АГРАРЕН УНИВЕРСИТЕТ
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REVIEW

On dissertation for obtaining the **Doctorate degree** in Higher education: 3. Social, Economic and Legal Sciences, Professional area: 3.8. Economic, scientific specialty: Economic and management

PhD candidate: ***Dobri Mateev Dunchev***.
PhD student at the Department of Economics at the Agricultural University - Plovdiv

PhD topic: Evaluation of the innovation technologies in precision agriculture

Reviewer: **Assoc. Prof. Dr.** Vanya Stoyanova Manolova, Agricultural University – Plovdiv, appointed at a member of scientific jury with order № РД-16 / 546.от 25.06.2020 by the Rector of Agricultural University – Plovdiv

1. Brief introduction of the applicant

Dobri Mateev Dunchev graduated with a degree in Ecology and Environmental Protection from the Agricultural University of Plovdiv in 2005. In 2008 he graduated with a master's degree in "Ecology of settlement systems" at the University. He also received a master's degree in Accounting and Control from the same university in 2010. After a student brigade in Haygrove, UK, his qualities were appreciated by the company's management and he was hired. From 2005 until now, he has held various positions: head of harvesting, head of labor planning and harvesting, head of recruitment and staff planning. He is responsible for a team of over 650 people and 3 other managers. In 2017, after successfully passing the exam, he was enrolled as a full-time doctoral student in the Department of Economics at the Agricultural University of Plovdiv. In connection with his work at Haygrove, Dobri Dunchev has participated in a number of trainings on decision

making, team building, professional skills, dispute resolution, project management, communication skills and others and has the necessary certificates. The PhD student has: a diploma for improving business techniques, a certificate of training in social security policies and poverty reduction in developing countries of the Ministry of Commerce of the People's Republic of China. He is fluent in English at a professional level (C2). His written English is at an intermediate level. He also uses Russian at a basic level (B2). Dobri Dunchev has excellent digital skills for working with Microsoft Office. As a full-time doctoral student in the Department of Economics, he participates in the AGROIN project at the MEandS, the CUPAGIS project and two Erasmus + projects: CUPAGIS and NICOPA. He is also participated in scientific forums in Bulgaria, Germany and China.

2. The relevance of the problem.

In modern conditions, innovation is a key factor in increasing economic efficiency in agriculture. Digitalization is rapidly entering in this industry and radically changing its traditional image. As a relatively new technological approach, precision agriculture, which is based on the use of the latest information technologies, has not been sufficiently studied. This is what determines the relevance of this dissertation.

3. Purpose, task, hypothesis and methods of research

The aim of the dissertation is clearly stated: to analyze the technical and economic efficiency of innovative technologies in agriculture and to assess the possibility of their implementation in Bulgaria. The tasks of the research allow to achieve the goal. The hypothesis is logically sound. The goal was realized on the basis of a doctoral study conducted by the doctoral student for a four-year period from 2016 to 2019 in four farms in the UK and one farm in Bulgaria growing soft fruits.

The doctoral student applies a well-established methodological approach in

assessing economic efficiency, which includes a system of indicators: average yield, income / expenditure ratio, gross profit. The following are also studied: the distribution of the labor force (permanent and seasonal workers) in the different production systems; the production structure of the studied farms. The quality of the produced production as a result of the applied innovations in the studied farms is analyzed.

4. Visualization and presentation of obtained results

The dissertation has a volume of 218 pages. It is relatively well structured and contains an introduction, three chapters, conclusions and recommendations, and a bibliography. It is illustrated by 22 tables and 54 figures. 331 literature sources were used.

5. Discussions of results and literature used

The introduction of the dissertation emphasizes the key role of agriculture for the national economy, its factor conditionality, the reduction of the production potential of natural resources as a consequence of their excessive and often unreasonable exploitation and the possibilities of precision agriculture as an intelligent approach with great potential for economic realization. and environmental benefits. The introduction presents the purpose of the dissertation and formulates nine tasks for its achievement.

