

**NATIONAL INSTITUTE OF RESEARCH-DEVELOPMENT  
FOR MACHINES AND INSTALLATIONS DESIGNED TO  
AGRICULTURE AND FOOD INDUSTRY  
– INMA Bucharest -**



**ROMANIA, Bucharest, Postal Code 013813, OP 18, Bd. Ion Ionescu de la Brad nr.6, sector 1,  
Tel. 021 269 3259, Fax: 021 269 3273  
E-mail: [icsit@inma.ro](mailto:icsit@inma.ro), <http://www.inma.ro>**



**INSTITUTUL NAȚIONAL DE CERCETARE - DEZVOLȚĂRE PENTRU  
MAȘINI ȘI INSTALAȚII DESTINATE AGRICULTURII ȘI INDUSTRIEI  
ALIMENTARE - INMA**

ROMÂNIA, București, Cod poștal 013813, OP 18, Bd. Ion Ionescu de la Brad nr.6, sector 1, Cod  
SIRUES 0798762, Cont virament RO88TREZ7015069XXX002593 Trezoreria Sector 1 București,  
RO78RNCB0072026604710001 BCR Sucursala sector 1 București, Cod fiscal 2795310,  
Tel.(021)269.32.55, 269.32.57; Tel/Fax (021)269.32.73, E-mail: icsit@inma.ro, http://www.inma.ro



- **MISSION:** developing scientific (fundamental and applicative) research activities and innovation in the field of processes, technologies and technical equipment of mechanizing and automating the works in agriculture and food industry, according to Ministry of National Education (MEN) policies and integration within European research area.
  
- **RESEARCH DIRECTIONS:**
  - elaborating diagnosis, prognosis and strategies in the field of technologies and technical equipment designed to agriculture and food industry
  - research and development of processes, mechanizing technologies and technical equipment for agriculture and food industry;
  - manufacturing functional, experimental models and prototypes;
  - testing in laboratory and field conditions the machines and installations designed to agriculture and food industry in compliance with EU procedures, norms and directives;
  - standardization in the field of suitable technical equipment and harmonization with EU practice;
  - training/qualification and specialization/professional perfecting activities;
  - scientific activities (tests, certification, technological transfer).
  
- **OBJECTIVES:**
  - Scientifically substantiating the agricultural and food industry processes and creating new mechanizing technologies, instruments and technical equipment appropriate and competitive to European research area specific to concepts of SUSTAINABLE AGRICULTURE AND FOOD SECURITY;
  - Increasing the technical equipment and performances of processes, technologies and technical equipment designed to agriculture and food industry, which comply with EU requirements in order to capitalize Romania agricultural potential;
  - Valorisation of renewable energy sources (biomass, biofuels) and technologies and technical equipment for being efficiently used for life, health and environment protection;
  - Dissemination and technological transfer of research results to economy, in order to enhance rural development and life standard;
  - Supporting R-D activity in enterprises manufacturing tractors and agricultural machines and training the users of technical equipment, in order to increase the capacity of spreading and developing the advanced technologies in economy;
  - Strengthening the research (logistics, apparatus, research equipment) base, performing laboratory tests, concluding external partnerships for harmonizing INMA researches with European research area, including integration within European technological platforms;
  - Increasing the professional training level of human resources and improving their structure;
  - Improving the institution organizational structure in order to allow scientific partnerships with similar institutes in Europe;
  - Raising institute activities visibility and results;
  - Assuring qualification activities and perfecting activities within the professional training centre.



