European Territorial Cooperation Programme
Greece - Italy
2007-2013

INVESTING IN OUR FUTURE

Co-funded by the European Union (ERDF)
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Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes

IRMA

WP2, Action 2.2, Deliverable 3

Open international conference (Italy), theme: "Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes"

Scientific Support for the organization of the Conference in Italy

www.irrigation-management.eu

IRMA info

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European Territorial Cooperation Programmes (ETCP)

GREECE-ITALY 2007-2013

www.greece-italy.eu

Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes (IRMA)

www.irrigation-management.eu

IRMA partners

LP, Lead Partner, TEIEP

Technological Educational Institution of Epirus

http://www.teiep.gr, http://research.teiep.gr

P2, AEPDE

Olympiaki S.A., Development Enterprise of the Region of Western Greece

http://www.aepde.gr

P3, INEA / P7, CRA

Instituto Nazionale di Economia Agraria

http://www.inea.it

P4, ISPA-CNR

Consiglio Nazionale delle Ricerche - Istituto di Scienze delle Produzioni Alimentari

http://www.ispa.cnr.it/

P5, ROP

Regione di Puglia

http://www.regione.puglia.it

P6, ROEDM

Decentralised Administration of Epirus–Western Macedonia

http://www.apdhp-dm.gov.gr

WP2, Action 2.2, Deliverable 3

Open international conference (Italy), theme: “Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes” - Scientific support for the Conference organization in Italy.

Involved partners:

CNR - ISPA

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Bari, 30 September 2015

European Territorial Cooperation Programme Greece - Italy 2007-2013

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www.irrigation-management.eu

Publication info

WP2: Information and Publicity

Deliverable 2.2.3 Scientific support for the organization of the international conference in Italy, general theme: Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes.

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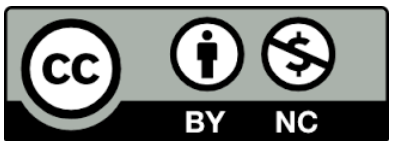


Contents

Introduction and basic objectives

The project “Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes (IRMA)”, financed in the framework of the European Territorial Cooperation Programmes (ETCP), GREECE-ITALY 2007-2013 (http://www.irrigation-management.eu/), has been launched in April 2013.

Two international conferences were planned in the framework of IRMA. During the project’s kickoff meeting it was decided that the two conferences will have different main themes which will form a complete reference to the objectives of IRMA project.

The conference in Greece was decided to be focused on the relation between irrigation – drainage and landscape, and was held in Patras at the end of 2014, under the name of “IRLA2014 - 1st International Symposium on Efficient Irrigation Management and its Effects on Urban and Rural Landscapes”.

The conference in Italy was decided to be focused on sustainable irrigation in Mediterranean agriculture, and was planned to be held as the closing event of the IRMA project.

In this framework, the **IrriMed 2015** International Conference on “**Modern Technologies, Strategies and Tools for Sustainable Irrigation Management and Governance in Mediterranean Agriculture**” was organized under the responsibility of Regione Puglia (P5 of IRMA project), and with the scientific support of CNR – ISPA (P4).

Conceptual issues

Water scarcity is becoming a real threat to the sustainability of irrigated agriculture. This issue is of primary interest in Mediterranean countries, where population dynamics, upgraded standards of living, economic and social development, and the use of water-consuming technologies require careful and continuous assessment of models and strategies for water resources use. The increasing competition for water resources has raised the interest of consumers and governments to adopt water conservation practices and to limit environmental burden. The focus is turned towards increasing the efficiency of water use in the Mediterranean agricultural systems since agricultural sector is the major consumer of water resources. This means also the development of optimal governance strategies considering the multiple interest of various stakeholders in water sector. The failure to adopt appropriate strategies for irrigation management could lead to further deterioration of resources and extended water shortage in Mediterranean agro-environments.

Irrigation management embraces a set of technical, socio-economic and environmental issues. Management decisions directly affect the whole chain of water delivery and its application to the fields. Hence, irrigation practices affect crop performance and can lead to qualitative and quantitative improvements in agricultural production. In turn, efficient irrigation management also contributes to the reduction of environmental impact and sustainable use of resources.

On the other hand, excessive irrigation results in low water use efficiency, leaching, and runoff of water, fertilizers, and other agrochemicals, contributing to make agriculture an important source of non-point source pollution.

With this background, the IRMA project aimed to establish a network of knowledge and expertise exchange which will lead to the development of practical irrigation management tools for demand-driven capitalization of scientific knowledge and good practices. The closing event of IRMA is the International Conference on “Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean agriculture” (IrriMed 2015), held on 23-24-25 September 2015 in Valenzano (Bari, Italy). IrriMed 2015 has been organised by Regione Puglia (Italy), with the scientific support of the Institute of Sciences of Food Production (CNR-ISPA, Bari, Italy) and in the partnership with the Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB, Bari).

IrriMed 2015 has been focused on the presentation of the latest scientific and technological achievements in the irrigation sector, with the ambition to offer a platform for discussion and debate among actors and stakeholders involved in the management and governance of water for

agricultural use. Both scientific research advancements on irrigation practice and water resources governance topics have been covered in the sessions of the Conference.

The IrriMed 2015 Conference attracted participants and presenters with different background (scientific, administrative, commercial), coming from a wide range of areas of the Mediterranean Basin, providing their valuable contribution in giving life to this event.

Addresses of the organizers

As mentioned above, IrriMed 2015 conference was the result of the organizational effort of three important institutions. Regione Puglia, partner P5 of the IRMA project, had the role of principle organizer of the event. CNR – ISPA was invested of the scientific responsibility of the conference. A fundamental contribution to the success of the event was provided by the Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB, Bari), which was assigned of the logistic tasks and played a key-role in giving a Mediterranean dimension to this international conference.

Hereafter we report the views of the different institutions involved, as it emerges from the words of their institutional representatives.

