



AgriTech Solutions: Innovating VET for Sustainable Agriculture
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 2024-1-RS01-KA210-VET-000244168

List of identified available literature and materials on renewable energy sources

Engaged teachers: Stefanovski Saso, Milosheva Zaklina, Jovanova Kristina, Doncheva Milica, Nikolov Efremcho, Slavkovic Sonja

Location: Kumanovo, Sveti Nikole, Skopje, Strumica, Kavadarci

R.b.	Title	Short description
1	"Renewable energy sources in agriculture - a guide to implementation" Publisher: Ministry of Agriculture, Forestry and Water Management (MAWF) and UNDP – Skopje Year: 2020 Language: Macedonian https://www.undp.org/mk/north-macedonia/publications/renewable-energy-sources-in-agriculture	A practical manual intended for farmers, teachers and extension services. It covers solar collectors and panels, biogas from animal and plant waste, windmills and foundations geothermal heating of greenhouses. Contains calculations for return on investment and case studies from Macedonia. Available through: MAFWE, UNDP or as PDF upon request
2	"Solar Powered Irrigation Systems - A Farmer's Guide" Publisher: FAO (Food and Agriculture Organization of the UN) Year: 2018 Language: English https://www.fao.org/3/I8887EN/i8887en.pdf	A more detailed guide to using solar energy for irrigation pumps. Includes system design, energy requirements, components, maintaining profitability. Illustrated and suitable for use in teaching. https://www.fao.org
3	"Energy-Smart Food for People and Climate" Publisher: FAO (Rome) Year: 2011 Language: English https://www.fao.org/3/i2454e/i2454e.pdf	Analytical report on energy efficiency across the agri-food sector. Provides guidance on integrating renewables sources in production, on food, transportation and processing. Recommended for teachers and higher vocational education
4	"Renewable Energy in Agriculture" - Policy Brief Publisher: IRENA (International Renewable Energy Agency) Year: 2021 Language: English https://www.irena.org/publications/2021/Jun/Renewable-energy-in-agriculture	Document and overview on the global application of solar, biogas and hydropower in agriculture. Highlights examples from Europe, India, Africa. Suitable for discussion and thematic projects in teaching. https://www.irena.org



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5	"Clean Energy Solutions for Agriculture" Publisher: National Renewable Energy Laboratory (NREL), USA Year: 2019 Language: English https://www.nrel.gov/docs/fy19osti/73495.pdf	Contains technical content and practical instructions for integrating photovoltaic panels, small wind turbines, biomass systems and batteries into small farms. Includes calculators and diagrams. Useful for practical/laboratory work
6	"Biomass Energy - A Guide for Farmers" Publisher: GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) – Regional Office for the Western Balkans Year: 2017 Language: Serbian/Macedonian https://www.giz.de/en/downloads/giz2017-en-energy-biomass-farmers-guide.pdf	A guide to converting crop and livestock waste into biomass – a fuel for heating or generating electricity. Describes processes, required equipment, and options for farms with limited resources. Available through GIZ Macedonia or the national biomass network
7	e-Learning course "Energy in Agriculture" Publisher: FAO eLearning Academy Year: current Language: English https://elearning.fao.org/course/view.php?id=683	Online course with certification. Covers renewables, energy efficiency, and analysis of small and medium-sized systems farms. https://elearning.fao.org
8	Renewable Energy for Agriculture: A Guide for Small-Scale Farmers Publisher: Practical Action (2014) https://practicalaction.org/docs/renewable-energy/renewable-energy-for-agriculture.pdf	A practical guide to using renewable energy sources in small agricultural farms.
9	Renewable Energy Technologies in Agriculture Publisher: Food and Agriculture Organization (FAO), 2015 http://www.fao.org/3/i4939e/i4939e.pdf	A publication explaining renewables the application on technologies in various agro-sectors.
10	Bioenergy and Agriculture: Promises and Challenges Publisher: International Food Policy Research Institute (IFPRI), 2012 https://www.ifpri.org/publication/bioenergy-and-agriculture-promises-and-challenges	Analysis of the potential and limitations of biomass as an energy source for agriculture. on in
11	Renewable energy sources https://mk.wikipedia.org/ Energy sources https://mk.wikipedia.org/	Renewable energy sources Renewable energy – energy that is obtained from natural sources, such as sunlight light, wind, rain, water waves and geothermal energy, which are renewable (naturally renewing). Renewable energy technologies everything on them