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# REPRESENTATIVE PROJECTS



## BIOFUELS - SOURCE OF COMMON SUSTAINABLE DEVELOPMENT IN THE CROSS-BORDER AREA

- **Program:** Cross Border Cooperation Program Romania – Bulgaria 2007 - 2013
- **Contract number:** 54121/15.07.2011/MIS-ETC 146 - 2(3i)-3.1-1
- **Partners:**
  - ✓ National Institute of Research and Development for Biological Sciences Bucharest - INCDSB;
  - ✓ National Institute of Research and Development for Machines and Installations Designed to Agriculture and Food Industry Bucharest -INMA;
  - ✓ University of Rousse;
  - ✓ BRCCI Rousse;
  - ✓ City Council Roata de Jos, district Giurgiu.
- **Overall objective:** supporting the development of border areas in Romania and Bulgaria through cooperation and promoting common solutions.
- **Specific objectives:**
  - ✓ Supporting the social and economic development of Giurgiu – Ruse area, using the business potential in capitalizing oil plants for obtaining biodiesel;
  - ✓ Creating a „bridge” between economic regions of the two countries, in order to promote joint solutions in the field of biodiesel obtaining from oil plants, which lead to economic growth of both areas and create new jobs.
- **Obtained results:**
  - ✓ 6 prospective studies on:
    - rape cultivation technology
    - rape harvest technology
    - primary preparing of seed for oil extraction;
    - filtering and extracting rapeseed oil;
    - chemical treatment of oil to obtain biodiesel;
    - using biodiesel and raw oil for diesel engines.
  - ✓ 6 demonstrations on:
    - technology for establishing and maintaining rape culture;
    - technology for harvesting rape;
    - primary preparing of seed for oil extraction;
    - extracting oil from rapeseed and filtering it;
    - chemical treatment of oil to obtain biodiesel;
    - using biodiesel and raw oil for diesel engines.
  - ✓ internet portal for the network project;
  - ✓ database;
  - ✓ workshops: 3;
  - ✓ seminars: 3;
  - ✓ conference: 1
  - ✓ training courses: 4
    - Sweet sorghum;
    - Growing oleaginous plants in Romania;
    - Harvesting oleaginous plants in Romania;
    - Vegetable oils, biofuel present and future.
  - ✓ promotional materials (flyers, roll-up, posters, etc): 1.510 / 5 / 60 [pcs]





## AGRICULTURAL CODE - TRAINING THROUGH VISUAL COMMUNICATION ON PREVENTION OF OCCUPATIONAL RISKS IN USE OF AGRICULTURAL MACHINEY

- **Programme:** LIFELONG LEARNING PROGRAMME 2007-2013. Leonardo da Vinci - Transfer of innovation

- **Partners:**

- Project manager: BETELGEUX (Spania);
- Coordonator: FEDERACION AGROALIMENTARIA (Spania);

*Main partners:*

- National Institute of R&D for Machines and Installations designed to Agriculture and Food Industry - INMA (Romania);
- Ondokuz Mayıs Üniversitesi (Turkey);
- SGS TECNOS (Spain);
- Confederazione italiana agricoltori dell'Umbria (Italy);
- Agroinštitút Nitra, štátny podnik (Slovakia);
- EFFAT (European Federation of Trade Unions in the Food Agriculture and Tourism sectors (Belgium).

*Associate partner:*

- Asaja-Granada (Spain).

- **General objective:** to improve quality and efficiency of the learning processes by means of design and training materials validation based on visual communication systems.

- **Specific objectives:**

- proper training in occupational risk prevention for agricultural sector;
- increasing workers safety in using tractors and other farm machinery;
- training as a strategy to increase workers adaptability to the changes and developments emerging in the sector, thereby improving their employability and competitiveness;
- promoting and implementation of occupational risk policy of the European Union, contributing, therefore, to protect workers health;
- increasing product quality by continuing evaluation during the whole project and by means of a final validation of technical aspects and the developed educational materials.



- **Results and implementing stage / extension**

- 12 didactic units (training courses) within occupational risks in using agricultural machines (available in 7 languages);
- Exchange of experience and good practices, specific for agricultural domain;
- International cooperation protocols in the field of agricultural research;
- New methods of fostering the technological transfer.