"Water is a vital resource, a primary element for humans and an essential source for the survival and development of any productive sector. It is responsibility for everyone, as well as for institutions, defend, protect and preserve water as the essence of life and the security for future generations.Hence arises the modern setting of water management in agriculture, based on stringent criteria of efficiency and environmental protection, required also by EU and national legislation.
The threat of climate change, the effects of which have an impact on the water cycle and are particularly evident in the Mediterranean area, requires an integrated approach among the water policies, over and above the geographical, economic and social dimension of subjects or sectors involved. It is therefore necessary to ensure policies based on governance models compatible with the limited water resources, with respect to the competition among the various demands of use, and that also take into account the trend of its consumption and its availability.
For the Region of Puglia the theme is strategic and results in investments in the knowledge of new solutions and approaches for the efficient and sustainable management of irrigation water, through the IRMA project.
The work carried out in the framework of the Project is the result of a virtuous partnership between the Region of Puglia, the National Research Council – Institute of Sciences of Food Production (CNR - ISPA) and the Council for Research in Agriculture and Agricultural Economic Analysis (CREA), in close collaboration with the Greek partners. Special thanks is due to all of them. Decisive for the international conference IrriMed 2015, organized by the Region of Puglia,

with the valuable participation of many experts and researchers, was the contribution of skills and experience of the International Centre for Advanced Mediterranean Agronomic Studies – Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB).
Farmers of Apulia and, more generally, of the Mediterranean territories are living water scarcity as a daily challenge. The works collected in this book are the building blocks for the construction of new knowledge and innovation in the field of optimization of water resources use for irrigation, to support rural areas of the Mediterranean basin, which express incessant needs."

Leonardo Di Gioia
Assessore all'Agricoltura - Risorse Agroalimentari, Regione Puglia
Assessor to Agriculture - Agrofood resources, Region of Puglia

"In most Mediterranean countries water availability is a main concern for agriculture, which uses for irrigation up to 70 % of this resource.
Nowadays, modern agriculture has to face the increasing scarcity of water for irrigation, as a result of the reduced availability and the increasing competition of civil and industrial sectors. The future scenario, resulting from climate changes, could intensify the irrigation requirements for crops, especially in those geographical areas characterized by high evapotranspiration demand, traditionally affected by water restrictions. This will result in the imperative need of policies for rational water management. At the same time, the adequate availability of water for irrigation is critical for raising the profitability of crops, both through the increased productivity and the possibility to achieve high quality standards, appropriate to the demands of the modern consumer. This aspect is of primary importance in Mediterranean countries, characterized by high consumption of fresh horticultural products. However, misguided irrigation practices can raise several environmental problems, such as depletion, pollution and progressive groundwater salinization, erosion and salinization of soil. Therefore, it is essential that the water resources governance will be sustained by the scientific support of research institutions in the definition of the most effective strategies to rationalize the use of water for irrigation, with the double aim to reduce the amount of water used and to maintain high agricultural productivity, both in terms of quantity and quality. The accurate assessment of crop water demand is the essential requirement for rational management of water, followed by its rational distribution to plants. This is the framework of the IRMA project ("Efficient Irrigation Management Tools for Agricultural Cultivations and Urban Landscapes'). The project is funded under the European Territorial Cooperation Programmes (ETCP) Greece-Italy 2007-2013, in which Italian institutions (Puglia Region, CNR-ISPA and CREA) closely cooperate with Greek institutions (TEIEP, ROEDM and AEPDE) with the aim of encouraging the exchange of knowledge between partners, through the development of practical tools and new practices for irrigation management, and sharing scientific experiences in specific areas such as greenhouses, public parks, and open field crops. In the certainty that the integration between different institutions and actors (research, politics, public administration, etc.) represents an extraordinary instrument to ensure the progress of knowledge, transfer and adoption of innovations, I am sure that this conference will trigger further and fruitful synergies and collaborations both at national and international level."

Antonio F. Logrieco
Director of the Institute of Sciences of Food Production (ISPA)
National Research Council (CNR)

"The International Centre for Advanced Mediterranean Agronomic Studies – Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB), Italy, organized the International Conference on "Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean agriculture" (IrriMed 2015) in straight collaboration with the Apulia Region and the National Research Council – ISPA (Istituto di Scienze delle Produzioni Alimentari). This is just one of numerous examples of collaboration between these two scientific Institutions and Apulia Region.Water, agriculture and environment are intrinsically linked throughout the scales: either considering the water pathway in the hydrological balance or through the components of soil-water and energy balance and the simple relations explaining water use efficiency and water/resources productivity. Actually, agriculture consumes about 70% of the world's water withdrawal and, due to limited availability of water, land and other natural resources, the challenge of our era is to promote the sustainable use of the resources and to produce more with less with a respect of the environment. In the last decades, the irrigation management has been getting more importance due to necessity to improve the efficiency of resources use in agricultural sector. The agronomic practices and engineering infrastructures have to be considered together with organizational, institutional, social, cultural problems as well as integrating activities of operation, maintenance and management. Moreover, the continuous technological progress leads to notable changes in irrigation equipment while innovation resulting from automation induce the farmers to behave in a way different from the one assumed at the design stage. In addition, the governance of resources and infrastructures is getting more complex due to increased demands and almost fixed or even reduced availability of resources. In the years to come, the relationship between water, energy, environment and agriculture is going to be more tight, functional and multifaceted due to a series of reasons comprehending primarily the accelerating changes in population growth, climate and land use. By the mid of this Century, the world population will reach at least 9 billion and agriculture will need to produce almost one-third more food than today with the unchanged or even reduced water and land input and under more variable and adverse climate. Certainly, many other changes will occur meanwhile including the political and financial arrangements, technological and socio-economic development, cultural setup, consumption pattern, and living and nutritional habits. This might create numerous scenarios describing the water-agriculture interlinks within the systems at local and global scale and deriving the possible implications on the availability and quality of water and land resources, the natural ecosystems and agricultural production. Efficient Irrigation management is, therefore, getting increasing importance since availability and quality of fresh water resources and the sustainable use of soil resources are under increasing pressure. Given the physical limitations of land and water, the link between food security, land use and water resources is particularly important for arid and semi-arid areas of Mediterranean. New strategies, approaches and tools are required in order to address irrigation water management, and performance and productivity of agricultural systems. This Conference is going to address this important issue and I would like to thank all outstanding experts and participants for their valuable contribution in promoting sustainable irrigation management and governance in the Mediterranean region."