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		include the solar energy, wind energy, hydropower, energy of biomass and biofuel. Energy Sources E –
12	E-textbooks on Renewable Energy Sources https://www.e-ucebnici.mon.gov.mk/pdf/obnovlivi_izv_na_energija_3_mak_izb.pdf https://www.e-ucebnici.mon.gov.mk/.pdf	textbooks on Renewable Energy Sources by author Elizabeta Trajkovska (mechanical technician for the 3rd year – elective) Sustainable Development – textbooks by the authors: Zorica Jankulovska and Aleksandar Aleksovski
13	Renewable energy sources https://www.slideshare.net/slideshow/obnovlivi-izvori-na-energija/PPT	Power Point presentation of 19 slides with solid content on Renewable Energy Sources
14	Types of Renewable Energy Sources https://prezi.com/p/6slexokgwr37/presentation/	Prezi presentation on renewable energy sources and types of renewable energy
15	Article from ESM on Renewable Energy Sources https://www.esm.com.mk/	Article from ESM on Renewable Energy Sources and the Hydro Potential Available to RSM, Energy from Water and Energy from especially for wind or windmills.
16	The most important sources of renewable energy that exist today use http://www.termosistem.com.mk/najvazhnite-8-izvori-na-obnovliva-energija-koi-denes-se-koristat/	The 8 most important sources of renewable energy used today. Renewable energy sources are found in traditional, most common forms of energy such as which are: sun, water, wind, tides, geothermal energy, etc. The primary goals for using renewable energy sources are: • environmental protection environment, which in large our quality of life. • increase in sustainable energy systems • creation and maintenance of energy independence, as a step that points to





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		mature and stable state of the system.
17	Energy and energy sources https://ekosvest.com.mk/wp-content/uploads/2021/03/energija-mali.pdf	Short presentation on Energy and energy sources
18	Energy efficient practices applied in agriculture https://ekosvest.com.mk/	Energy efficient practices that which are applied in agriculture (Positional document for improvement of the energy efficiency of agricultural holdings in the municipality of Gradsko)
19	RESEARCH ON THE POSSIBILITIES FOR ENERGY SOLUTIONS WITH THE LOWEST NEGATIVE IMPACT ON THE ENVIRONMENT (BROCHURE) https://ekosvest.com.mk/	ENERGY , RESEARCH ON OPPORTUNITIES BROCHURE LOWEST COST SOLUTIONS NEGATIVE IMPACT ON THE ENVIRONMENT
20	Unlocking the potential of renewable energy in agriculture https://www.dowellelectronic.com.mk/blogs/unlocking-the-potential-of-renewable-energy-in-agriculture/	Unlocking the potential of renewable energy in agriculture The integration of agriculture and energy storage is an emerging trend that has potential to revolutionize green So agricultural development. By combining renewable energy production with advanced energy storage solutions, farms can achieve greater energy efficiency, reduce environmental impact, and improve overall sustainability. This article explores how the synergy between agriculture and energy storage unlocks new opportunities for green growth in the agricultural sector.
21	Renewable Energy in Agriculture: Sustainable Solutions for Farmers Author: Julian Roche Book	This book describes practical ways that farmers can use renewable energy sources – solar panels, wind turbines, biogas and biomass – in order to reduce costs, increase





