Newsletter n. 1
April 2018

LIFE ARIMEDA

First steps...

Volume 1, Nº1 April 2018

Highlights!

- The project
- The team
- Transferability platform
- CITA
- Website and social networks

Content

The LIFE ARIMEDA project

The LIFE ARIMEDA project, coordinated by the Centre for Agrifood Research and Technology of Aragon (CITA) was approved in the last call of the 2016 LIFE Programme. It involves 8 partners from 2 countries, Italy and Spain, whose activity is directly linked with agriculture and livestock breeding; research centres, associations of farmers and technology and engineering companies.

The project aims at developing and demonstrate innovative systems of fertigation in Mediterranean extensive crops using the liquid fraction from the raw pig slurry and digestate. 4 phase separation prototypes will be desgined and built in order to commit with the requirements of the irrigation systems: pivots and drip irrigation.

These techniques will be evaluated in the cultivation of corn . The work includes a comparative analyse with the traditional application system of slurry, assessing its agronomic efficiency and its potential to reduce emissions of ammonia into the atmosphere.

Ammonia is one of the main polluting gases. Because of its impact on air quality, it affects both the environment and the health of people and animals.

It is expected to obtain a reduction of 50% and 90% of the ammonia emissions in fertigation with pivots and with buried drip systems respectively.

Maize

LIFE ARIMEDA in figures

8 partners

2 countries

46 months

2,6 M€

15.704 t slurry

141 has

4.311 kg NH_3 avoided emissions

The LIFE Programme

The **LIFE Programme is the only financial instrument of the European Union dedicated, exclusively, to the environment.** Its overall objective for the period 2004-2020 is to contribute to sustainable development and to achieving the objectives of the Europe 2020 Strategy and other Union plans in the field of environment and climate.

http://ec.europa.eu/environment/life/

WHO WE ARE? The team

	Spain	Italy
Research centers	CITA (coordinator) www.cita-aragon.es	University of Milan www.unimi.it
Farmer associations	ADS nº2 Ejea www.ads2porcinoejea.es	ARAL www.aral.lom.it
Engineering and technology companies	Mecàniques Segalés www.mecsegales.com REGABER www.regaber.com	AGRITER www.agriter.it ACQUAFERT www.acquafert.it

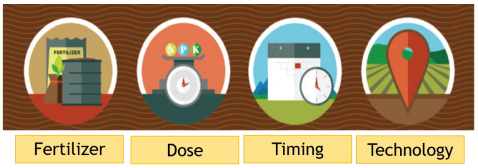
In addition to reducing ammonia emissions, the aim is to maximize the recycling of nutrients, closing the nutrient cycle

D. Quílez - Coordinator of the project

WHAT FOR? Objetives of the project

> Demonstrate that the application of the liquid fraction of slurry and digestate, used as fertilizer through innovative pivot and drip irrigation systems, are effective techniques to reduce the emissions of ammonia into the atmosphere with respect to the traditional application with splash-plate.

> Promote the reuse of nutrients in Mediterranean agricultural areas of extensive irrigated crops.



WHAT ARE WE GOING TO DO? Actions of the project

1. Economic, agronomic and environmental evaluation of the fertigation techniques demonstrated with liquid fraction of slurry (Aragon) and digestate (Italy).
2. Evaluation of the increase of N efficiency in slurry through precision fertilization techniques based on nutrient recycling.
3. Comparative assessment with the traditional application techniques: splash-plate.
4. Environmental and economic analysis of the use of slurry as a substitute for synthetic fertilizers.
5. Development of separation prototypes to obtain a liquid fraction suitable for irrigation infrastructures.
6. Contribution to the awareness, acceptance and capacity of the sector to incorporate these techniques: Guide of Good Fertigation Practices.
7. Contribution to the development of environmental policies in the reduction of ammonia emissions and particulate matter at all scales.

Field trials in the experimental facilities of the CITA

AND FINALLY…? Expected results

The objective of the project is to demonstrate an efficient management model from an environmental, agronomic and economic point of view. This model is based on fertigation using the liquid fraction of organic fertilizers in Mediterranean crop systems. The techniques demonstrated and optimized throughout the LIFE ARIMEDA project will be replicate in other plots of Aragon and Lombardy, with the support of the following tools:

1. Transferability platform, in which research centres and companies of the sector will have the opportunity to exchange knowledge and experiences.
2. Guide of Good Fertigation Practices. This document will gather the key features to take into account when implementing these techniques in other sites.
3. Creation of an APP that incorporates the basic information of the Guide of Good Practices and provides advice.