Cosimo Lacirignola
Secretary General of CIHEAM, Paris

Conference specifications

Location

The conference was held in Valenzano, a small city in the metropolitan area of Bari. Bari is the main city and administrative centre of the Puglia region (Italy).

Venue:

The Conference place was CIHEAM – Mediterranean Agronomic Institute of Bari (IAMB), Via Ceglie, 9, Valenzano, Bari

www.iamb.it

The Mediterranean Agronomic Institute of Bari (IAMB) is a Centre for post-graduate training, applied scientific research and design of in-loco partnership actions in the framework of the international cooperation programmes. It works in four thematic areas: “Land and water resources management”, “Integrated pest management of Mediterranean fruit and vegetable crops”, “Mediterranean organic agriculture” and “Sustainable agriculture, food and rural development”. The Mediterranean Agronomic Institute of Bari (MAI-Bari) was established by CIHEAM as its Italian operating facility, and it enjoys the privileges of extra-territoriality attributed to international organisations by the Republic of Italy. For MAIB, the synergy between training/education, applied scientific research and cooperation provides tangible answers to topical issues such as food safety/security and agricultural quality.

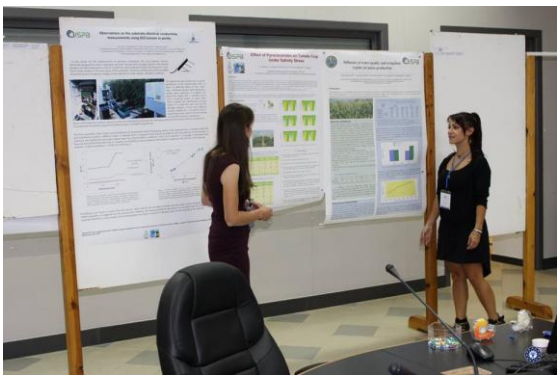
Through unremitting attention paid to institutional dialogue in the Mediterranean region, MAIB is involved in a wide range of activities ranging from international programmes and national strategic plans to local initiatives.

The campus includes a conference great hall, equipped with bilingual simultaneous translation facilities and a multi-purpose projection system, and several other spaces and rooms for meetings, exhibitions, discussions, which make this location a perfect venue for an international conference.

The IrriMed 2015 sessions and roundtables were distributed between the “Great Hall” (Picture 1) and the “Media Center” (Picture 2), which hosted also the poster sessions (Picture 3). Other facilities of the IAMB campus (the garden, the restaurant, the visitor residence) contributed to the fruitful implementation of the conference.


Picture 1: During sessions in the Great Hall.

Picture 2: Discussion during a session in the Media Center

Picture 3: During the poster session

Date

23 – 25 September 2015

Language

The official language of IrriMed 2015 was English.

Logo:

Picture 4: The IrriMed 2015 logo.

Conference web-site

http://irrimed2015.iamb.it/

Abstract submission, review and publication process:

A web system for abstract submission was implemented through the conference website. Received abstracts were subjected to the review of the scientific committee, which decided for acceptance, acceptance after revisions or reject. Accepted contributions were scheduled in the conference program after the confirmation of attendance by the authors, and the related abstracts were included in the Proceedings – Book of Abstracts of the conference (Montesano, F.F., Parente, A., Lamaddalena, N., Todorovic, M., Trotta, L. (Eds.) (2015). *Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean Agriculture* (IrriMed 2015), Proceedings – Book of Abstracts, 23-25 September 2015, Valenzano (BA, Italy). Valenzano, IT: CIHEAM, ISBN 2-85352-549-X). Key-note invited speakers were asked to submit a full paper on the topics of their presentation.

With the aim to promote a wide diffusion of the conference outcomes, presentations from speakers who gave their explicit permission were posted on IRMA website (http://www.irrigation-management.eu/communication/events-and-media#event99).

The key-note speeches were video-recorded and posted at:

https://www.youtube.com/playlist?list=PLXjaPcQfVApqSJ7SLPGCC6ZQIZ28I4dvi

Invitation letters and VISA issues:

In case of specific request, an invitation letter was provided by the Organizing Committee to all the participants that are member of the Organizing or the Scientific Committee, keynote and invited speakers and presenters that have submitted an approved abstract for oral or poster presentation.

Considering the international nature of the conference and the fact that many of applicants were from countries outside the EU in the Mediterranean basin and worldwide, a dedicated office at IAMB offered assistance to the procedures for obtaining VISA.

Participants:

144 people attended the conference and signed the attendance register. They came from 19 different Countries (Italy, Greece, Brazil, Lebanon, Turkey, Germany, Albania, Egypt, Spain, Tunisia, Czech Republic, USA, Palestine, Jordan, South Africa, Algeria, Morocco, Iraq, Bosnia).

Conference materials:

All participants were provided with a conference file containing the program, a printed copy of the Proccedings – Book of abstracts, a notebook, a pen, and a USB flash-drive containing the pdf version of the book (Picture 5).

Picture 5: The conference materials provided to participants.

Photo Album resources:

https://www.facebook.com/CIHEAM.IAM.Bari/photos/a.10153019003406433.1073742112.71381411432/10153019003501433/?type=3&theater

https://www.facebook.com/CIHEAM.IAM.Bari/photos/a.10153019308471433.1073742113.71381411432/10153019311096433/?type=3&theater

https://www.facebook.com/media/set/?set=a.565977873554651.1073741858.271906729628435&type=3

Committees

CONVENERS

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- Francesco F. Montesano, *CNR-ISPA, Bari, Italy*

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- Francesco F. Montesano, *CNR-ISPA, Bari, Italy*
- Cosimo Lacirignola, *CIHEAM-IAM Bari, Italy*
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- Bartolomeo Dichio, *University of Basilicata, Italy*
- Mladen Todorovic, *CIHEAM–IAM Bari, Italy*

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- Luigi Trotta, *Apulia Region, Italy*

• Luigi Scamarcio, *Apulia Region, Italy*

• Silvia Vanino, *CREA (Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria), Rome, Italy*

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• Penelope Baltzoi, *TEI of Epyrus, Arta, Greece*

• Konstantina Fotia, *TEI of Epyrus, Arta, Greece*

Contributions and themes: the IrriMed 2015 program

The conference was structured in order to give space to oral presentations and poster presentations arising from spontaneous submissions by researchers and experts in the different themes of the conference, beside a number of key-note invited speeches given by outstanding personalities selected in the international floor for their expertise.

