



## LETTER OF INTENT

### 1. BACKGROUND:

#### *1.1. Short presentation of INMA*

The National Institute of Research-Development for Machines and Installations designed to Agriculture and Food Industry-INMA, from Bucharest/Romania has an experience of about 80 years and it is the unique Romanian institute in the field. The main activities performed within the institute are *research-development* and *scientific services*.

*The research-development activities* comprise in elaboration of diagnoses, prognoses and strategies in the domain of technologies and technical equipment designed to agriculture and food industry, research and development of the processes, technologies and technical equipment for agriculture and food industry, performing of experimental models and prototypes, testing in laboratory and operating conditions of the machines and installations designed for agriculture and food industry in compliance with the UE procedures, norms and directives, standardization in the domain of technical equipment and activities of professional training, specialization and staff certification in the domain of mechanization technologies.

*The scientific services* comprise in testing of technical equipment, certifying the product conformity, performing technical inspections for tractors, lorries, trailers and cars, technological transfer and innovative business through the accredited incubator INMA-ITA.

*The main Research Directions* are:

- Fundamental research of interaction phenomena of biological, soil and technological factors on the technical equipment in the processes of mechanization and automation of works in agriculture;
- Scientific substantiation of the processes in agriculture, food industry and creating of new innovative technologies, instruments and technical equipment designed to soil works, establishing, maintaining and harvesting agricultural crops, horticultural cultures, as well as, agricultural and livestock and agro-forestry works; in compliance with environment preserving and fighting against draught phenomena and desertification;
- Renewable power sources: biomass, bio-fuels, biogas (from animal dejections and vegetal wastes), technologies and technical equipment for their use in conditions of efficiency, life, health and environment protection;
- Rural development and raising of life quality by technological transfer and demonstrations of the research results performed by the Institute;
- Strengthening the research basis (human resources, logistics, research equipment) and performing some partnerships for connecting to ERA, including the integration within the technological platforms at the European level;
- Substantiating and achieving new mechanizing and automating technologies designed to agricultural and food industry processes, such as: conditioning, processing, stocking and storing primary agricultural products, non-agricultural products and aquaculture in conditions of efficiency, security and safety.

#### *1.2. INMA achievements*

Production of biomass is a resource of renewable energy and a significant opportunity for the sustainable rural development, to achieve independence from fossil fuels on farms and to reduce the greenhouse effect.

INMA Bucharest has developed three research projects focused on promoting in Romania the energetic plants *Miscanthus* and *Salix Viminalis* as renewable sources. Within the research projects,

we have designed and developed technologies for setting-up, maintaining and harvesting Miscanthus and Salix cultures in accordance with the pedoclimatic conditions in Romania. In order to mechanize all the works within these technologies we have developed and tested five new experimental models: a Miscanthus rhizomes planting machine, a harvesting equipment for dry stems, a technical equipment for harvesting Miscanthus rhizomes, a planting machine for Salix seedlings and a harvesting machine for Salix stems.

Within these technologies there were established the requirements of the plants towards the climate, soil, temperature and humidity, the farming calendar and agro-technical requirements imposed on agricultural machines used for mechanization. In order to specify the optimal period to perform specific agro technical works, INMA has established and completed the farming calendar which include the applying activities for organic fertilizers, applying herbicides for perennial weed control, applying chemical fertilizers, etc.

INMA has a good knowledge of production and processing technologies of agricultural and forestry solid biomass (drying, grinding, sorting) in order to obtain woodchips, pellets and agro-pellets. Also we have results in the field of other bio-products such as crude oil obtained from various oil crops. Its experience is proved by the research projects conducted in this area.

### ***1.3. INMA infrastructure***

In terms of recognition of technical and scientific capabilities by accreditation, the research infrastructure of INMA consists in research, testing and experimenting laboratories, accredited in accordance with the rules and directives of EU, which verifies the technical and scientific competence of certain ideas, solutions, equipment and new products having a state-of-the art technical endowment and high qualified personnel.

The institute has a Testing Department for Tractors and Technical machinery for agriculture and food industry which has in subordinate 2 equipped laboratories performing similar to EU laboratories level, accredited in accordance with standard SR EN ISO/CEI 17025: 2005:

- DITRMA - Testing Laboratory for Tractors and Technical Equipments for Agriculture and Food Industry;
- LIMS – Testing Laboratory for Spraying Machines.

## **2. DIRECTION AND OBJECTIVES OF RESEARCH:**

**Project title:** Enhancement of agricultural production by practising the conservative agriculture, restoring the soil damaged structure and developing new infrastructure environmental-friendly elements on cereal farms.

**Main objective** of project consists in developing on cereal farms certain agronomic techniques in order to reduce soil erosion and improve soil quality.

### **A. Current competences of INMA Bucharest partner**

#### ***I. Conservative agriculture***

- Environmental-friendly soil technologies aiming to preserve its structure, fauna and organic matter, by promoting minimum tillage system and sowing directly in stubble field;
- Innovative technology for establishing straw cereals cultures in sustainable system;
- Innovative technology for establishing hoeing plants crops in sustainable system;
- Innovative technology for sowing straw cereals directly in stubble field .

#### ***II. Restoring soil structure***

Technologies of restoring the soil damaged properties by loosening the soil compacted layers which are deeper than furrow, without turning them over;

- Deep decompaction and aeration technology designed to damaged soils, concomitantly with applying nutritive elements (chemical fertilizers) and removing the soil impermeable layer (hardpan) between arable layer and sub-layer;
- Innovative technology and technical equipment with active parts driven for a soil deep loosening.

#### ***III. Environmental-friendly infrastructure elements designed to reduce the effects of hydric and wind erosion***

Creation of buffer-areas between agricultural crops by establishing agro-forestry belts

- Technology for establishing the energetic willow;
- Technology for planting forestry seedlings.

## **B. Partners required competences**

### **I. Conservative agriculture**

- Different rotations and combinations of culture which stimulate the soil microorganisms and remove plants pests, weeds and diseases;
- Permanently covering the soil (covering crops, wastes and mulch) in order to protect the soil and easily remove the weeds.

### **II. Restoring soil structure**

Cultivating two or more crops in alternative rows, in various width closing stripes or in different layers (sub-sown cultures) in the same field, during the same period of cultivation.

### **III. Environmental-friendly infrastructure elements designed to reduce the effects of hydric and wind erosion**

Environmental-friendly infrastructure elements designed to reduce the effects of hydric and wind erosion

Cultivation and working the soil on terraces, for avoiding the erosion destructive effects, eluviation and soil damaging, in general.

## **3. COLLABORATION PROPOSAL: SUSTAINABLE FOOD SECURITY**

**Sub call of: H2020-SFS-2014-2015**

**Topic: Assessing soil-improving cropping systems SFS-02b-2015**

### **4. Contact person:**

PhD. Eng. Eugen MARIN

Email: [marin\\_43eu@yahoo.com](mailto:marin_43eu@yahoo.com)

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**General Manager,**  
Prof. PhD. Eng. Ion Pirna