



Efficient Irrigation Management  
Tools for Agricultural  
Cultivations and Urban  
Landscapes

# IRMA

## Supply and installation of new meteorological stations

WP: 5

Action: 5.4

Deliverable: 5.4.2

**“Scientific support for the installation of network Meteorological Stations”**

Part I. Assessment Report for the Support Actions of the Contracting Authority in the installation, connection and operation of the Network Meteorological Stations



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Innovative Solutions

Place and time: Thessaloniki, July 2015.



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## Publication info

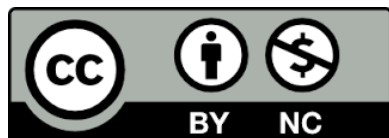
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### WP: 5 Irrigation management tools

#### Deliverable: 5.4.2 Supply and installation of new meteorological stations

#### “Scientific support for the installation of network Meteorological Stations”

The work that is presented in this ebook has been co-financed by EU / ERDF (75%) and national funds of Greece and Italy (25%) in the framework of the European Territorial Cooperation Programme (ETC.P) GREECE-ITALY 2007-2013 ([www.greece-italy.eu](http://www.greece-italy.eu)): IRMA project ([www.irrigation-management.eu](http://www.irrigation-management.eu)), subsidy contract no: I3.11.06.



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### **A.1 Crossborder Programme**

The Crossborder European Territorial Cooperation Programme “Greece- Italy 2007-2013” was approved by the European Commission on 28/03/2008 by Decision C (2008) 1132/28/03/2008.

The total budget for the programme amounts to 118,606,893 €, of which 29,651,723€ (25%) come from national funds, whereas 88,955,170 € (75%) come from the European Regional Development Fund (ERDF). Eligible areas of the programme are the Regions of Western Greece (Prefectures of Aetolokarnania and Achaia), of Ionian Islands (Prefectures of Corfu, Lefkada, Kefalonia and Zante) and of Epirus (Prefectures of Ioannina, Preveza and Thesprotia) in Greece, as well as the Region of Puglia in Italy (Provinces of Bari, Brindisi and Lecce). The Prefectures of Ilia and Arta in Greece and the Provinces of Taranto and Foggia in Italy are included in the Programme as adjacent territories.

The general objective of the Programme “Greece- Italy” is “to strengthen the competitiveness and territorial cohesion in the area towards the sustainable development by linking the potential on both sides of the cross-border maritime line”.

This general objective shall be achieved through the following strategic objectives:

- Strategic Objective 1: Support for sustainable economic growth by focusing on common comparative advantages
- Strategic Objective 2: Improvement of the accessibility potential to networks and services in the cooperation area, so as to enhance mobility of people and goods
- Strategic Objective 3: Improvement of the quality of life, preservation and effective management of the environment and increase of the social and cultural cohesion

## **A.2 Scope and Objectives of the Act**

The Decentralised Administration of Epirus- Western Macedonia/ Directorate of Agricultural Affairs of Epirus announces Clipboard Competition with subject the award of the project: “PROVISION OF SUPPORTING SERVICES FOR THE IMPLEMENTATION OF THE SUB-PROJECT OF THE DECENTRALISED ADMINISTRATION OF EPIRUS & WESTERN MACEDONIA IN THE FRAMEWORK OF THE ACT ‘EFFICIENT IRRIGATION MANAGEMENT TOOLS FOR AGRICULTURAL CULTIVATIONS AND URBAN LANDSCAPES’ ”.

The corporate structure involves the TEI (Technological Educational Institute) of Epirus, the Decentralised Administration of Epirus- Western Macedonia, the Region of Puglia, the Development Association of the Region of Western Greece, the Institute of Agricultural Economy of Italy and the Research Institute of Food Production of the National Research Council of Italy.

### **A.2.1 Intervention Area of the Act**

#### **Municipality of Arta**

The city of Arta constitutes the administrative, economic and cultural center of the homonymous Regional Unit, having formed a different culture, different from the one cultivated by the mountainous populations of Tzoumerka. Different civilisations have left their own indelible marks on architecture, cultural tradition and identity of the settlements of the Unit.

Two magnificent rivers, Arachthos and Louros, flow through it, while their deltas cross and pour into the Amvrakikos Gulf. The latter is the natural southern border of the Prefecture of Arta and forms a spectacular landscape, which consists of exceptionally beautiful wetlands and of the lagoons of Logarou and Tsakalou. This is the shelter for swans and flamingos, among others.

Arta is located in the midst of the chain of urban centers of the north-western part of Greece, which constitute a network of sites endowed with particular natural, ecological, historical archaeological and cultural interest. This axis of urban centers shall essentially constitute the road communication axis of the country with Albania and Italy as well (Ionian Road- Egnatia- Port of Igoumenitsa).