IrriMed 2015 conference included the following thematic sessions:

- Water governance
- Environmental, social and economic aspects of water management
- Use of non-conventional water resources
- Soil-plant-atmosphere continuum
- Innovative tools for irrigation management at farm and district level
- Modern strategies for water management under protected environment
- Modern strategies for water management for open field crops

The synthetic conference program is reported hereafter:

International Conference on

"Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean agriculture" (IrriMed 2015)

Valenzano (Bari, Italy), 23-25 September 2015

Wednesday, September 23rd

8:30 -9:30	Registration	*Great Hall*
9:30 -10:00	**Opening Ceremony**	*Great Hall*
10:00 -10:30	Main Theme Keynote Speech	*Great Hall*
10:30 -11:00	*Coffee Break*	
11:00 -13:15	**Water Governance**	*Great Hall*
13:30 -14:30	*Lunch*	
14:30 -16:30	**Environmental, social and economic aspects of water management**	*Great Hall*
16:30 -17:00	*Coffee Break*	
17:00 -17:45	**Environmental, social and economic aspects of water management**	*Great Hall*
17:45 -18:30	**Poster Session**	*Media Center*
21:00-23:00	*Gala Dinner*	

Thursday, September 24th

9:00 -10:30	**Soil-plant-atmosphere continuum**	*Great Hall*
9:00 -10:30	**Use of non-conventional water resources**	*Media Center*
10:30 -11:00	*Coffee Break*	
11:00 -12:30	**Use of non-conventional water resources**	*Media Center*
11:00 -12:15	**Innovative tools for irrigation management at farm and district level**	*Great Hall*
12:30 -13:30	**POSTER SESSION**	*Media Center*
13:30 -14:30	*Lunch*	
14:30 -16:00	**Modern strategies for water management under protected environment**	*Great Hall*
14:30 -16:00	**IRMAproject, Audit in agriculture, INEA/CRA (CREA)**	*Media Center*
16:00 -16:30	*Coffee Break*	
16:30 -18:30	**Modern strategies for water management for open field crops**	*Great Hall*
16:30 -17:30	**IRMAproject, Audit in agriculture, INEA/CRA (CREA)**	*Media Center*
17:30 -18:00	**Closing Ceremony**	*Great Hall*

Friday, September 25th

8:00-17:30 Technical visit with lunch in Matera

For each of the themes/sessions, we invited distinguished key-note speakers:

- **Opening** session **- Main Conference theme**
  - Pasquale Steduto (FAO - Near East and North Africa Office (NENA), Egypt). *Water Efficiency, Water Productivity and Water Saving: Between Confusion and Effective Solutions.*

- **Water governance** session
  - Enrique Playan (CSIC, Spain). *Water Governance in irrigated areas: Models, principles and innovative solutions.*
  - Umberto Fratino (DICATECh Politecnico di Bari, Italy). *Innovation in Water Governance: what is the future?*

- **Use of unconventional water resources** session
  - Alfieri Pollice (CNR-IRSA, Italy). *Water and wastewater recycling in the Mediterranean area.*

- **Environmental, social and economic aspects of water management** session
  - Atef Hamdy (IAMB, Italy). *Water scarcity governance for securing the future*

- **Soil – plant - atmosphere continuum** session
  - Dimitrios Savvas (University of Athens, Greece). *Movement of water and nutrients in the soil-plant-atmosphere continuum*

- **Innovative tools for irrigation management at farm and district level** session
  - Mladen Todorovic (CIHEAM – Mediterranean Agronomic Institute of Bari, Italy). *Modern approaches and tools for irrigation management: from research achievements to on-field applications*

- **Modern strategies for water management under protected environment** session
  - Marc van Iersel (University of Georgia, USA). *Modern strategies for irrigation management in protected environments*

- **Modern strategies for water management for open field crops** session

- Marcello Mastrorilli (CRA-SCA, Italy). *Modern strategies for water management for open field crops*

As a result, 51 oral presentations and 35 poster presentations were scheduled in the final conference program (see it in attachment to this report).

Conclusions

The IrriMed 2015 conference had the ambition to touch in its sessions the whole chain of the irrigation water management process. Both scientific research advancements on irrigation practice, water resources governance and management topics have been covered during the Conference.
The principle outcomes of IrriMed 2015 are summarized in the take-home messages reported hereafter, based on the valuable contributions of the speakers and key-note speakers which outlined the issues on the spotlight for each of the Conference themes.

- Water efficiency, water productivity and water saving are concepts which specific meaning should be properly considered when strategies for sustainable water resources management under water scarcity are developed. When concerned with water saving and the sustainability of scarce water resources management, setting the limits of water consumption is the first line of action to be undertaken. Within these limits, all possible measures need to be implemented to make the best use of each single drop of water substantiated through the adoption of a solid water accounting framework. (From the key-note speech of Dr Pasquale Steduto).

- As the largest water-using sector worldwide, irrigation have to adapt to new demands of non-consumptive water uses. According to this, the management of irrigation has become the protagonist in a debate where society questions their own socioeconomic and environmental limits while emphasizing its multifunctional role. (From the contribution of Dr Sandra Ricart Casadevall)

- Irrigation water governance respond to a variety of models. The last decades have seen a contraction of the public system and an expansion of the private governance levels. Irrigation governance models should adhere to commonly accepted management principles: Transparency, Participation, Water traceability in the distribution systems, Effectiveness, Monitoring and

performance evaluation, Standardization, Certification. (From the key-note speech of Dr Enrique Playan).

- Water governance is the final action in a process with multiple goals which takes into account the variety of stakeholders directly or indirectly concerned, based on the principles of the public nature of water resources, fairness, environmental quality, public health, water's social role, and security for society. Innovation within the governance system is necessary to better deal with realizing collective goals of public interest, whereas the governance of water innovations is crucial in the future, being conscious that, on the one hand, governance system can enable, encourage and accelerate the development, implementation and marketing of water innovations and, on the other hand, governance system, can block, hinder or postpone innovations. (From the key-note speech of Dr Umberto Fratino).