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		energy independence and yes contribute to climate stability. Includes case studies from rural areas in Europe and Asia.
22	Renewable Energy for Agriculture (IEA Report) Institution: International Energy Agency (IEA) Report	This report analyzes the energy needs of the agricultural sector and highlights best practices for the integration of renewable energy. It is considered the economic viability of solar irrigation systems, biogas for heating and electrification with wind turbines.
23	Solar-Powered Irrigation Systems: A Guide for Farmers Institution: GIZ (German Agency for International Cooperation) Manual	A practical guide for small and medium-sized farmers who want to install solar water pumps. Explains calculations for capacity, system components, financial analysis and maintenance. Aimed at developing countries, but applicable in the Balkan context as well.
24	Biogas Technology in Agriculture Institution: IRENA Technical guide	Scope of biogas systems for small and large farms, using animal feed waste, corn stalks and vegetable waste. Technological and environmental aspects, as well as examples of successful biogas installations in Europe and Asia.
25	National Energy and Climate Plan (NECP) – North Macedonia Institution: Ministry of Economy Strategic document	The national plan identifies key areas for the application of renewable energy sources, including in agriculture. Investments are planned in biogas plants and micro-solar systems, in particular in rural communities.
26	UNDP Project: Solar pumps for irrigation on Macedonian farms Institution: UNDP North Macedonia Project report	Within the framework of UNDP, solar pumps have been installed on small farms in Pelagonija and Tikveš. The report analyzes the effectiveness, savings and sustainability of such systems.





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27	Research: Sustainable energy use in the agricultural sector in the Republic of Macedonia Institution: Faculty of Mechanical Engineering – Skopje Scientific paper	Scientific analysis of the potential for the application of solar and biomass energy on Macedonian farms. Both technical and economic aspects are covered, with proposals for subsidies and support for small farmers.
28	"Renewable Energy for Rural Development" Author: World Bank Group Report / case study	The document outlines how the integration of solar, wind and biomass energy can improve livelihoods and productivity in rural farming communities. The focus is on financing, public policies and an inclusive approach for poor rural areas.
29	"Energy Smart Food for People and Climate" Institution: FAO Global report	This report analyses how to transform the agricultural system into an energy-efficient and climate-resilient one. It highlights the role of renewable energy (especially solar and biogas) in all stages of the agri-food chain. value chain.
30	"Biomass Resources for Energy and Industry" Authors: Martin Kaltschmitt, Hans Hartmann Academic book	A detailed explanation of using biomass from agricultural waste for energy production. Includes waste processing processes, technical equipment and energy efficiency. The book is intended for researchers and engineers in the sector.
31	Renewable energy sources – basics Author: Prof. Dr. Tome Maleev (FEIT, Skopje)	It covers the basic types of renewable sources: solar, wind, hydropower, biomass and geothermal energy.
32	Renewable Energy: Power for a Sustainable Future Author: Stephen Peake (Oxford University Press)	A modern and comprehensive textbook, with graphs, data, and examples for all major technologies: photovoltaics, windmills, biofuels, etc.
33	Renewable Energy Systems: A Smart Energy Systems Approach to the Choice and Modeling of 100% Renewable Solutions Author: Henrik Lund	For advanced users – analyzes renewable sources in context of integrated energy systems, decentralized network,



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		energy storage and energy policies.
34	Energy Systems and Sustainability: Power for a Sustainable Future • Authors: Bob Everett, Godfrey Boyle, Stephen Peake	A comprehensive book that covers the entire energy system – from resources to consumption. It examines in detail renewable sources, but also their integration with other sources.
35	Solar Engineering of Thermal Processes Authors: John A. Duffie, William A. Beckman	A classic book on solar thermal systems – very technical. Good for engineers and researchers in the field of solar energy.
36	Wind Energy Explained: Theory, Design and Application Authors: James Manwell, Jon McGowan, Anthony Rogers	A detailed technical guide to wind turbines – from basic physics to design and performance analysis
37	Introduction to Renewable Energy • Author: Vaughn Nelson	A compact and clear introduction to all major renewable technologies. Ideal for students or beginners.
38	"Renewable energy sources in agriculture" – practical guide Publisher: MAFWE and UNDP (period 2018–2022) https://www.undp.org/mk/north-macedonia/publications/renewable-energy-sources-in-agriculture	A practical guide for farmers, extension services. Covers solar collectors and panels, biogas from animal and plant waste, windmills and foundations of geothermal heating in greenhouses. Contains return on investment calculations and case studies from Macedonia. Available through: MAFWE, UNDP or as PDF upon request
39	"Renewable Energy in Agriculture" - Policy Brief Publisher: IRENA (International Renewable Energy Agency) Year: 2021 Language: English https://www.irena.org/publications/2021/Jun/Renewable-energy-in-agriculture	Document and overview on the global application of solar, biogas and hydropower in agriculture. Highlights examples from Europe, India, Africa. Suitable for discussion and thematic projects in teaching.
40	"Biomass Energy - A Guide for Farmers" Publisher: GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) – Regional Office for the Western Balkans Year: 2017 Language: Serbian/Macedonian https://www.giz.de/en/downloads/giz2017-en-energy-biomass-farmers-guide.pdf	Guide to converting waste from plant livestock production into biomass – fuel for heating or generating electricity. Describes processes, required equipment, and options for farms with limited resources.