The historical center of the city, the clock of the castle and the surrounding districts lend a particular character to the city. In Arta, art and culture thrived, while the

economic growth gradually provided the city with several educational institutions, churches and monasteries, mansions, newly built roads, often as a result of local benefactors' donations.

Nowadays, Arta is a modern city with Technological Educational Institutes, museums, libraries, many cultural groups and choirs and, of course, the largest stone bridge of the country as its trademark. On the other side, populations of mountainous Tzoumerka developed a special lifestyle based on livestock, trade, constructions and crafts. Populations of the surrounding villages of the valley had been producers and caterers of the entire R.U. of Arta for centuries, in fact exporting various agricultural products to the rest of the country and abroad.

Nowadays, cultivations are constantly decreasing, whereas activities related to the Secondary and Tertiary Sector are being multiplied.

### **Municipality of Nikolaos Skoufas**

The Municipality of Nikolaos Skoufas was established in 2011, after the implementation of "Callikrates" Programme. Its headquarters is located in Peta, while its historical headquarters is in Kommemo. The current municipality was formed after the integration of the municipalities of Peta, Arachthos and Kompoti and the community of Kommemo.

The Municipality bears great historical significance and it is named after the national hero and founder of "Filiki Etairia" (Friendly Society), Nikolaos Skoufas, who was born in Arta and dedicated his life to the idea of revolution of the Nation.

Moreover, several places of the Municipality are engraved in bold within the pages of modern history of the country. Important historical events that took place in this area is the battle of Peta on July 4, 1822 with the sacrifice of Greek and foreign volunteer philhellenes, the struggle against the Ottoman Rule and the Holocaust of Kommemo on August 16, 1943 with the massacre of 317 civilian victims of the Nazi troops.

In the mountainous northern part of the Municipality stands the capital, Peta, with the traditional square, the church of Saint George, the Monument of foreign Philhellenes, the Monastery of Virgin Mary, the Folklore Museum and the exquisite lake of Pournari with the panoramic view of Arta and the Amvrakikos Gulf.

The semi-mountainous region of the Municipality, full of greenery, is completed with the settlements Kleisto, Zygos, Markiniada, Megkla and Melas and offers spectacular lake view.

Following a stroll through the Municipality, one comes across the rapidly growing village of Agios Dimitrios with its charming square, the traditional village Neochoraki with stone houses, the lovely city of Amfithea and the picturesque city of Megarchi.

In the central part of the Municipality there is the settlement of Kompoti, featuring the following sites: Nikolas Skoufas' statue, Turkish guardhouses, the port, the Environmental Center in Kopraina and the old churches of Saint George and of the "Assumption" of Virgin Mary in Sellades. Traditionally built on the opposite hil, lies Peranthi with its huge plains of Arta and the Amvrakikos Gulf.

The southwestern part of the Municipality, which is flat and is crossed by the river Arachthos, is full of scattered rural settlements.

On the opposite side, next to the basin of Arachthos, one may find Neochori and the waterside park, the picturesque beach Platanaki and lagoons.

The villages Pachykalamos, Akropotamia, Anthotopos, Agia Paraskevi and Kolomodias complement the lovely landscape.

### **Region of Puglia**

The Region of Puglia borders with the Region of Molise to the north , with Campania and Basilicata to the west, while it is washed by the Adriatic sea to the northeast and by the Ionian Sea to the southwest.

Puglia covers an area of 19,366 square km and its population amounts to 4,072,839 residents.

It is the Region with the least mountainous lands in Italy (2%), whereas large part of its territory is located at an altitude between 100 and 300 meters.

From hydrographic aspect, the Region of Puglia is passed through by various minor rivers, among which the most important one is Ofanto, having a length of 170 kilometers. The largest lakes are the ones of Lesina and Varano, to the north.

Major cities of the Region of Puglia are Bari, Foggia, Brindisi, Lecce and Taranto.

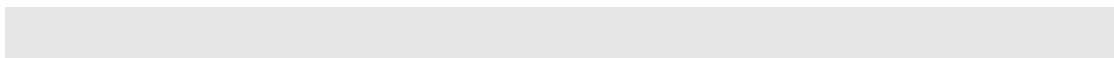
### **A.2.2 Objectives of the Act**

The general objective of IRMA is to develop, implement and promote effective irrigation management tools and techniques in rural and urban environments. Other specific objectives of the Act are:

- the development of networking and other expertise transfer mechanisms;
- the research on local irrigation practices;
- the creation, implementation and evaluation of control procedures for irrigation systems;
- the development, implementation and evaluation of a fully functional Information System, which shall provide information about plant water needs, as well as tools and practical instructions on irrigation scheduling and irrigation planning/management systems;
- scientifically documented knowledge on drought-resistant crops/ varieties, sensors and irrigation management systems, as well as alternative water sources for agricultural and urban irrigation;
- actions for the diligent and cautious establishment of public, professional training/ certification on strategies and methods for efficient irrigation management.

