REVIEW

on the dissertation for obtaining a Scientific Degree "Doctor" (PhD) in field of higher education 3. Social, economic and legal sciences, professional field 3.8. Economics, scientific specialty "Organization and management of production" (agriculture and sub-sectors).

Author of the dissertation: Tatyana Ivan Pilyan, PhD student in self-study at the Department of "Management and Marketing".

Doctoral thesis topic: **"Opportunities and barriers for sustainable agricultural development in the Republic of Serbia."**

Reviewer: Prof. Snezhinka Konstantinova Stoyanova, PhD 3. Social, economic and legal sciences; professional field 3.8. Economics, appointed as a member of the Scientific Jury by order No. RD-16-1342 / 02.12.2021, from the Rector of the Agricultural University – Plovdiv.

1. Brief introduction of the candidate.

Tatyana Ivan Pilyan was born on June 11, 1988 in the town of Zemun, Serbia.

For the period 2007-2011, Tatyana Pilyan graduated from the Belgrade Business School for Professional Economists (College for Professional Research), Belgrade.

In the period 2011-2013 he obtained the Master's degree at the Faculty of Business Economics and Entrepreneurship, Belgrade.

He speaks Russian and English.

The professional experience of the candidate is the following:

- from October 2014 to September 2017 – teacher of management skills in the field of management at the Secondary Business School "Prof. Radomir Boykovic, PhD", Krushevac;
- from October 2017 to the present – Assistant Professor at the Faculty of Business Economics and Entrepreneurship, University of Belgrade.

2. Relevance of the problem.

The pertinence of the topic of the dissertation is great. The dissertation correctly points out that the new era in the development of agriculture requires sustainable solutions and technologies that provide opportunities for higher incomes with less investment. Improving the quality of seeds, the introduction of genetic technologies and digital agricultural tools create conditions for the implementation of sustainable strategies in the field of agriculture. In this context, sustainable agriculture forms the necessary potential to solve two opposing problems: to increase food stocks and to protect the environment.

The development and application of modern technologies and especially information and communication technologies (ICT) have opened up new

opportunities for finding non-traditional solutions in the field of agriculture. These technologies, as an emanation of the new era, have made it possible to monitor and document agricultural production with the help of appropriate geographic information systems, to process data and to manage the work process with high speed and precision. The new characteristics of modern technologies have made it possible to implement and widely apply the so-called "Precision farming". Farmers received modern tools for the implementation of eco-management in the planning and implementation of sustainable agricultural production, to identify the forms and sources of pollution and on this basis for land protection. All this emphasizes the high relevance of the current dissertation research in the aspect of global environmental problems.

3. Purpose, tasks, hypotheses and methods of research.

The purpose and objectives of the study are not well defined. In practice, the goal is not to describe and classify the environment and sustainable development, but to reveal environmental problems and the need to implement sustainable development through the application of modern technologies in agriculture in Serbia. In this sense, specific and logically justified research tasks could be defined.

The following four hypotheses are formulated:

H-1: The application of modern technologies in the field of sustainable agriculture contributes to optimizing investments, reducing losses and maximizing income. The nature of the general hypothesis thus set requires that it be operationalized by special hypotheses.

H-2: The benefits of using modern technologies in agriculture are clear.

H-3: The application of modern technologies in agriculture enables sustainable agriculture and healthy food.

H-4: The level of application and perception of modern technologies in the Republic of Serbia is still low.

In the dissertation the emphasis is placed on the following main analytical and synthetic methods of knowledge and research:

- analysis;
- induction;
- deduction;
- comparison;
- specification;
- generalization.

The author has purposefully focused on the use of methods and techniques tested and proven in practice, such as methods and techniques for insurance of farm animals in the Republic of Serbia.

Empirical research is properly organized in three phases:

1. Conducting an anonymous survey through a questionnaire with previously prepared questions.
2. Data collection.
3. Data processing and evaluation of results.

Statistical methods for evaluating the results were used correctly.

4. Visualization and presentation of the obtained results.

The dissertation is well illustrated, which is confirmed by the following elements of its content:

- 33 figures;
- 29 graphics;
- 38 tables.

They are all properly arranged, numbered and titled.

At the beginning of the dissertation, well-formed lists of figures, graphs and tables are presented.

The analysis shows that the sources from which the respective figures or tables were used are correctly indicated. A significant part of the visual aids are created by the author himself, which is indicated in the relevant place.

It does not make a good impression that some of the figures and tables are compiled in the Republic of Serbian, which is automatically copied to the English and Bulgarian versions of the dissertation and abstract.

It should be noted that the abstract adequately reflects the main results of the research contained in the dissertation.

To some extent, it has an original layout, not following the structure of the dissertation, but has the following main elements:

- Introduction;
- Methods and tools of eco-management in sustainable development planning;
- Research methodology;
- Results;
- Conclusion.

Over 60% of the volume of the abstract contains the results of the author's empirical research, which I assess as the right approach for structuring and presenting the relevant research of the authors.

5. Discussion of results and references.

The dissertation contains three chapters, introduction, conclusion and literature. Although it contains three main parts, the dissertation practically does not have the classical form: "theory – methodology – research".

The first chapter contains both the theory and the methodology and methodology for revealing links and dependencies between ecology and sustainable development.

The second chapter aggregates the theoretical and methodological foundation of innovations and especially the application of modern technologies in the field of sustainable agriculture with the methodological tools for their study.

The third chapter has a strongly applied character, as it presents both the results of the empirical research and the statistical tools for assessing the relationship between the attitudes of the respondents and their socio-andragogical characteristics.

At the beginning of her dissertation relatively well revealed and presented global environmental issues.