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		Available through GIZ Macedonia or the national biomass network
41	Agroenergy: Renewable and Sustainable Energy Authors: Lina María Grajales Agudelo; Juan Carlos Valdés Serra; Erich Collicchio ISBN: 9780443214301 Publication Date: 2023 • Publisher: Woodhead Publishing eBook ISBN 9780443214295 https://www.perlego.com/book/4462394/agroenergy-renewable-and-sustainable-energy-pdf	Renewable and sustainable energy represents a development in the field of agroenergy. With a special focus on sustainability, each chapter of the book – productivity of cultures, production on biofuels based on the generation of raw materials and technologies for bioenergy production – deals with different aspects on agro-energy production chain, identifying strategies for higher yields and reduced risks. Sample chapters explain theoretical and economic aspects related with crop productivity, as well as issues related to the circular economy, life cycle assessment with and the impact of future climate scenarios. Other chapters discuss biofuel production on basis of generating raw materials, describe the valorization of biomass residues, are deal with pretreatment issues and more. This book is of interest for scientists, researchers, engineers, industrial practitioners, master's and postgraduate students, as well as for everyone working in every sector of agroenergy.
42	Energy in Agroecosystems A Tool for Assessing Sustainability Author: Casado, Manuel Gonzalez de Molina Issued: October 18, 2019 ISBN 9780367436049 Publisher: CRC Press https://www.routledge.com/Energy-in-Agroecosystems-A-Tool-for-Assessing-Sustainability/Casado-deMolina/p/book/9780367436049	Energy in Agroecosystems is a sustainability assessment tool and energy analysis book specifically dedicated to agriculture. It is written from an agroecological perspective and exceeds the conventional analyzing the efficient use of energy. The book provides a methodological guide for assessing the energy efficiency on





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		efficiency and sustainability from an eco-energy perspective. Case studies from Europe and America, representative of the most commonly used scales of analysis today (crop, farm, local or national level) and the different farm management practices (traditional, industrialized and modern organic), apply this methodology. This book will be of primary interest to researchers, practitioners and students working in the fields of agroecology, sustainable agriculture, environmental science, energy analysis, natural resource management, rural development and international development. for
43	Handbook on renewable energy sources in rural areas environments Publisher: CeProSARD https://www.ceprosard.org.mk/MK/PDF/PRIRACNIK_OBNOVLIVI%20SOURCES_mk.pdf Released: 2009	The Center for Promotion of Sustainable Agricultural Practices and Rural Development has published a manual that focuses on the use of renewable energy sources and energy efficiency in agriculture in rural areas in Republic of Macedonia
44	Textbook: RENEWABLE ENERGY SOURCES Author: ELIZABETA TRAJKOVSKA Published: Skopje, 2023. MES number 26 - 611/1 of 22.03.2023 https://www.e-ucebnici.mon.gov.mk/pdf/obnovlivi_izv_na_energija_3_mak_izb.pdf	This textbook, in topic 6, covers the topic of biomass energy, suitable for students and teachers.
45	Bioenergy and Agriculture: Promises and Challenges Author: Peter Hazell PhD, MS, DSc, NDA Publisher: Food and Agriculture Organization of the United Nations (FAO) Released: February 2006 https://www.researchgate.net/publication/5055925_Bioenergy_and_agriculture_promises_and_challenges	This publication explores how bioenergy can be integrated into agricultural systems, considering both the opportunities and risks. It is ideal for policymakers and researchers.
46	Biofuels, Solar and Wind as Renewable Energy Systems: Benefits and Risks Author: D. Pimentel Publisher: Springer	Covers a wide range of renewable energy sources, including biofuels from agricultural crops. The impacts are discussed on