## TECHNOLOGY AND TECHNICAL EQUIPMENT FOR THE ESTABLISHMENT AND CAPITALIZATION OF BIOMASS TYPE MISCANTHUS

- **Program:** PN II; NUCLEUS
- **Contract number:** 21 038 / 14.09.2007; 15 N / 27.02.2009 / AA 1/ 2011; 15 N / 27.02.2009 / AA 2/2012
- **Partners:**
  - ✓ National Institute of Research - Development for Machines and Installations Designed to Agriculture and Food Industry-INMA Bucharest;
  - ✓ ASAS;
  - ✓ INCDA;
  - ✓ U.P. Bucharest.
- **General objective:** development of a technology and technical equipment related to the establishment and capitalization of biomass of type Miscanthus.
- **Specific objectives:**
  - ✓ the development of a technology to promote in Romania the energetic plant Miscanthus, as a renewable source in order to increase the competitiveness and energetic security;
  - ✓ the development of a technology for the capitalization of Miscanthus rhizomes in order to increase the efficiency for creating of this energetic crops;
  - ✓ achievement of a technology for superior capitalization of Miscanthus energetic crop.
- **Results obtained::**
  - ✓ *Miscanthus planting machine MPM4:*
    - technological study;
    - execution documentation EM; EM;
    - patent application A00558/15.06.2011; articles (1);
    - implemented and executed at S.C. MECANICA CEAHLAU SA Piatra Neamt.
  - ✓ *Miscanthus harvesting equipment – EPI*
    - technological study;
    - execution documentation EM; EM;
    - patent application A00466/19.06.2009; articles (2);



Fig. 1 - Miscanthus planting machine MPM4



Fig. 2 - Miscanthus harvesting equipment – EPI

### Technical characteristics:

- |                               |             |                                  |            |
|-------------------------------|-------------|----------------------------------|------------|
| - working width [m]:          | 2.8...4;    | - working width [m]:             | 1,6;       |
| - working depth [cm]:         | 8...12;     | - cutting height [mm]:           | 100 - 120; |
| - distance between rows [mm]: | 700...1000; | - rotor diameter [mm]:           | 800;       |
| - no. rows planted [pcs]:     | 4;          | - number of rotors:              | 2;         |
| - working capacity [ha/h]:    | 0.6...0.76. | - no. of knives:                 | 2;         |
|                               |             | - toothed rotor speed [rev/min]: | 46;        |
|                               |             | - knives speed [rev/min]:        | 288.5.     |

- ✓ *Technical equipment for harvesting the Miscanthus rhizomes ERR*
  - technological study;
  - manufacturing documentation EM;
  - experimental model (EM);
  - patent application no. A00554/17.07.2009; articles (1);
  - implemented and executed at S.C. MECANICA CEAHLAU SA Piatra Neamt.



Fig. 3 - Technical equipment for harvesting the Miscanthus rhizomes ERR

**Technical characteristics:**

- tractor power from aggregate [CP]: 70...80
- working width [m]: 1.2
- working depth [cm]: max. 25
- separation conveyor actuation mode: hidraulically
- weight [kgf]: 495

- ✓ *Heating plant by harnessing the energetic plant Miscanthus IIVM*
  - technological study;
  - drawing up documentation EM;
  - experimental model (EM);
  - patent application no. A 00970/07.12.2012.



Fig. 4 - Heating plant by capitalizing the energetic plant Miscanthus IIVM

**Technical characteristics:**

- Power [kW]: 75;
- Maximum temperature of the hot water [°C]: 95;
- Capacity of the hot water accumulator [l]: 1500;
- Collecting surface of the solar panel [m<sup>2</sup>]: 2.55;
- The nominal power of photovoltaic panel [W]: 235.



## INCREASING THE COMPETITIVENESS OF MAT CRAIOVA BY ASSIMILATING OF A MULTIPURPOSE AGGREGATE FOR SOIL PROCESSING IN THE AGRICULTURAL HOLDINGS

- **Program: INNOVATION;**
- **Contract no.:** 219 / 28.07.2010;
- **Partners:**
  - SC MAT SA Craiova;
  - National Institute of Research - Development for Machines and Installations Designed to Agriculture and Food Industry-INMA Bucharest.
- **General objective:** increasing the competitiveness of economic agent of INTR type - S.C. MAT S.A. Craiova by promoting a multifunctional aggregate for working the soil in *minimum tillage system* required by the market demand.
- **Specific objective:** performing the laboratory-field tests and operation tests for determining the qualitative, energetic and operating working indexes, in order to homologate *the multifunctional aggregate for working the soil -MATINA* and passing to manufacturing stage.
- **Results obtained and the degree of implementation / execution (multiplication)**
  - Testing procedure;
  - Methodology for demonstration;
  - Methodology of use;
  - Patent Application no. A-1414/29.12.2010;
  - Awards AGIR 2011 Bucharest, September 14. 2012: *Multipurpose aggregate for soil tillage in agricultural holdings – MATINA*;
  - Articles BDI: 1.
- **Beneficiary:** SC MAT SA Craiova