Boquilla de baja presión instalada en pivot - Pruebas de diseño

WHO ARE WE WORKING FOR? Transferability platform

OBJETIVES

To generate value from organic fertilizers, minimizing the environmental impact and creating advanced and practical knowledge within the sector stakeholders (cooperatives and associations):

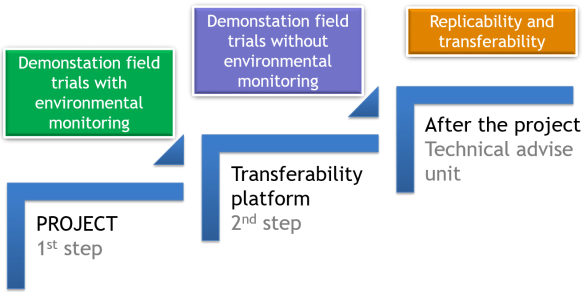
- Supporting and taking part in the development and transfer of new agricultural models based on the implementation of efficient organic fertilization models.
- Acting as an innovative, effective and dynamic demonstration case.
- Promoting the transfer of knowledge with the aim of breaking down barriers between stakeholders and causing interactions.

TASKS

- Demonstration field trials
- Study visits
- Discussion forums
- Development of a transferibility plan
- Exchange of knowledge through the website, social networks, newsletters and workshops.
- Work on the incorporation of new members to the platform.

ROLES

- Research centres They will contribute with their know-how and technical and scientific knowledge during and after the project.
- Farmer associations and irrigation communities They will involve more members through technical conferences, study visits and new demonstration trials.
- Technology companies They will look for new niche markets.



Transference and replicability stages of the LIFE ARIMEDA strategic plan .

How can I take part in the project?

Contact us by email: lifearimeda@cita-aragon.es or register on the website as a user. You will receive all the updated information of the project and you will be able to raise all the doubts that arise to you through the blog available for it in the website www.lifearimeda.eu

They already collaborate with us …

RIEGOS del alto aragón

GOBIERNO DE ESPAÑA · MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE · CONFEDERACIÓN HIDROGRÁFICA DEL EBRO

UNIVERSIDAD POLITÉCNICA DE MADRID

IT ALL STARTED HERE... Kick off Conference

Last November 9, 2017, it took place the presentation of the project at the facilities of the Mediterranean Agronomic Institute of Aragon in Zaragoza.

On this conference, which was attended by around 50 technicians, administration and people of the agricultural and livestock sector, the project partners had the opportunity to introduce themselves and explain the objectives, actions to be carried out over the next 4 years in the Project and the results expected.

Throughout the seminar, several talks explained the problem of slurry management both in the region of Aragon and in Lombardy and offered attendees a vision of the current technological framework available in this area, as well as where, from their point of view, should the efforts be focused on in order to guarantee the sustainability of the current agro-livestock system in the Mediterranean area.

The opening of the conference was carried out by the Director of the CITA, José Antonio Domínguez and it was closed with the intervention of the Technical General Secretary of the Government of Aragon, José Luis Castellanos, who put the spotlight on the use and development of innovative techniques that contribute to the strength of such an important sector as livestock breeding in the region of Aragon.

The quality of the conference, according to the surveys, was positively valued by the attendees

Thank you so much!

ALL TOGETHER AT ONCE First project meeting

LIFE ARIMEDA quiere fomentar la reutilización de recursos disponibles en áreas de elevada carga ganadera sustituyendo la fertilización producida a partir de fuentes no renovables por fertilizantes orgánicos gestionados de una forma correcta y sostenible.

Last November 10, 2017, the first ARIMEDA project meeting took place at the CITA facilities, where the technical and administrative bases of the work to be developed over the next 4 years were set up.

Every partner explained their expectations and their point of view on how the technical tasks should be approached and a common coordination protocol was approved establishing the basic management guidelines in order to successfully achieve the expected results. Additionally, the Transferability Platform was started up, which represents a key tool for the transfer of knowledge throughout all the LIFE ARIMEDA Project and so on, giving support to all the stakeholders interested in replicating the management model demonstrated .

BROADENING HORIZONS The Project in Brussels, Navarra, Lérida...

D. Quilez (CITA) and G. Provolo (Univ. Milan) in the kick off meeting of the LIFE 2016 projects in Brussels.

The project has participated in technical seminars where the Project has been presented, giving information about the activities foreseen and the results expected.