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		the environment and energy efficiency.
47	Biomass and Bioenergy: New Advances Author: MR Islam Publisher: Nova Science Publishers	Focuses on biomass technologies and their role in sustainable energy production, with application in agriculture.
48	Bioenergy and Agriculture: Promises and Challenges Author: Rodomiro Ortiz Released: April 2023 https://doi.org/10.2499/2020FOCUS14 https://www.sciencedirect.com/science/article/abs/pii/S0045653523009475	Authors' calculations based on actual energy production and demand from 2005 2018 according to data from the International Energy Agency Worldwatch and (IEA). Projections for Brazil and the United States are based on bioenergy data from the IEA and the United States Department of Agriculture (USDA), respectively. The larger share in Brazil includes significant exports of for production on ethanol. The projection for the European Union is based on a potential path dominated by biodiesel, while other regions only represent substitution with bioethanol.
49	Agricultural waste biomass for sustainable bioenergy production: Feedstock, characterization and pre-treatment methodologies Authors: J. Aravind Kumar, S. Sathish, D. Prabu, A. Annam Renita, A. Saravanan, VC Deivayanai, M. Anish, J . Jayaprabakar, Omirserik Baigenzhenov, Ahmad Hosseini-Bandegharai Issued: May 2024 https://doi.org/10.1016/j.chemosphere.2023.138680	The use of agro-waste biomass is seen as a major alternative energy source that significantly reduces emissions. on greenhouse gases. Agricultural residues produced as waste after each agricultural production step are used as sustainable for on biomass resources bioenergy production. As a result of the rapid innovations in the use of agro-waste for biomass-derived bioenergy, a comprehensive review of the achievements and necessary advances, along with detailed analysis of raw materials, their characterization, bioconversion and modern methods of previous processing. To this end, this study examines the current





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		status of bioenergy generation from agricultural biomass through various pre-processing methods, along with presentation of relevant challenges and prospects for future research.
50	Book: Agroecology and Strategies for Climate Change Author:: Eric Lichtfouse Publisher: Springer Dordrecht DOI https://doi.org/10.1007/978-94-007-1905-7 ISBN 978-94-007-1904-0 Issued: 01 October 2011	It begins with an official United Nations report showing that agroecology is the solution for current food world problems. The report presents many agricultural techniques for reduction of emissions greenhouse gases. The report contains a list of transgenic stress resistant drought plants. This book includes chapters on agroenergy as part of climate-innovative agriculture.
51	RENEWABLE SOURCES ENERGY (ELECTIVE) III YEAR ELIZABETA TRAJKOVSKA	The content presented in the textbook will help them for students to understand the importance of renewable energy energy sources for overcoming climate change, global warming and ensuring environmental and economically sustainable system
52	Renewable energy sources Gordana Janevska St. Kliment Ohridski Faculty of Technology -Bitola	Description of Renewable Energy Sources, data on the presence of these resources in RSM
53	RENEWABLE ENERGY SOURCES - SOLID RECYCLING MUNICIPAL WASTE	Characteristics of renewable energy sources





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	SOFCE TRAJKOVA "GOCE DELCEV" UNIVERSITY - SHTIP FACULTY OF NATURAL AND TECHNICAL SCIENCES ENVIRONMENTAL ENGINEERING SHTIP https://eprints.ugd.edu.mk/534/1/Sofce_Trajkova.pdf	Types and properties of biomass Defining the quantities of biomass from agriculture and livestock
54	Do you know what the different types of renewable energy sources are? https://ekoenergija.mk/blog/articles/articles1.html	Description of renewable energy sources