- The utilization of non-conventional water-sources, with particular reference to treated waste-water, is a promising strategy for limiting lack of natural water resources. The interest of scientific community and European Governments for wastewater reuse has increased significantly in the last 15 years, as shown by the high number of EU funded research project in this field. However, the full potential of wastewater reuse in the Mediterranean area is still unexploited. In order to achieve this objective, wastewater treatment for reuse should be considered as a production process where sewage is the raw material and the produced water is the final marketable product. Moreover, the definition of quality standards should take into account that different produced water qualities should be dedicated to different uses, also considering the cost of treatment. (From the key-note speech of Dr Alfieri Pollice).

- New generation of relatively low cost technologies supporting irrigation management are continuously developed, including decision support systems, environmental sensor networks, drones and satellites. The new management strategies and technological achievements converge towards complex, integrated, multi-scale solutions able to satisfy different types of users, from a single farmer to large irrigation districts. Accordingly, to support the implementation of these solutions on the ground, the European Union has launched several initiatives and funds as they are the European Innovation Partnership on Water (EIP Water), European Agricultural Fund for Rural Development (EAFRD), H2020 and other programs. However, it is still complicated to transfer effectively the latest achievements to the fields due to i) complexity, heterogeneity, fragility and non-stationarity of soil-plant-atmosphere continuum and pertinent water systems and ii) continuous update and frequent

incompatibility of ICT. On-ground implementation of innovations requires reliance and continuous dialogue and exchange of ideas between technology providers, potential users and funding agencies. New technological solutions require the integration of monitoring systems and management tools (agronomic, engineering, environmental and economic) at different scales and decision levels and full involvement of all pertinent stakeholders. (From the key-note speech of Dr Mladen Todorovic).

- One of the challenges the greenhouse industry will need to address is to decrease water use and minimize any negative environmental impact from greenhouse production. Increasing interest of research and commercial R&D focused on the use of wireless sensor networks to provide growers with the information they need to make better irrigation decisions. Hardware and software that helps growers automate irrigation and make more informed nutrient management decisions based on that information have been developed. This approach to irrigation management is expected to be largely adopted at commercial level in the greenhouse industry in the near future. Among the benefits of wireless sensor networks for irrigation management are the following: Provide growers with real-time information; Precision Control of Irrigation; Increased Yields and Quality; Reductions in nutrient leaching; Better disease management; Overall Environmental Benefits. (From the key-note speech of Dr Marc van Iersel).

- Several adaptive strategies at farm level (i.e. changes in crop management practices leading to a reduction of the impact of water scarcity on farm productivity) have been proposed in the last decades. Modernization of irrigated systems at farm and scheme levels has increased irrigation efficiency significantly (minimizing losses and improving uniformity) but, rather than resulting in more reliable annual allocation (the general objective), the saved water had resulted in an expansion of the irrigated area. However there are limits to the improvement of water productivity on farm, not necessarily associated to water scarcity. There is a need to know these limits in order to avoid inadequate efforts. Benchmarks for water productivity are realistic references that can be considered as objective for farmers. Economic and environmental risks associated to any strategy must be well understood and evaluated for resulting viable options. These risks may vary between socio-economic and environmental conditions. Ideally, strategies should not result a problem for farmers in term of labor or large capital investments nor should they damage the environment. (From the key-note speech of Dr Marcello Mastrorilli).

International Conference on

"Modern technologies, strategies and tools for sustainable irrigation management and governance in Mediterranean agriculture" (IrriMed 2015)

Valenzano (Bari, Italy), 23-25 September 2015

Wednesday, September 23rd

8:30 -9:30	Registration	*Great Hall*
9:30 -10:00	**Opening Ceremony**	*Great Hall*
10:00 -10:30	Main Theme Keynote Speech	*Great Hall*
10:30 -11:00	*Coffee Break*	
11:00 -13:15	**Water Governance**	*Great Hall*
13:30 -14:30	*Lunch*	
14:30 -16:30	**Environmental, social and economic aspects of water management**	*Great Hall*
16:30 -17:00	*Coffee Break*	
17:00 -17:45	**Environmental, social and economic aspects of water management**	*Great Hall*
17:45 -18:30	**Poster Session**	*Media Center*
21:00-23:00	*Gala Dinner*	

Thursday, September 24th

9:00 -10:30	**Soil-plant-atmosphere continuum**	*Great Hall*
9:00 -10:30	**Use of non-conventional water resources**	*Media Center*
10:30 -11:00	*Coffee Break*	
11:00 -12:30	**Use of non-conventional water resources**	*Media Center*
11:00 -12:15	**Innovative tools for irrigation management at farm and district level**	*Great Hall*
12:30 -13:30	**POSTER SESSION**	*Media Center*
13:30 -14:30	*Lunch*	
14:30 -16:00	**Modern strategies for water management under protected environment**	*Great Hall*
14:30 -16:00	**IRMAproject, Audit in agriculture, INEA/CRA (CREA)**	*Media Center*
16:00 -16:30	*Coffee Break*	
16:30 -18:30	**Modern strategies for water management for open field crops**	*Great Hall*
16:30 -17:30	**IRMAproject, Audit in agriculture, INEA/CRA (CREA)**	*Media Center*
17:30 -18:00	**Closing Ceremony**	*Great Hall*