> Septembre 2017. Zaragoza. Presentation of the Project in the **Manure management Workshop** organized by the **Department of Environmental Quality of the Government of Aragon.**

> October 2017. Brussels. Kick off meeting of the European projects funded by the LIFE 2016 call (http://europa.eu/rapid/press-release_IP-17-3429_en.htm).

> October 2017. Olite (Navarra). Presentation of the Project in the seminar ***KliNaDebates: Agriculture for a changing climate.*** Organized by the **Government of Navarra.**

> October 2017. Zaragoza. Presentation of the Project in the second **Commission of the Innovation Cluster for the efficient use of water ZINNAE.**

> December 2017. Lérida. Presentation of the project in the Seminar **Atmospheric emissions in agriculture** organized by **IRTA** and the project **LIFE Futur Agrari**.

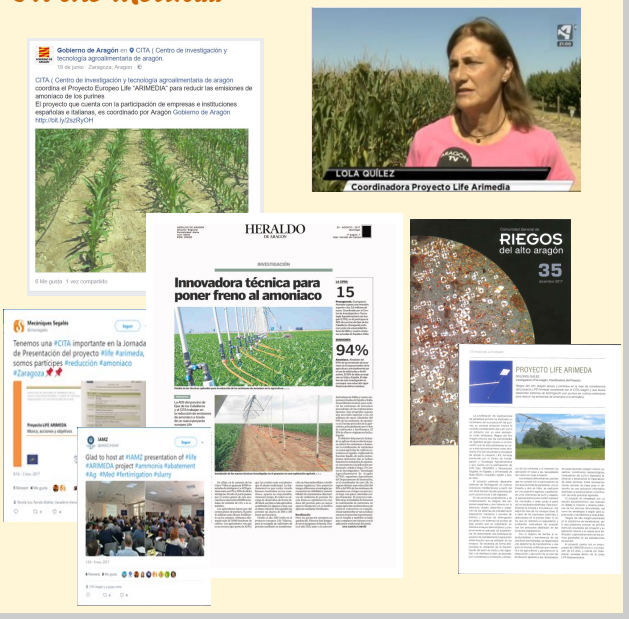
WHERE CAN YOU FIND US Contact us through our website and social networks

www.lifearimeda.eu

@lifearimeda

Come and visit us!

In the media...



Today we introduce you to ...

the coordinator of the project: Centro de Investigación y Tecnología Agroalimentaria de Aragón

The Centre for Agrifood Research and Technology of Aragon (CITA) is a public research organization belonging to the Department of Innovation, Research and University of the Government of Aragon, whose mission is to obtain benefits for the society through research, technological development, training and knowledge transfer. These improvements focus on enhancing the economic profitability of the Aragonese agri-food companies and increasing the quality of life of the entire population, from the people who produce the raw matters to the consumers.

The Unit of Soils and Irrigation, that coordinates LIFE ARIMEDA project, focuses its activity on scientific resesarchs of the interface between crop, water, soil and environmental agronomy from the perspective of one of the driest regions of Europe: the middle valley of the Ebro.

In this context, the agrarian sector faces a growing problem derived from:

a) the concurrence in the use of water

b) the need to satisfy national and global demand for food, fibers, bio-fuels and other agricultural products

c) the water and atmosphere quality requirements (Nitrate Directive, Water Framework Directive, National Emission Ceiling Directive).

The Unit of Soils and Irrigation is linked to the National Council for Scientific Research - Experimental Station Aula Dei as an associated Unit and, together with researchers from both centres, make up the "Irrigation, Agronomy and Environment" research group, one of the largest groups in Spain in this field. They account with a large experience in R&D, participating in national and European projects to:

1. Establish innovative technologies for the diagnosis, management and control of the agricultural environment.
2. Increase efficiency in the use of production inputs.
3. Increase production stability and crop diversification.
4. Preserve natural and agrarian resources, as well as the environment in general.

The research challenge is to generate scientific and technical information to establish ***more competitive, efficient and sustainable agrarian systems.***

cita
CENTRO DE INVESTIGACIÓN Y TECNOLOGÍA AGROALIMENTARIA DE ARAGÓN

Tradicional broadcasting application of pig slurry.

