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### Preliminary analysis of agriculture land for vegetable farming system

<sup>b</sup>Dimka HAYTOVA\*, <sup>a</sup>Vera STEFANOVA, <sup>a</sup>Zhulieta ARNAUDOVA, <sup>c</sup>Tatyana BILEVA

<sup>a</sup> Department of Melioration and Land Surveying, Agricultural University, 12Mendelev str.,4000 Plovdiv, Bulgaria

<sup>b</sup> Department of Horticulture, Agricultural University, 12Mendelev str.,4000 Plovdiv, Bulgaria

<sup>c</sup> Department of Ecology and Environmental Protection, Agricultural University, 12Mendelev str.,4000 Plovdiv, Bulgaria

\*Corresponding author: haitova@abv.bg

#### Abstract

Vegetable sector is one of the important components of Bulgarian agriculture where diversity in vegetable cropping brought by different agro-ecological regions of the country. The main aim of the article is to analyze and evaluate the state of the sector and Bulgarian agriculture land for vegetables crop production with relevance for GIS database. The article suggests that the results in the horticulture sector are far below of biological potential of vegetables and effectively using of lands. The analysis will be the basis for creating a GIS database for vegetables crop production. The using of GIS database in vegetables crop production will help to increase the knowledge of the vegetable growers relating with the selection of areas, selection of suitable productions direction and varieties and applying of good agricultural practices for sustainable vegetable production sector.

**Keywords:** vegetables crop production, GIS database, using of lands

#### Introduction

Vegetables crop production is an integrate part of Bulgarian agriculture. Its development in Bulgaria is determined by a number of preconditions - appropriate soil and weather conditions, various species composition and structure of adequate cultivars, several production ways. Extensive experience and rich national traditions in growing vegetable crops determine Bulgaria as an established producer of vegetables. According to Toskov (2013) the proportion of fresh vegetables and potatoes in the gross production of agriculture sector is 10.2% and the gross production in crop production - about 20%. These facts determine the important economic and social importance of vegetable growing.

Several authors point the need for developing strategies for the production and realization of vegetable production (Stoeva, 2013; Christova et al, 2013; Toskov, 2013; Nikolova, 2013). According to them, the developed measures should be complex are reflected in a general system for effective management of vegetable farms. One of important aspects of these strategies is to support vegetable growers by creating a

database which allows quick access to practical and applicable information. This could be achieved by using GIS information systems.

The main aim of the article is to analyze and evaluate the state of the sector and Bulgarian agriculture land for vegetables crop production with relevance for GIS database

#### Materials and Methods

For analysis and evaluation of the areas used for growing vegetable crops used data of the "Agricultural Statistics" MAF and BANCİK for the period 2008-2012 (Agrostatistical reference handbook 2000-2012, 2014).

#### Results

Agricultural production is related to the rational use of the most important natural resource - the land. The analysis of land use shows that the area for agricultural use is decreasing. Decreases and utilized agricultural area (Fig. 1). After 2009 year observed annual increase. In 2010 year, its size exceeds with 22 281ha areas of 2009 year. In 2012 year the increase in the area is 90 000 ha, compared with the level of 2009 year.

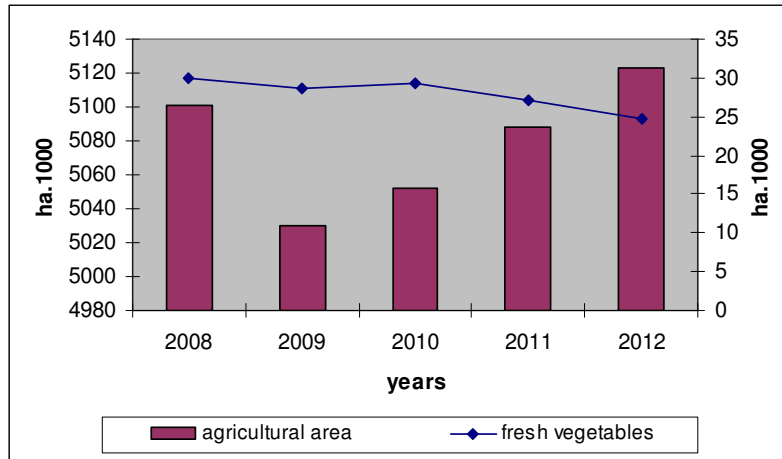


Figure 1. Dynamics of the UAA and the area with fresh vegetables (ha x 1000) for the period 2008-2012 years

At the current stage the areas under vegetables are about 2.2-2.4% of the utilized agricultural area (UAA) of the country. Productions of fresh vegetables have the greatest economic importance to the sector. Independently of strong dynamics in the UAA, the level of land used for the production of fresh vegetables varies in the somewhat less range. The trend is to reduce these areas. It is due to the reduction in open fields.