Friday, September 25th

8:00-17:30 Technical visit with lunch in Matera

Detailed Programme

Wednesday, September 23rd

8.30 – 9.30	Registration	
9.30-10.00	Opening Ceremony	- Leonardo Di Gioia (Regione Puglia) - Antonio F. Logrieco (CNR – ISPA) - Ioannis Tsirogiannis (TEI of Epirus – IRMA Project coordinator) - Nicola Lamaddalena (CIHEAM-IAMB)
10:00-10:30	Main theme key-note speech	- *Water Efficiency, Water Productivity and Water Saving: Between Confusion and Effective Solutions* - Pasquale Steduto
10.30-11.00	*Coffee break*	
11.00 – 13.15	**Session: Water Governance**	**Great Hall**
	Chairman: **Atef Hamdy**	
11.00 – 11.30	Key note speech	*Water Governance in irrigated areas: Models, principles and innovative solutions* - E. Playan, J. A. Sagardoy, R. Castillo
11.30 – 12.00	Key note speech	*Innovation in Water Governance: what is the future?* - U. Fratino
12.00 – 12.15		*The activities of Puglia Region at EU level in the water sector* - P. Casalino
12.15 – 12.30		*Water governance and territorial analysis: how to improve irrigation management from stakeholders' involvement in decision-making processes* - S.R. Casadevall
12.30 – 12.45		*Governance of water for agriculture use: the case of "Taourirt Tafoughalt Rural Development Project"* - K. Rerhrhaye
12.45 – 13.00		*Assessing the impact of climate change on water demand and supply management strategies in the West Bank* – A. Alnajajreh, M. Todorovic
13.00 – 13.15		*The concept of groundwater governance* - B. Jabary
	13.30-14.30	*Lunch*

14.30 – 17.45 Session: Environmental, social and economic aspects of water management

GREAT HALL

Chairman: **Pasquale Steduto**

14.30 – 15.00	Keynote speech	*Water scarcity governance for securing the future* - A. Hamdy, M. Todorovic.
15.00 – 15.15		*Sustainable water management in green roofs* - P. Luz, I.Tsirogiannis, M. Accorsi, F. Orsini, G. Gianquinto
15.15 – 15.30		*Monitoring and evaluation of the economic and environmental impacts of irrigated agriculture in northwestern Libya* - S. A. Alghariani, Y. D. Ezlit,A. E., M. Elaalem, A. Ganfoud.
15.30 – 15.45		*Water and energy efficiency in a high environmental value agricultural area* - R. de Vito, I. Portoghese, A. Pagano, U. Fratino, M. Vurro
15.45 – 16.00		*Eco-efficiency of wheat cultivation under rainfed and irrigated conditions* - A. Mehmeti, M. Todorovic, A. Scardigno, V. Cantore
16.00 – 16.15		*Sustainability of irrigated agriculture: Turkey as a case study* - S. Ors
16.15 – 16.30		*Design and performance analysis of irrigation networks operating on demand in developing countries* – I. Alkhayer

16.30-17.00 Coffee break

Chairman: **Nicola Lamaddalena**

17.00-17.15	*Evolution of irrigation methods: the case of Apulia region* - A. Caliandro, F. Boari
17.15-17.30	*Some socio-economic aspects of replacing sugar beet instead of sugar cane* - N.S. Abdel Kareem, G.Fawzy, M. Rady.
17.30 -17.45	*Recognition of salinity sources in the coastal aquifer, West of Bardaweil lake, north Sinai, Egypt, using hydro-geochemical parameters* – M.A. Gomaa

17.45-18.30 ***POSTER SESSION*** *Media Center*

21.00 – 23.00 Gala dinner

Thursday, September 24th

9.00-12.30 Session: Use of non-conventional water resources

Media Center

Chairman: **Maria Kokkora**

9.00 – 9.30	Key note speech	*Water and wastewater recycling in the Mediterranean area* - A. Pollice
9.30 – 9.45		*Yield response of quinoa to irrigation with drainage water and planting times in the Mediterranean Region* – A. Yazar, S. M. Sezen, Y.B.Çolak
9.45 – 10.00		*Cost-benefit analysis of wastewater reuse* - S. Arborea, B. De Gennaro, G. Giannoccaro, V. Iacobellis, A. F. Piccinni
10.00 – 10.15		*Heavy metals uptakes through irrigation: A case study of Nickelium (Ni) and Chromium (Cr) in Lavender (Lavandula angustifolia) and Sweet bush basil (Ocimum basilicum L.) in a soil never previously polluted with heavy metals* - P.E. Barouchas, M. Bakea, P. Baltzoi, K. Fotia, G. Patakioutas, G. Manos, D. Savvas
10.15 – 10.30		*Effect of treated urban waste water irrigation on two soils (clay and sandy) and two crops (tomato and bean) in Southern Italy* - L. D'Andrea, C. Riefolo, A.D. Palumbo, M. Mastrorilli

10.30 – 11.00 Coffee break

Chairman: **Attila Yazar**

11.00 – 11.15	*Economic considerations for maize fertigation with treated olive mill wastewater* – M. Kokkora, K. Petrotos, C. Papaioannou, P. Gkoutsidis
11.15 – 11.30	*Modelling rainwater harvesting to assess potential water savings for urban food gardens* – F. Lupia, A. Campisano, G. Saitta
11.30 – 11.45	*Effects of recycled and grey water on the development and status of plants in urban landscapes* - K. Fotia, P. Baltzoi, A. Paraskevopoulou, K. Karelis, E. Tzima, I.L. Tsirogiannis
11.45 – 12.00	*Irrigation with municipal wastewater affects soil chemical characteristics and nutrient uptake in a nectarine orchard* – G.A.Vivaldi, A.M.Stellacci, C.Vitti, S. Camposeo
12.00 - 12.15	*EU-India R&D Project Water4crops. Activities about improving water use efficiency through agronomics, plant breeding and locally adapted irrigation technologies and techniques* – A. Lo Porto, A. Lopez, R. Ragab
12.15 – 12.30	*Development and evaluation of the use of brackish groundwater in integrated aqua-agriculture systems in New Land in Egypt* – A. A. A. S. Aboukheira, Y.A.M. Ali

9.00 – 10.30 Session: Soil-plant-atmosphere continuum

Great Hall

Chairman: **Marc W. van Iersel**

9.00 – 9.30	Key note speech	*Movement of water and nutrients in the soil-plant-atmosphere continuum* – D. Savvas, I.Tsirogiannis
9.30 – 9.45		*The role of intra-specific biodiversity to cope with climate change: a case study on durum wheat cultivars* - E. Monaco, F. De Lorenzi, S.M. Alfieri, M. Menenti, A. Basile, M. Riccardi, M. Rinaldi
9.45 – 10.00		*Root signaling and tree physiology in relation to irrigation methods* - E. Xylogiannis, A. Sofo, A. N. Mininni, G. Montanaro, B. Dichio
10.00 – 10.15		*Impact of climate change on water requirements and yield of maize grown under different pedo-climatic conditions in Bosnia and Herzegovina* - N. Stojakovic, R. Stričević, M. Vujadinović-Mandić, M. Todorović
10.15 – 10.30		*Rapeseed (Brassica napus L.) irrigation scheduling via crop water stress index (CWSI) using line source sprinkler irrigation* – H.T. Gültaş, Y. Ahi

