes and the size of treated areas by neonicotinoids. In territories with big percentage of treated areas the gross margin is lower or it does not exist because of lack of collapsed area.

3. Results

Additional costs, used for alternative methods against soil pests, per regions (BGN)



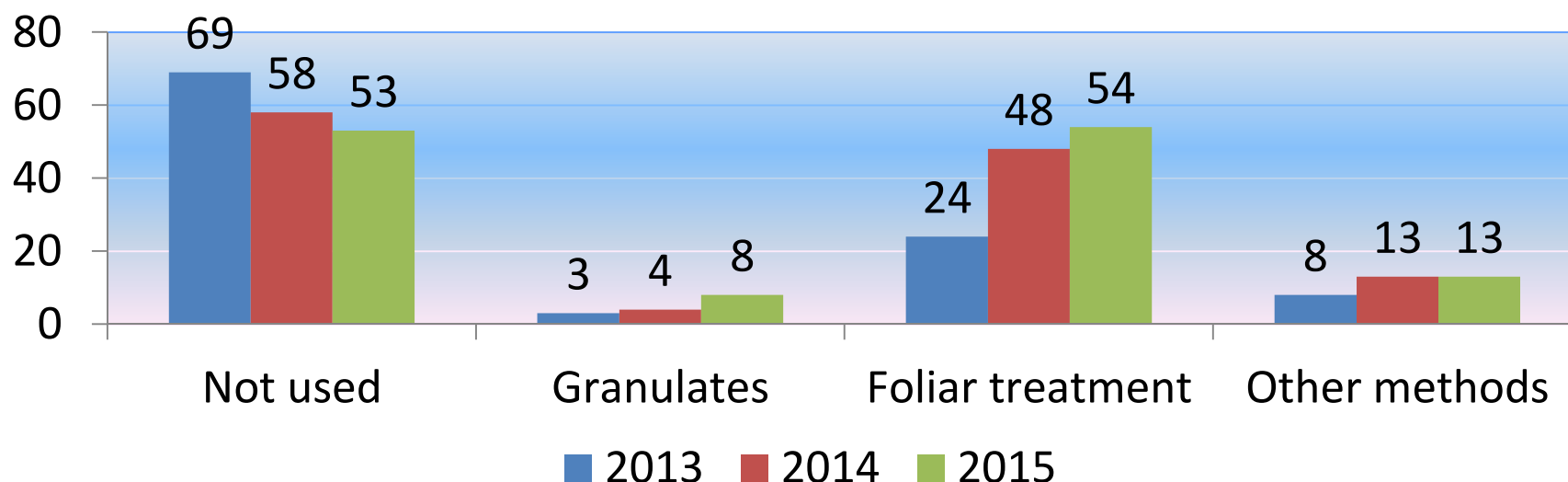
Source: Information from empiric research and own calculations

3. Results

- The most sensitive has increased additional costs in Dobrich and Burgas, respectively 4 and 3,6 times.
- There is a big variety and inequality between additional costs' amount in different regions.
- The variation coefficient is approximately 122-124%.
- The established trend of increase of the additional costs' amount is due mainly to farmers from Dobrich, Razgrad and Varna regions.

3. Results

Farms used different alternative methods for pest control in the period 2013-2015 (numbers)

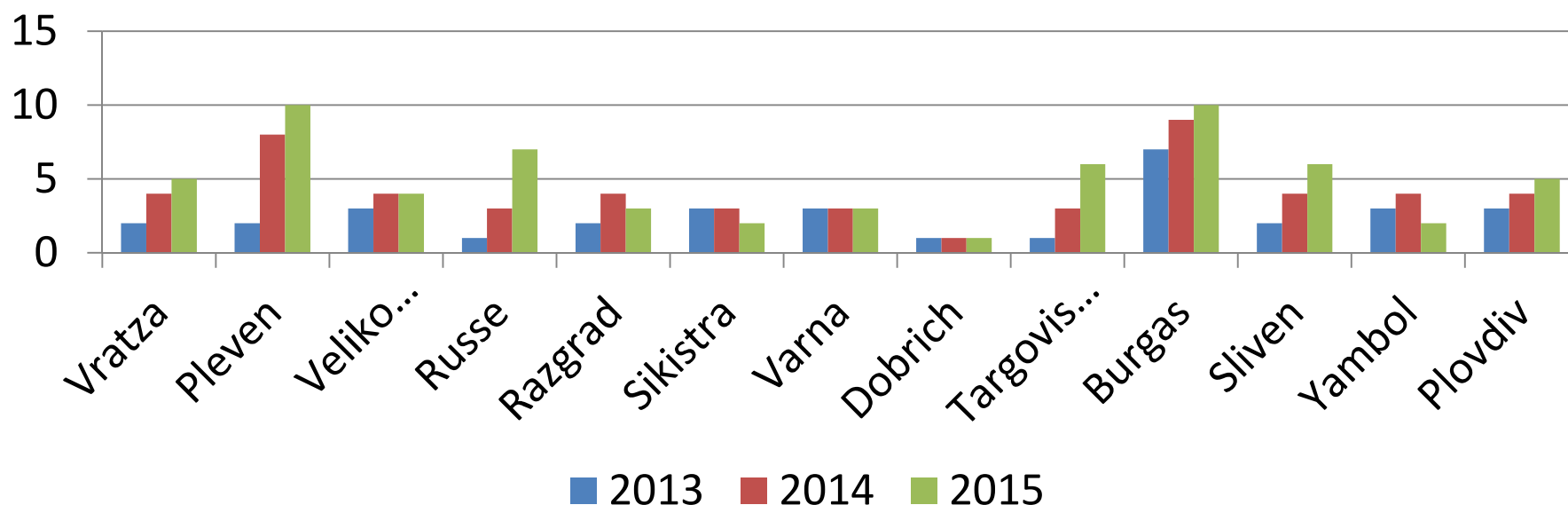


Source: Information from empiric research and own calculations

- ✓ There is an optimistic trend of increase in the number of farmers for the implementation of alternative methods for pest control. Farmers indicated as other methods of reseeding areas and increased sowing norm.
- ✓ Bulgarian farmers use other pesticides, different from neonocotinoid ones, but having chemical composition. The implementation of biological methods for pest control is still unpopular.