The characteristics of eco-management are structured correctly, as are consistently presented:

- the main functions;
- the roles of the eco-manager;
- the characteristics of the management team;
- the content of the city government
- the development of eco-management as a good business practice in the process of deepening urbanization.

The author of the dissertation has appropriately defined the methods and tools for environmental management in order to achieve sustainable development. Based on an in-depth analysis of the literature, it presents six groups of methods and tools with the following purpose:

- for identification and analysis of the condition;
- to define policies and actions based on the information gathered;
- to assess the impact of policies and actions;
- for action management;
- to inform the public about sustainable development;
- to create a social climate for sustainable development.

Using the research of other authors in the dissertation is relatively clear and forms of strategic environmental assessment are correctly presented. Due attention has been paid to the scope of this assessment, indicating both the cumulative effect and the social impact.

At the beginning of the second chapter Tatyana Pilyan gives a brief overview of innovations in the field of agriculture. On this basis, through Figure 18 on page 72, she illustrates the main components of the concept of precision farming. The emphasis of the research in this part of the dissertation is correctly directed in the following three directions:

- the application of information technologies;
- protection of people and the environment;
- creating more efficient agriculture and improving the quality of production.

This part of the dissertation uses current Internet sources (from 2020) to present the rapidly evolving process of digitalization of agriculture.

The end of the second chapter is devoted to the interesting problems of the application of GPS-technologies in precision agriculture, with emphasis on the following:

- remote sensing;
- market information systems.

As I have noted, the third chapter has a strongly applied character. It presents in sufficient detail the results of a survey conducted on the territory of Voyvodina, on an appropriate sample of 325 respondents. According to the doctoral student, the aim of the study is to determine the attitude of citizens to the application of modern technologies in the function of sustainable agricultural development.

I evaluate as well formulated and logically arranged the eight questions contained in the survey. The content of some of them could be improved. For example, the first and second questions are highly correlated, given the application of modern technologies for sustainable agricultural development is a good choice (first question), it is normal to expect good results (second question). Directly related to these two questions are the answers to the sixth question, about investing in modern technologies.

I have no remarks on the other five questions, which are targeted at differentiated assessments of the respondents.

I positively evaluate the conducted regression analysis and the used mathematical and statistical tools for assessing the relationship between the attitudes of the respondents and their socio-andragogical characteristics. In further research Tatyana Pilyan should take into account my comments and eliminate the coherence of some issues, which would lead to multicollinearity in the construction of multiple correlation and regression models.

I accept that the literature used is sufficient, but not optimal in number and content. I believe that there was a need for a more in-depth literature review of foreign sources, especially on the application of modern technologies in agriculture and their impact on its sustainability. It would be appropriate to classify the sources better (in Cyrillic and Latin).

6. Contributions of the Dissertation.

There is no report on the contributions of the dissertation, which I consider a serious omission. For this reason, I cannot take a formal approach to them, but in an informal aspect of the review, I revealed significant contributions, noting the following:

I. In scientific terms:

1. The formed methodology for studying the impact of modern technologies on sustainable development.
2. The developed toolkit of methods and models of eco-management for sustainable development planning.

II. In scientific and applied terms:

1. The proven benefits of using modern technologies in agriculture.
2. The revealed connections and dependencies between the application of modern technologies, sustainable agriculture and healthy food.
3. Scientifically substantiated support for the development of civic awareness of growing environmental risks and the need to apply modern technologies for sustainable agriculture.

7. Critical notes and questions.

I have the following critical remarks and recommendations for the dissertation:

7.1 Table 2, presented on page 18, presents a SWOT analysis of nature conservation and sustainable rural development, borrowed from Serbia's national strategy. It would be appropriate for the PhD student to compile

such an up-to-date analysis or use newer sources, as this source was compiled before the financial crisis of 2007-2009, when global environmental issues and the application of modern technologies in Industry 4.0 were not so relevant.

7.2 In certain places in the dissertation (in English) and both versions of the abstract (in English and Bulgarian) are included tables and figures that have not been translated from Serbian. This is especially true of the results of the survey.

7.3 Four hypotheses have been formulated, the claims of which must be proven or rejected after the research. It would be appropriate to restructure the system of hypotheses, as the third hypothesis (H-3: The application of modern technologies in agriculture allows for sustainable agriculture and healthy food) was established as the main (general) hypothesis of the overall study. If modern technologies do not lead to optimization of investments, reduction of losses and maximization of incomes, their application will be naturally eliminated by the processes of competition.

7.4 In the third chapter there is a certain monotony of the exposition, which would be overcome by restructuring the presented material.

These recommendations do not diminish my positive attitude towards the dissertation. Regardless of the remarks on the structure, I assess the hypotheses as well-argued and convincingly proven.

8. Published articles and citations.

A list of 18 publications is presented. Some of them are not directly related to the problems addressed in the dissertation. Nevertheless, a careful review shows that the bulk of the research contained in the dissertation has been published in national publications in Republic of Serbia. A good impression is made by the fact that in the majority of the publications Tatyana Pilyan is a leading author. There are no publications in refereed editions.

There is no reference to the citations.

CONCLUSION:

Based on the dissertation research and its scientific contributions, I think that the dissertation work meets the requirements of the Application of the Act for the Development of the Academic Staff of the Republic of Bulgaria, and the Rules of the Agricultural University – Plovdiv for its application, which gives me a reason to rate it **POSITIVE.**

I allow myself to propose to the venerable Scientific Jury also to vote and to award to **TATYANA IVAN PILYAN** the Educational and Scientific Degree **'Doctor'** (PhD) in the Scientific Specialty "Organization and management" (agriculture and sub-sectors).

January 21, 2022
Plovdiv

REVIEWER: .....
(Prof. Sn. Konstantinova, PhD)