### **A.3 Scope and Objectives of the Act**

Within the scope of installing and connecting Meteorological Stations, the Contractor has undertaken the obligation to support the Contracting Authority throughout the whole process, from the receipt of the equipment up to the operation of the Stations.



## **B** INSTALLATION OF METEOROLOGICAL STATIONS IN NETWORK IN THE AREA OF EPIRUS

### **B.1** General info

One of the major results of the implementation of the IRMA Project for the Intervention Area is undoubtedly the installation of a network of meteorological stations at selected points. These stations shall give local farmers the opportunity to have a complete image of the evolution of weather conditions, while planning their actions according to them. In addition, research institutions and organisations shall have the chance to carry out measurements and calculations, using validation.

The Decentralised Administration of Epirus and Western Macedonia, taking into account the objectives of the IRMA Project and in consultation with the other partners, has proceeded to the Declaration 57585/1782 on 05/09/2014 for finding the appropriate equipment for meteorological stations, so as to multiply the benefits of its installation for residents of the Intervention Areas.

According to the above, it has been decided that the newly established network of meteorological stations would include three different types of stations. Specifically:

- a) Six wireless (UHF) reference stations of high precision (Type A)
- b) Nine online stations of high precision (Type B)
- c) Five online stations of medium precision (Type C)

After the completion of the Declaration process, three different types of meteorological stations were selected, each of which corresponds to a type. Specifically, the following types were selected:

Type A: ADCON A753

Type B: DAVIS VANTAGE PRO 2

Type C: SYMMETRON STYLITIS 10

The features of each of the three types, as well as their compliance with the formalities of the Declaration 57585/1782 is reference object of the Deliverable “3.2 One (1)

Evaluation Report on the installation of Meteorological Stations” of this project and, therefore, it will not be further referred to in this Report.

## **B.2 Actions supporting the process of installation, connection and operation on behalf of the Contractor**

The Contractor provided supporting services to the Decentralised Administration of Epirus and Western Macedonia throughout the course of installation, connection and operation of meteorological stations. In cooperation with specialised personnel (meteorologist) with years of experience in the operation of respective networks, the Contractor has ensured the optimum support for the Body.

It is noteworthy that there has been contact with the supplier of the technical equipment, always in consultation with the Decentralised Administration, in order for him to certify the features, the functionality and the credibility of the plants.

### **B.2.1 Technical Meetings**

#### **B.2.1.1 First Technical Meeting**

The first meeting between the parties involved in the installation and operation of the plants took place on 29/01/2015 at the premises of the equipment supplier (SCIENTACT company) in Thessaloniki. The meeting took place following an initiative of the Decentralised Administration of Epirus and Western Macedonia (DAEWM) and after the consent of all attending partners. Present were the following representatives of the Decentralised Administration and the equipment Contractors, as well as its technical support services Contractors.

<b>NAME</b>	<b>CONTACT NUMBER</b>	<b>BODY</b>
Filis Vaggelis	2651090267	DAEWM
Toufidis Pantazis	2651090263	DAEWM
Kouvas Dimitrios	6945873501	SCIENTACT
Mamanis Giannis	6944733216	SCIENTACT

Pitidis Vangelis	6975858456	HYPERCO
Rammos Nikolaos	6983522806	HYPERCO
Kotoula Maria	6939475481	HYPERCO
Pantziou Konstantina	6971974661	HYPERCO

The meeting agenda included the following:

1. Detailed discussion about the meteorological equipment to be received by the DAEWM in the framework of the Project.
2. Clarification of the sites where such equipment is to be placed, as well as of Underwriters' role to support the installation process of the stations.
3. Clarification of the features of each type of plant.
4. Scheduling of in-spot inspection of the sites where the stations are to be placed.

After a comprehensive discussion among all participants in the meeting, they concluded in a plan to launch the implementation of the Project activities. This specific plan included the scheduling of a site visit to the areas where it was agreed to place meteorological stations, as well as the overall cooperation among all involved parties. Furthermore, it was decided that the SCIENTACT Company should administer technical brochures and certificates to the Body, which would certify the operational potentials of the plants, with the help of specialised staff of its Contractor.