The first chapter of the dissertation is theoretical and is dedicated to its sustainable development and its dependence on innovation. The concept of sustainable development and innovation, as well as the main factors that influence them in the context of the specifics of agriculture are discussed in chronology. The concept of precision agriculture is also discussed in detail. The methodological framework of the research is presented.

The second chapter of the dissertation is analytical. It is based on the PhD student's own study on four farms in the UK: Trumppet Farm (plants are

grown outdoors in raised beds), Ledbury Farm (the area is covered with standard tunnels, and the plants are grown in pots with coconut fiber), Newent Farm (the area is covered with advanced tunnels and the plants are grown in coconut fiber pots), Riverside Farm (the plants are grown in glass greenhouses in coconut fiber pots). The doctoral student studies a farm in Bulgaria - "Berach", in which two breeding systems are applied. In the first farm, the plants are planted in open areas in the soil of raised beds. In the second, the plants are grown in standard polyethylene greenhouses. In all farms the results of the cultivation of blackberries, variety "Victoria" are analyzed. The results of the analysis clearly show that precision agriculture and innovation in the cultivation of soft fruits (blackberries) provide higher economic results and better use of factors of production. The main obstacles to the application of these technologies are: high investment costs, the need for high professional capacity of staff, ensuring production and excellent organization and management of the production process.

The third chapter of the dissertation examines the possibilities for technological development of Bulgarian agriculture on the basis of digitalization. The potential of digital technologies to increase the efficiency and sustainability of agriculture is justified. The strategies for digital agriculture in the world, the European legislation in this field and the strategic documents that our country has adopted are discussed. The process of digitalization of Bulgarian agriculture is also analyzed and it is found that we are among the countries with the lowest R&D expenditures of GDP (0.75%).

Conclusions and recommendations have been made. I appreciate the recommendations as better formulated than the conclusions.

Dobri Dunchev uses a wide range of literary sources - 331, which he interprets relatively well. The majority of the bibliography is in Latin and 17 titles are in Cyrillic. 20 internet sources were also used. The doctoral student shows good analytical skills.

6. Contribution to the thesys

I accept the proposals submitted by the doctoral student for scientific and scientific-applied contributions in the abstract. They objectively reflect the results of the study.

7. Critical notes and questions

I have the following critical remarks to the PhD student:

1. Chapter one includes an analysis of the utility of technologies in precision agriculture. However, it is not applied in the analytical part of the dissertation, which raises the question of whether this section makes sense.

2. The conclusions. should be more focused and directly related to the specific study - for example, conclusions 1, 2, 3,, 5, 6, 7, 9, 14, etc. do not meet this requirement.

3. Some technical errors and inaccuracies have been made. However, this does not diminish the merits of the study. I hope that these weaknesses will be avoided in the future.

I have the following question for the doctoral student: What are the arguments not to include in the final version of the dissertation the payback period indicator in the evaluation of precision technologies? I know that it was calculated at an earlier stage and I ask the doctoral student to say what are the results and conclusions in this regard.

8. Published articles and citations

The doctoral student has presented 5 publications - 1 individual and 4 co-authored. Four of the articles are in English. They have been published in journals: Agricultural sciences - two articles (2019), Problems of agricultural economics (2019), Trakia Journal of sciences (2019) and Scientific papers of the Agricultural University (2020). The publication "Influence of foliar nutrition on the productivity of two varieties of common wheat" is not related to the present dissertation. The

author did not present the citation.

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CONCLUSIONS:

On the bases of quality of the work, learned and applied of PhD candidate different methods of research, learned and applied by the doctoral student and the summaries made, I believe that the dissertation meets the requirements of the Application of the Act for the development of Academic Staff in the Republic of Bulgaria and the Rules of the Agricultural University for its application, which gives me a reason to rate a **POSITIVE**.

I allow myself to propose to the venerable Scientific jury also to vote positively and to award to Dobri Mateev Dunchev the educational and scientific degree "**DOCTOR**" in the scientific specialty: "Economic and management".

Date: 29.07.2020 **REVIEWER:** .....

Plovdiv (Assoc. Prof. Dr. Vanya Manolova)