10.30 – 11.00 Coffee break

11:00 – 12:15 Session: Innovative tools for irrigation management at farm and district level

Great Hall

Chairman: **Ioannis Tsirogiannis**

11.00-11.30	Key note speech	*Modern approaches and tools for irrigation management: from research achievements to on-field applications* - Mladen Todorovic
11.30 – 11.45		*Satellite vs. ground-based monitoring of durum wheat biometric and physiological parameters* - N. Mzid, R. Albrizio, V. Cantore, M. Todorovic
11.45 – 12.00		*Low pressure subsurface irrigation technique for a precision and optimal irrigation management* – A. Dührkoop, A. Bencheikh, T.A. O. Madjed, A. Djoudi, O. Hensel
12.00 – 12.15		*Irriga System: Irrigation Management Service* - R. Carlesso and M. Pasin
12.00 – 12.15		*Management of hybrid irrigation method for enhancing crop water productivity in old land in Egypt* – A.A. A. S. Aboukheira, H.A. Abedl-Raheem

12.30-13.30	***POSTER SESSION***	*Media Center*

13.30 – 14.30 Lunch

14.30 – 16.00 Session: Modern strategies for water management under protected environment

GREAT HALL

Chairman: **Francesco F. Montesano**

14.30 – 15.00	Key note speech	*Modern strategies for irrigation management in protected environments* – M. W. van Iersel
15.00 – 15.15		*Online professional irrigation scheduling system for greenhouse crops and fruit trees* – N. Katsoulas, C. Kittas, T. Bartzanas, J.J. Alarcón, O. Mounzer, F. Pedrera, B. Baviera, A. Nikitas
15.15 – 15.30		*Growth and ornamental quality of potted Bougainvillea genotypes grown in two shapes under deficit irrigation* – C. Cirillo, Y. Rouphael, R. Caputo, G. Raimondi, S. De Pascale
15.30 – 15.45		*Soft- and hard-sensors for advanced control of fertigation in substrate cultivation of greenhouse and nursery crops* – D. Massa, L. Incrocci, A. Pardossi
15.45 – 16.00		*Decision Support system- DSS- for irrigation management in greenhouses: a case study in Campania Region* - E. Monaco, M. Riccardi, A. Basile, G. D'Urso , C. De Michele , V. Magliulo, A. Tedeschi

16.00 – 16.30 Coffee break

16.30 – 18.30 Session: Modern strategies for water management for open field crops

GREAT HALL

Chairman: **Antonio Elia**

16.30 – 17.00	*Key note speech*	*Modern strategies for water management for open field crops* - M. Mastrorilli
17.00 – 17.15		*A First Year of Comparison Between Ordinary Drip Irrigation and Subsurface Drip Irrigation (SDI) in a cv. 'Greco b.' Vineyard* - G. Lopriore, M. Di Cataldo, D. Scelsa, N. Noviello, P. Soldo
17.15 – 17.30		*Enhancing potato drought tolerance by regulating potassium*

	fertilization and irrigation in Bekaa valley-Lebanon - T. Darwish, A. Fadel, S. Baydou, I. Jomaa, A. Mohamad, H. Zeina , T. Atallah
17.30 – 17.45	*Evaluation of various sensors for irrigation management in urban landscapes* – I.L. Tsirogiannis, N. Malamos, P. Barouchas, C. Iraklis, K. Papakonstantinou, P. Baltzoi, K. Fotia
17.45 – 18.00	*Effect of Magnetic Water on Yield and Fruit Quality of some Mandarin varieties* – A.E. Hamdy, S.M. Khalifaand, S. Abd-Elrahman Abdeen
18.00 – 18.15	*Growth, Water and nitrogen use efficiency under drip irrigation on wheat grown on an arid region* - M.S. Awaad
18.15 – 18.30	*The effects of potassium application on the growth, membrane permeability and nutrients uptake of young corn plants grown under drought conditions* – M. Kuzucu, A. Güneş, F. Dökmen

Parallel event – **IRMAproject, Audit in agriculture, INEA/CRA (CREA) (Media Center)**, 14.30-17.30 with coffee break (16.00-16.30)

Friday, September 25th

8.00 – 17.30	**Technical visit with lunch**	**The ancient city of Matera, European Capital of Culture 2019, where the systems of water collection represented the basis for the existence of civilization from prehistoric times to the present day**

Posters

S. Mancarella, G. Pennisi, E. Della Pia, M. Accorsi, F. Orsini, G. Gianquinto	**Adaptability of edible crops in Mediterranean extensive green roofs**	Environmental, social and economic aspects of water management
S. Vanino, S. Capone, P. Nino, S. Fabiani, P. Barouchas, D. Maretas	**Irrigation management by water users associations: case studies in the regions of Apulia, Epirus and Western Greece**	Environmental, social and economic aspects of water management
M. A. Gomaa	**Assessment of hydro-geochemical processes affecting groundwater quality in the area between safaga and el-quseir, eastern desert, egypt**	Use of non-conventional water resources in agriculture
C. Mininni, F.F. Montesano, F. Serio, A. Parente	**Evaluation of anaerobic digestates liquid fraction from posidonia residues as nutrient solution for lettuce seedling production**	Use of non-conventional water resources in agriculture
I. Alkhayer	**Constructed wetlands**	Use of non-conventional water resources in agriculture
N. Montemurro, V. Lacasella, A. Lonigro	**Microbial quality of treated wastewater for agricultural reuse in Apulia region (Italy)**	Use of non-conventional water resources in agriculture
M. Kuzucu, F. Dökmen, A. Güneş	**The Importance of Water Consumption in Agriculture Under the Effect of Changing of Climate and Global Heating**	Soil-plant-atmosphere continuum
N. Malamos, A. Tegos, I. L. Tsirogiannis, A. Christofides, D. Koutsoyiannis	**Implementation of a regional parametric model for potential evapotranspiration assessment**	Soil-plant-atmosphere continuum
S. Toscano, F.Giuffrida, E.Farieri, D. Romano	**Effects of substrate water content on two Mediterranean ornamental shrubs**	Soil-plant-atmosphere continuum
A. Parente, M. W. Van Iersel, F. Boari, V. Cantore, F. F. Montesano	**Use of capacitance soil moisture sensors for assessing the effects of different substrate water content on growth and water relations of soilless tomato**	Soil-plant-atmosphere continuum
F. Altobelli, F. Lupia, S. Falanga Bolognesi, C. de Michele, G. D'Urso, F. Vuolo, A. Dalla Marta	**Innovation and the water footprint (WF) indicator for ensuring sustainable irrigation: an example from Italy.**	Innovative tools for irrigation management at farm and district level
I. Chalkidis, K. Fotia, M. Sakellariou-Makrantonaki	**Evaluation of irrigation auditing at a water deficit area of Thessaly –Greece, Lake Karla area.**	Innovative tools for irrigation management at farm and district level
F. Dökmen, Y. Ahİ, D.D. Köksal	**Irrigation of Pyrus in the Vicinity of Hisareyn-Gölcük/Kocaeli,Türkiye**	Innovative tools for irrigation management at farm and district level