3. Results

Number of farmers, which have used alternative methods for pest control (per regions)



Source: Information from empiric research and own calculations

In almost all regions tended to increase the activity of farmers in conjunction with other methods of pest control. The reported trend is stronger in the region of Ruse, Plevnen, Targovishte.

3. Results

Values of variation coefficient (V) between the different regions, in relation to different alternative methods use

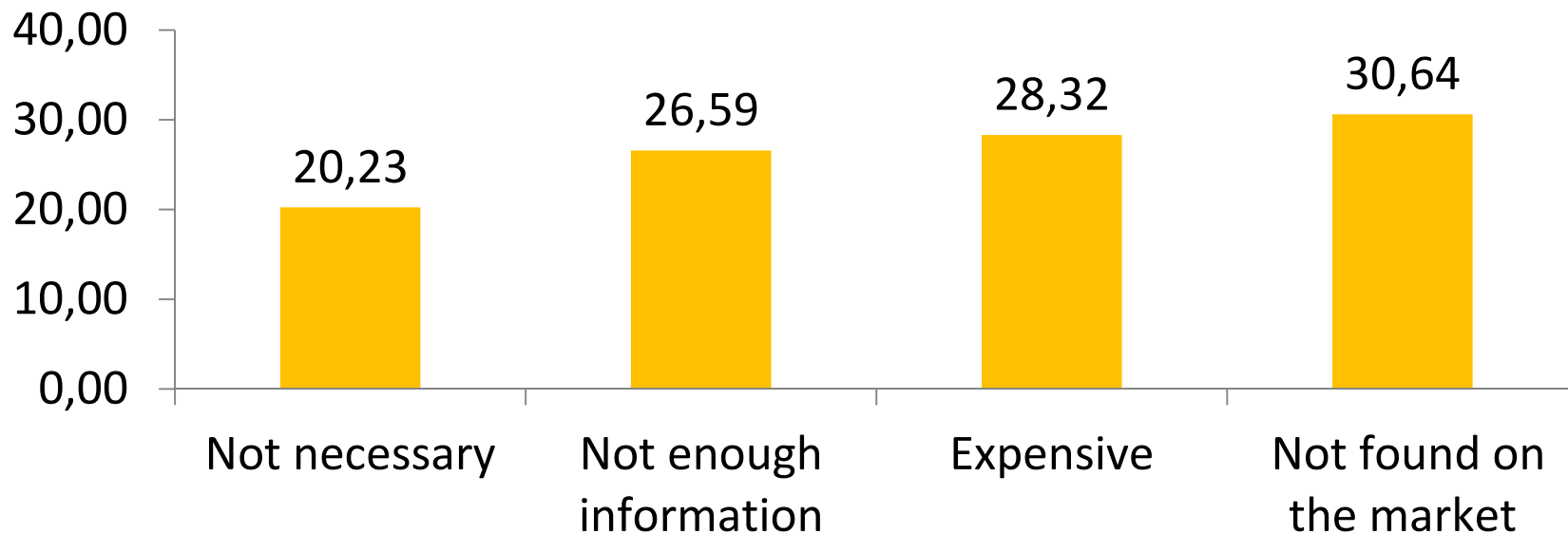
| Types of alternative methods/years | 2013 | 2014 | 2015 |
|---|-------------|-------------|-------------|
| Granulates | 3.18 | 2.54 | 2.42 |
| Foliar treatment | 0.78 | 0.93 | 0.92 |
| Other methods | 3.29 | 1.69 | 1.47 |
| Not used | 1.23 | 1.38 | 1.37 |

Source: Information from empiric research and own calculations

- From the made analysis we could generalize that independently of the general trend of farmers number increase, which search alternative methods for cope with soil pests, there are big differences between the regions.
- The increasing number of producers using the foliar treatment, which determines the lower variation coefficient (under 1).

3. Results

Factors defining the non-using of alternative methods for pest control (%)



Source: Information from empiric research and own calculations

The reasons of market character have leading place, despite the small differences between the mentioned reasons. The lack of enough information for the opportunities of alternative methods also determines the relatively low degree of their application.

4. Conclusions

- In 2015 agricultural producers of sunflower and maize have suffered serious economic losses after the respect of the imposed prohibition for neonicotinoids' use.
- An inverse correlation between the levels of gross margin in farms has been established; the share of treated by neonicotinoids areas, compared to the total area, cultivated by sunflower or maize.
- Regions with biggest losses suffered by the farmers, assessed through the gross margin from collapsed areas with sunflower are Russe and Dobrich.

4. Conclusions

- Damages are expressed firstly in missed incomes due to collapsed areas. Secondly, losses are supplementary costs, related to the necessity of reseeded, to the implementation of alternative methods against the soil pests and the raised sowing norm.
- As a result of the complete or the partial ban for the use of neonicotinoid pesticides, the farmers have reacted by an increased interest in the implementation of different alternative options, especially other chemicals for pest control.
- Regarding the opportunities of non-chemical (biological) methods, they are insufficiently known and still unattractive for Bulgarian farmers.

Thank you for your attention!