In 2010, the areas used for the production of vegetables farms are about 43.2 (ha x1000). Greenhouse area is 1000 ha. The main open fields where vegetables are grown in are 42.2 (ha x1000). Harvested areas of vegetables in 2010 are 42.6 (ha.1000). Compared to 2009 there is a decrease in harvested area to 9.4%. In 2012, the areas used for the production of vegetables are about 35.4 (ha x1000), 24.3% less than the previous year. Of

these, 34.4 (ha x1000) are open field and 948 ha - greenhouse areas. Harvested area of vegetables in 2012 year decreased by 15.6% from 2011 year. The highest relative share is potatoes harvested areas (37.9%), followed by tomatoes (8.7%), watermelons (7.9%) and pepper (7.7%).

The structure of the fresh vegetable crops is formed mainly of tomato, pepper, cucumber, cabbage, onion, legumes (green beans and green peas), etc. (Fig. 2). The size of the area filled by the main vegetable crops remains relatively constant.

Distribution of relative shares for different vegetable crops is 40-45% for Solanaceae (tomato, pepper and eggplant), 22-24% for Cucurbitaceae (cucumbers, watermelons, melons, and pumpkins), 9-10% for legumes (green beans and green peas), 2-3% for carrots, 10-11% for Alliaceae (onions, leek and garlic).

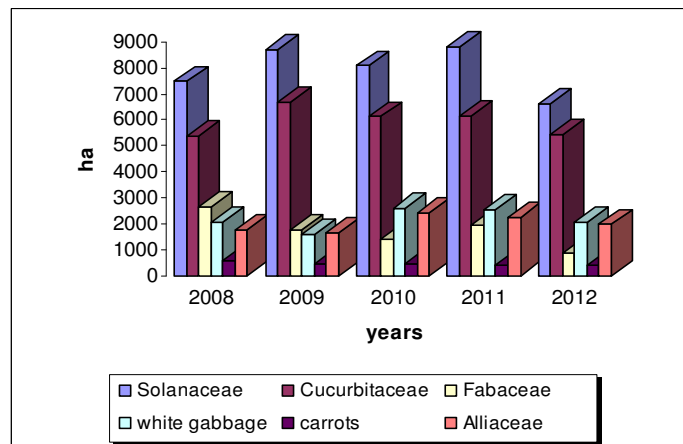


Figure 2. Structure of the areas of vegetable crops for the period 2008-2012

## Discussion

According to Stoeva (2012) most of the farms are relatively small in size, which in turn leads to lower average yields per unit area and reduce the competitiveness of the production. Fragmentation of the essential resources - the land, dependence of vegetables crop production by climatic conditions, and the low level of mechanization of the growing process, are only a small part of the current problems of the Bulgarian vegetables crop production.

According to Nikolova (2013) there is creating in the sector opportunities for many innovative growers to increase the area for cultivation of traditional and non-traditional vegetable crops and to apply modern environmentally friendly technologies.

Christova and Ilieva (2013) recommended the development of the sector Vegetables crop production is used both economic and technological tools. On the one hand will increase the technology base, and the other will increase knowledge of vegetables growers.

The creation of a GIS database has practical effect and allows producers to receive in accessible all relevant information for the specific agro-ecological region of the country. The use of GIS in vegetable could facilitate the planning, organization and production of vegetable production, in compliance with the requirements for quality. Assessment of land use is directly related to the determination of suitability for vegetables crop production and also the determination of the limiting factors for the cultivation of vegetable crops. So, farmers will receive specific recommendations well-founded in research for growing vegetable species according to their biological requirements and potential. It obtained a classification of vegetable species under their suitability to a specific area, relevant with the interests of vegetables growers.

## Conclusion

Following the assessment of the suitability the accumulated information should to bring to the attention of vegetables growers. In this regard, it is appropriate, the application of multi-criterial method, based on the number of analyzes, systematized by GIS information systems.

The using of GIS database in vegetables crop production will help to increase the knowledge of the vegetable growers relating with the selection of areas, selection of suitable productions direction and varieties and applying of good agricultural practices for sustainable vegetable production sector.

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