N. Malamos, I.L. Tsirogiannis, A. Christofides, S. Anastasiadis	**IRMA_SYS: a web-based irrigation management tool for agricultural cultivations and urban landscapes**	Innovative tools for irrigation management at farm and district level
A. Petrelli, L. Trotta, L. Scamarcio, F. Schiavone, G. Laera, M. Del Prete, M. Zippitelli, E. Riezzo, G. D'amato	**Efficient management of the irrigation for agricultural crops: Upgrade of the irrigation module and testing of Bluleaf system**	Innovative tools for irrigation management at farm and district level
P. Toufidis, E. Filis, M. Kassioumi, E. Papingioti	**The meteorological stations network that has been installed in the plain of Arta**	Innovative tools for irrigation management at farm and district level
M. Feki, G. Ravazzani, A. Ceppi, C. Corbari, M. Mancini	**Improvement of infiltration modelling to assess the efficiency of water use and irrigation scheduling**	Innovative tools for irrigation management at farm and district level
S. Falanga Bolognesi, C. De Michele, L. Marotta, M. Colandrea, I. Mula, E. Anzano, F. Vuolo, G. D'Urso	**Mapping irrigated areas: the case study of pivot systems in the Mallee Districts of the South Australian Murray-Darling Basin**	Innovative tools for irrigation management at farm and district level
M. A. Gomaa, I. Khater, M. M. Abd El Aziz	**Farm mechanization and water scarcity options under climate change scenarios in Egypt**	Innovative tools for irrigation management at farm and district level
M.I. Schiattone, R. Viggiani, P. Putignano, D. Di Venere, M. Perniola, V. Candido[(1)]	**Effect of irrigation regime and nitrogen fertilization on wild rocket**	Modern strategies for water management under protected environment
P. Tompoulidis, G. Patakioutas, N. Mantzos, E. Lambraki, T. Albanis	**Application of thiamethoxam through the nutrient supply system in a greenhouse hydroponic cultivation of cucumber**	Modern strategies for water management under protected environment
C. Kittas, A. Elvanidi, N. Katsoulas, K.P. Ferentinos, E. Kitta, T. Bartzanas	**New tool for sustainable irrigation management in greenhouse conditions based on hyperspectral camera**	Modern strategies for water management under protected environment
F. Montesano, M.W. van Iersel, A. Parente	**Observations on the substrate electrical conductivity measurements using GS3 sensors in perlite**	Modern strategies for water management under protected environment
V. Cantore, L. Sergio, D. Di Venere, M.I. Schiattone, F.Boari	**Effect of Pyraclostrobin on tomato crop under salinity stress**	Modern strategies for water management for open field crops
G. Cucci, G. Caranfa, F. Boari, G. Lacolla, V. Cantore	**Influence of water quality, and irrigation regime on maize production**	Modern strategies for water management for open field crops
H. F. Khayatzadeh, A. Gomrokchi	**Modeling Energy Saving in Operation of Pressurized Irrigation Systems**	Modern strategies for water management for open field crops
D. Laterza, G. Montanaro, B. Dichio,	**Seasonal moisture variation at deep and shallow soil layers in a Mediterranean kiwifruit orchard**	Modern strategies for water management for

R. Ermini, C. Xiloyannis		open field crops
Y. Rouphael, S. De Pascale, F. Kara, R. Khouwayer, G. Colla	**Yield and water-production functions of lettuce under full and deficit irrigation regimes**	Modern strategies for water management for open field crops
M. Strnad, L. Spíchal, K. Doležal, R. Koprna, L. Plíhalová, M. Zatloukal, P. Galuszka	**New cytokinin prodrugs for drip irrigation**	Modern strategies for water management for open field crops
C. A. Okechukwu	**Methods and technologies to improve efficiency of water use**	Modern strategies for water management for open field crops
S. Falanga Bolognesi, F. Vuolo, C. De Michele, G. D'Urso	**Analysis of time-series MODIS 250 m vegetation index for tree-crop systems**	Modern strategies for water management for open field crops
S. Tekin, S. M. Sezen, A. Yazar, S. Boyacı	**Yield and Quality Response of Wheat to Saline Irrigation in the Mediterranean Environment**	Modern strategies for water management for open field crops
F. Boari, M. I. Schiattone, V. Cantore, F.F. Montesano	**Effect of split-root-system water stress on physiological and morphological aspects of eggplant (Solanum melongena L.)**	Modern strategies for water management for open field crops
F. Boari, V. Cantore, M. I. Schiattone, F. F. Montesano	**Effects of particle film technology on tomato under salinity stress**	Modern strategies for water management for open field crops
A. Elia, G. Conversa	**The DSS GesCoN for managing irrigation and fertilization in vegetable crops. Application in processing tomato crop in southern Italy**	Modern strategies for water management for open field crops

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