### Technical characteristics::

- |  |              |
|--|--------------|
| ✓ Type of equipment:                               | semi-carried |
| ✓ Tractor power [CP]:                              | 180÷240      |
| ✓ Number of loosening parts:                       | 5            |
| ✓ Number of jagged discs:                          | 22           |
| ✓ Maximum working depth, [cm] of loosening bodies: | 25           |
| ✓ Maximum working depth, [cm], of jagged discs:    | 14           |
| ✓ Overall dimensions [mm]:                         |              |
| - length:  | 7.920        |
| - width:   | 2.998        |
| - height:  | 1.400/1.700  |
| ✓ Weight [kg]:                                     | 2.630        |







## ENHANCEMENT OF INNOVATION CAPACITY BY ASSIMILATING INTO PRODUCTION OF A MODERN IRRIGATION INSTALLATION WITH RAMP AND WATERING GUN

- **Program: INNOVATION**, Contracting Authority: MANAGERIAL AGENCY OF SCIENTIFIC RESEARCH, INNOVATION AND TECHNOLOGY TRANSFER - POLITEHNICA
- **Partners:**
  - S.C. GRUP ROMET S.A. Buzău,
  - National Institute of Research - Development for Machines and Installations Designed to Agriculture and Food Industry-INMA Bucharest.
- **General objective:**
  - increasing competitiveness of GRUP ROMET SA BUZAU by the production and marketing of efficient irrigation installations at the level of profile producers from EU;
- **Specific objectives:**
  - increasing the capacity of RDI system from Partnership (GRUP ROMET SA BUZAU and INMA Bucharest) in accumulating knowledge, results and first class experience in scientific and technological fields of top and to disseminate and transfer them to economic and social environment for increasing its competitiveness;
  - increasing the competitiveness of producers from agriculture by the use of modern irrigation installations which ensures the increase of the quality and of the agricultural production.
- **Results obtained and the degree of implementation / execution (multiplication)**
  - technological study;
  - prospective study- market study;
  - technical execution project of technical irrigation equipment endowed with ramp and watering gun;
  - testing procedure;
  - demonstration method;
  - homologated product.
- **Beneficiary:** GRUP ROMET SA BUZAU (realized and sold in the period 2010 - 2012, 25 pcs / year).
- **Technical characteristics:**

- chassis type:	directing
- opening of watering ramp [m]:	12...40
- hose diameter [mm]:	100;
- hose length [m]:	360;
- working pressure [bar]:	4...8;
- flow of water [m <sup>3</sup> /h]:	10...50;
- Installation weight [kgf]:	2,700.



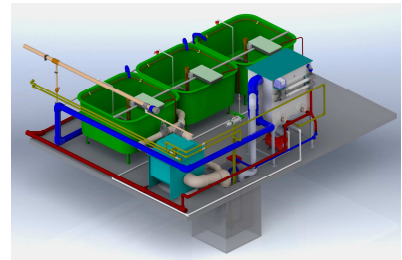


## JOINT RESEARCH CENTRE IN THE FIELD OF HYDROBIOLOGY AND FISHES BIOLOGY AT SZARVAS AND TIMISOARA - HUOFISH

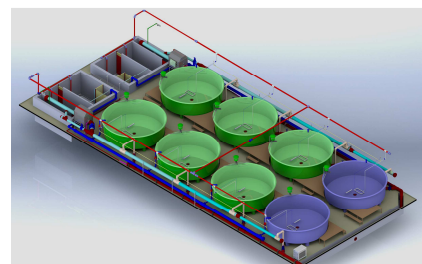
- **Program:** Cross Border Cooperation Programme Hungary - Romania 2007 -2013
- **Partners:**
  - Research Institute for Fisheries, Aquaculture and Irrigations - HAKI Szarvas, Hungary;
  - University of Agricultural Sciences and Veterinary Medicine of of Banat Timișoara-USAMVBT, Romania;
  - National Institute of Research - Development for Machines and Installations Designed to Agriculture and Food Industry-INMA Bucharest, Timișoara Branch, Romania.
- **Objectives:**
  - ✓ Strengthening of social and economic cohesion in the border area;
  - ✓ Promoting cooperation in the R & D and innovation field.
- **Results obtained and the degree of implementation / execution (multiplication)**
  - ✓ execution documentation for technological installations:
    - two modules for pre-development of young fishes;
    - two modules for rearing of adult fishes.
  - ✓ patent application: A01435/22.12.2011
- **Implemented:** University of Agricultural Sciences and Veterinary Medicine of Banat Timișoara -USAMVBT, Romania.
- **Made:** at S.C. EUROCAR SRL Oradea

