





<b>FUNDING PROGRAMME: MCI Sectoral Plan</b>	
<b>PROJECT TITLE/ACRONYM:</b> Technologies for carrying out agricultural work using ecological machinery	
<b>AGREEMENT NO.:</b> 1PS/28.08.2019	
<b>TOTAL PROJECT BUDGET:</b> 122.000 LEI	<b>BUDGET INCDTP:</b> 71.000 LEI
<b>START DATE:</b> October 2019	<b>END DATE:</b> December 2020
<b>WEBPAGE:</b> <a href="https://inma.ro/wp-content/uploads/2020/12/pagina-web_final_contract-1PS.pdf">https://inma.ro/wp-content/uploads/2020/12/pagina-web_final_contract-1PS.pdf</a>	
<b>PARTNERS:</b>	
	Institutul Național De Cercetare – Dezvoltare Pentru Mașini și Instalații Destinate Agriculturii și Industriei Alimentare -INMA București - Coordonator
	Institutul Național de Cercetare-dezvoltare pentru Inginerie Electrică - ICPE-CA București
	Institutul Național de Cercetare-Dezvoltare pentru Protecția Mediului – INCDPM București
	Institutul Național de Cercetare-dezvoltare pentru Mecatronică și Tehnica Măsurării – INCDMTM București
	Institutul Național de Cercetare Dezvoltare pentru Textile și Pielărie - INCDTP București
<b>GENERAL OBJECTIVES:</b>	
<ol style="list-style-type: none"> <li>1. Conducting a study on the sources and level of pollution generated by agricultural works, by categories of works and equipment and establishing ways to reduce the negative impact on the environment generated by them;</li> <li>2. Making a substantiated proposal for the creation of an electric tractor model based on a design theme conceived based on the specific needs identified in the organic agriculture sector;</li> <li>3. Developing the technical solution for the experimental electric tractor model - technical specification and 3D project of the experimental electric tractor model;</li> <li>4. Conducting a study on the sources and level of pollution generated by agricultural works, by categories of works and equipment and establishing ways to reduce the negative impact on the environment generated by them;</li> <li>5. Development of the technical solution for the experimental model of electric tractor - execution documentation of the experimental model of electric tractor;</li> <li>6. Development of the experimental model of an electric tractor;</li> <li>7. Dissemination of the results at the regional level;</li> <li>8. Implementation of the experimental model of the electric tractor and functional validation activities;</li> <li>9. Constructive finalisation of the experimental model of the electric tractor following the experiments;</li> <li>10. Development of the technical solution for the prototype of electric tractor - 3D project and execution documentation of the prototype of electric tractor;</li> <li>11. Execution of the prototype of the electric tractor;</li> <li>12. Implementation of the experimental activities of the prototype of the electric tractor;</li> <li>13. Constructive finalisation of the prototype following the experiments;</li> <li>14. Implementation of the functional validation activities of the prototype of the electric tractor;</li> <li>15. Development of the user documentation;</li> <li>16. Dissemination of the project results.</li> </ol>	
<b>PHASES/ACTIVITIES:</b>	
<ul style="list-style-type: none"> <li>● <b>Phase 1:</b> Study on the sources of pollution generated by agricultural work and establishing ways to reduce the negative impact on the environment; Development of the technical solution for the electric tractor (Design - experimental model TRL 5) <ul style="list-style-type: none"> <li>✓ <b>Activity I.1</b> Inventory of pollution sources and levels, by categories of agricultural works and equipment</li> </ul> </li> <li>● <b>Phase 2:</b> Development of the technical solution for the electric tractor (execution – experimental model) TRL 5) <ul style="list-style-type: none"> <li>✓ <b>Activity II.1</b> Developing the matrix of complementary elements for organic agricultural works</li> </ul> </li> </ul>	
<b>NOVELTY ELEMENTS:</b>	

The degree of novelty is given by the use of Li-ion technology to make the tractor's battery. This technology is already validated in the automotive industry and has been adapted to the agricultural sector by optimising the propulsion system. The complexity of such an electric tractor prototype is given by the multitude of interconnected moving components that a green energy source must power.

**PROJECT RESULTS:**

- 1) Report on the sources and level of pollution generated by agricultural works, by categories of machinery works, including a substantiated proposal for the development of an electric tractor model
- 2) Technical specification and execution documentation for the electric tractor
- 3) Functionally validated experimental model for the electric tractor
- 4) Validated prototype for the electric tractor
- 5) Documentation for the presentation and use of the electric tractor (Presentation Manual, User, Maintenance and Repair Manual)
- 6) Scientific communications and ISI/BDI articles;
- 7) Project website;
- 8) Report on the national and regional debate of the results

**OBTAINED RESULTS:**

- 1 experimental model of a protective cover specially designed and manufactured by the INCDTP partner to provide comfort to the operator.
- 1 interactive workshop "Agricultura și textilele - domenii colaborative în contextul dezvoltării durabile a României", MODEXPO 2019, ROMEXPO-B2, 27.09.2019.

**HOW TO APPLY THE RESULTS OBTAINED :**

The project results will be applied by :

- ✓ Ministry of Research and Innovation
- ✓ Ministry of Agriculture and Rural Development
- ✓ Ministry of Environment, Water and Forests
- ✓ Ministry of Regional Development and Public Administration
- ✓ Ministry of Economy
- ✓ Other national, regional and local authorities
- ✓ SMEs in the field of agricultural machinery construction, and farmers.

**DISSEMINATION, PATENT APPLICATIONS, AWARDS:**

• **WoS published papers:**

Cărpuş E., Vladuţ V., Dorogan A., Muscalu A., Matache M.G., Creativity, innovation and future - the key points regarding the "architecture" for the production of agro-textiles, Industria Textila, vol. 70, no. 6, 2019

• **BDI published papers:**

1. Cărpuş E., Dorogan A., Sârbu T., Grosu C., Stroe C., Coonsiderations on the role of textile fibers recovered in high value-added products, 20<sup>th</sup> International Scientific GeoConference SGEM 2020, 16 - 25 August 2020, Albena, Bulgaria
2. Sârbu T., Dorogan A., Grosu C., Stroe C.E., Innovative tool for the circular design of technical textiles, The 8th International Conference on Advanced Materials and Systems, ICAMS 2020 1-3 October, Bucharest
3. Cărpuş E., Dorogan A., Sârbu T., Structurile textile – elementele de legatură dintre om, mediul înconjurător și utilajul agricol, Sesiunea anuală de comunicări științifice "Protecția plantelor – cercetare interdisciplinară în slujba dezvoltării durabile a agriculturii și protecției mediului" organizată de IND Protecția Plantelor, 6. 11. 2020, ISBN 978-973-668-5

• **Scientific communications:**

1. E. Cărpuş, C. Grosu, Tudora C., Vladuţ N.V., "Agricultura și textilele – domenii colaborative în contextul dezvoltării durabile a României", Seminar MODEXPO "Cercetarea științifică din textile pielărie - realizări și tendințe, 27.09.2019, ROMEXPO
2. A. Dorogan, E. Cărpuş, Vladuţ N.V., Matache M. G., Disiparea efectului mediului înconjurător asupra culturilor agricole prin structuri multifuncționale, INDAGRA 2019.

• **Patent Applications:**

Cerere de brevet depusa la OSIM A-00799, Structuri si metode de realizare a arhitecturilor textile complementare activitatilor din agricultura, autori: Dorogan A., Cărpuş E., Matache M. G., Vladuţ N. V.

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