The problem of pig slurry in Aragón

Spain is the first producer of pigs in the EU with a census of 28 million heads. Pig breeding represents in Aragon 24% of the pig production in Spain and it has had a continuous growth, almost doubling in the last 15 years the population. It represents a high economic value in this region, 35% of the Final Agricultural Production, with a considerable difference with respect to its national weight (13%). The increase in the swine census is directly linked to an increase in the production of slurry; the estimation of pig slurry production in Aragon in 2015 was 11 million m^3, which means 40,000 tons of nitrogen (N) that must be managed efficiently to avoid negative impacts on the environment, such as the volatilization of the ammonia, the pollution of water by nitrates or the increase in the emission of greenhouse gases such as nitrogen oxides.

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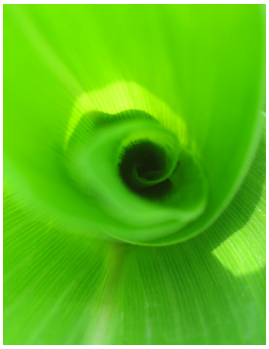


Next events:

> Development of environmental, agronomic and economic monitoring protocols (measurement of emissions).

> Design and implementation of fertigation field trials in the demonstration plots in Italy and Spain.

> First study visits to the demonstrative field trials and technical workshops

> Dissemination in our social networks of all our activities and more...

AMMONIA: PRECURSOR FOR THE PRODUCTION OF MICROPARTICLES

In September 2015 the journal Nature (Lelieveld et al., 2015) published the results of several epidemiological studies that linked premature death with different causes, among others, with the air pollution of microparticles less than 2.5 microns in diameter ($PM_{2.5}$).

Microparticles cause respiratory conditions such as Chronic Obstructive Pulmonary Disease (COPD) or the group of lung diseases that includes emphysema and chronic bronchitis that block the flow of air in the lungs, making breathing more difficult. They also produce cardiovascular diseases, lung cancer and reduce the life expectancy between 6 and 12 months.

The premature mortality attributed to air pollution by $PM_{2.5}$, for the population under 5 years and over 30, is estimated at more than 3.6 million people a year in the world and more than 400,000 people in Europe (Lelieveld et al., 2015, CE, 2015).

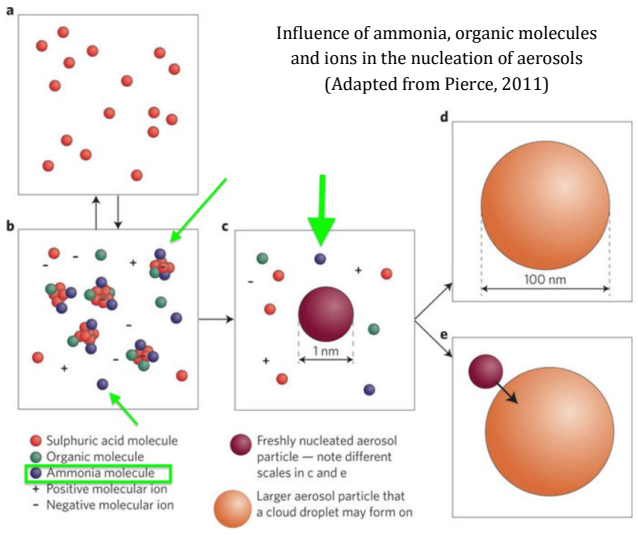
The ammonia in the atmosphere is a precursor of the production of secondary microparticles since it facilitates the formation of inorganic secondary aerosols, such as ammonium sulphate ($(NH_4)_2SO_4$) or ammonium nitrate (NH_4NO_3). Inorganic aerosols are the main constituents of anthropogenic contamination by $PM_{2.5}$. Therefore, the mitigation of this pollution will only be effective if the ammonia emissions are reduced proportionally to the emissions of sulfur oxides (SO_2) and nitrogen oxides (NO_x) (Bauer et al., 2016).

Agriculture (94%) is the main source of ammonia emissions. These emissions are derived, mainly, from the production, storage and application of manure (74%) and the use of synthetic nitrogen fertilizers (21%) (EEA, 2017).

The monitoring studies of air pollution policies in the EU have estimated the benefits for human health of reducing air pollution and conclude that these exceed the costs of emission reduction measures (Wagner et al., 2015).

The objective of the LIFE ARIMEDA project is to contribute to the development of new strategies to reduce ammonia emissions in the application of organic fertilizers, such as pig slurry and digestate, to the field.

Dr. Arturo Daudén
Centro de Investigación y Tecnología Agroalimentaria de Aragón



Influence of ammonia, organic molecules and ions in the nucleation of aerosols (Adapted from Pierce, 2011)

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