### Technical characteristics:

- **Acvacol recirculating system (ARS) for juveniles pre-development**
  - ✓ **1.5m square basins:** effective volume approx. 1.2 m<sup>3</sup>;
  - ✓ **Rotary mechanical filter, drum type:** flow: 50 m<sup>3</sup>/h;
  - ✓ **Biofilter:** volume of filtering material approx. 0.6 m<sup>3</sup>;
  - ✓ **Recirculating pump:**-flow: minimum 6 m<sup>3</sup>/h;
  - ✓ **Feeder:** capacity: 5 kg;
  - ✓ **Hydrophore:** flow: 70 l/min.
- **Acvacol recirculating system (ARS) for adults rearing**
  - ✓ **4.5 m circular tanks:** effective volume approx. 16 m<sup>3</sup>;
  - ✓ **Rotary mechanical filter, drum type:** flow: 200 m<sup>3</sup>/h;
  - ✓ **Filtering material (biofilter) 12 m<sup>3</sup>:** Support bacteria biological filter;
  - ✓ **Recirculating pump:** debit: min. 80 m<sup>3</sup>/h;
  - ✓ **Dirty water discharge pump:** flow: min. 6 m<sup>3</sup>/h;
  - ✓ **Fully equipped feeders:** vibrating feeder.



Acvacol recirculating system (RAS) for juveniles pre-development



Acvacol recirculating system (SAR for) adults rearing

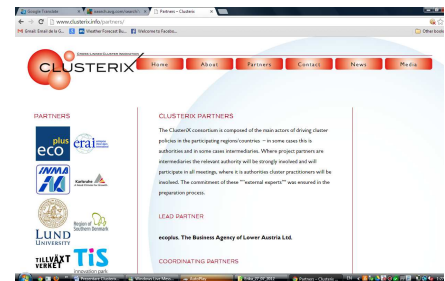


## CLUSTERS FOR EUROPEAN INNOVATION CROSS – LINKING” – CLUSTERIX

### • **Partners:**

- ✓ ECOPLUS – The Business Agency of Lower Austria, Austria – Lead partner;
- ✓ Lund University, Sweden;
- ✓ Region of Southern Denmark, Denmark
- ✓ ERAI - Entreprise Rhône-Alpes International, France;
- ✓ Economic Development Karlsruhe, Germany;
- ✓ Nyugat-Pannon Terület- és Gazdaságfejlesztési Szolgáltató Közhasznú Nonprofit Kft, Hungary
- ✓ TIS - Techno Innovation South Tyrol SpA, Italy;
- ✓ INMA – The National Institute of Research-Development for Machines and Installation designed to Agriculture and Food Industry, Romania;
- ✓ Tillväxtverket - Swedish Agency for Economic and Regional Growth, Sweden.

- **The overall objective:** to increase the competitiveness of European regions and their innovation potential through the improvement and strategic re-orientation of cluster policies towards smart specialisation.



### • **Specific objectives:**

- "cross-networking": to create synergies across existing cluster networks, to position and spread the topic of cross-linking technologies through clusters - within and between the regions - at European level;
- to improve the efficiency of public money spending through the cluster technological cross-linking, by avoiding duplications of technological developments;
- to enhance the cohesion policy through a mix of regions with different levels of experience all over Europe;
- to contribute to the European innovation policy on the basis of lessons learnt and joint policy recommendations developed from a regional/national perspective.



### • **The main results:**

- 9 improved cluster policies based on exchange of experience; improved skills of partners/stakeholders' staff; in-depth know-how and trust building for sustainable interregional partnership.
- 9 regional implementation plans that could bring Europe a step closer to smart specialisation;
- jointly policy recommendations and the manual of good practices;
- cross-links to social media cluster platforms (e.g. TCI, ECA, ECCP, linked in, facebook);
- the CLUSTERIX website [www.clusterix.info](http://www.clusterix.info);
- a wikipedia section dedicated to CLUSTERIX;
- newsletters.



# INMA Bucharest