Technical meetings concerning the installation, connection and operation of the plants took place several times also at the premises of the Decentralised Administration of Epirus and Western Macedonia, many of which were informal and relied on the close relation between the Body and the Contractor. Representatives of the Contractor were at all times ready to offer their services to the Body, whenever requested, while its specialised staff had phone or online contacts to clarify any problems that arose.

On the other side, the Contractor had continuous communication with the supplier of the meteorological equipment, both by phone and e-mail, as well as in personal meetings. The cooperation between the two sides is characterised as excellent, as there was mutual respect and convergence of views.



### B.2.1.2 Second Technical Meeting

The second Technical Meeting in the context of the Body- Contractor cooperation for the implementation of the Project was held on 23/6/2015 at the premises of the Directorate of Rural Affairs of the Decentralised Administration of Epirus and Western Macedonia. Present were the following ones:

<b>NAME</b>	<b>CONTACT NUMBER</b>	<b>BODY</b>
Filis Vangelis	2651090267	DAEWM
Toufidis Pantazis	2651090263	DAEWM
Papiggioti Eleonora	6973316179	DAEWM
Vartzioti Fotini	2651090255	DAEWM
Kasioumi Maria	2651090267	DAEWM
Pitidis Vangelis	6975858456	HYPERCO
Ramos Nikolaos	6983522806	HYPERCO
Kotoula Maria	6939475481	HYPERCO
Koliou Vicky	2651065600	HYPERCO
Sforos Spyros	6945934837	HYPERCO

During this particular meeting, there was an update on the part of the Contractor on the Deliverables related to the installation and operation of the meteorological stations, which were being finalised. Moreover, all parties agreed that an additional visit to the mounting areas of the plants would significantly contribute to the deduction of more comprehensive results about the functionality and sustainability of the network.

The Contractor drew and sent to all participants detailed Reports with records of all the technical meetings held.

## B.2.2 In situ visits to the area

### B.2.2.1 First Visit

As participants agreed in the technical meeting of 29/01/2015, an in situ visit took place in the sites selected for the installation of the meteorological equipment on 05/02/2015. Present at the visit were representatives of the Decentralised Administration, as well as of the Underwriters of the equipment and of the technical support services.

The meeting agenda included the following topics:

1. In situ inspection of some spots where the meteorological equipment was to be installed.
2. Detailed examination of the site, so that the most adequate mounting location of the meteorological equipment could be identified.
3. Eligibility criteria were the sustainability of the plants (protection- security of materials), the infrastructure for continuous operation and uninterrupted data transmission, as well as the topography of the area.

Participants visited selected locations of the Regional Unit of Arta, where they agreed to install meteorological equipment. At each spot, the most appropriate mounting location of the equipment was looked for, given the morphology of the ground, the orientation and the particularities of the place. In addition, the existing infrastructure and the possibility of their exploitation for the operation of meteorological stations were examined. Finally, excluded were the cases in which the morphology of the ground and the activities carried in the area could affect the operation of the plants.

Specifically, the following positions were inspected:

Area	Location	Type of Plant
Pantanassa	Creamery “Pappas Bros.”	DAVIS VANTAGE PRO 2
Kampi	Butchery “Kokkalis”	ADCON A753
Vlacherna	Nursery “Vitsios”	SYMMETRON STYLITIS 10
Kompoti	Poultry house “Giannoulis”	ADCON A753

Megarchi	Elementary School of Megarchi	SYMMETRON STYLITIS 10
Foteino	Community Bureau	DAVIS VANTAGE PRO 2
Kalogiros Bridge	Nursery “Giozgatoglou”	DAVIS VANTAGE PRO 2
Agios Spyridonas	Greenhouses “Apostolidis”	ADCON A753
Kalovatos	Local Organisation of Land Reclamations of Kalovatos (TOEV)	DAVIS VANTAGE PRO 2
Kostakioi	Technological Educational Institute of Arta	DAVIS VANTAGE PRO 2

Additional visits to the mounting locations of the rest of plants were performed in other periods of time, in which the Contractor had constant presence and opinion on the adequacy of each of them and on the infrastructure projects probably needed to ensure the sustainability of their operation.

Lastly, the following representatives per organisation attended this visit:

<b>NAME</b>	<b>CONTACT NUMBER</b>	<b>BODY</b>
Filis Vangelis	2651090267	DAEWM
Toufidis Pantazis	2651090263	DAEWM
Kouvas Dimitrios	6945873501	SCIENTACT
Mamanis Giannis	6944733216	SCIENTACT
Trompoukis Efthymios	6945203675	HYPERCO
Ramos Nikolaos	6983522806	HYPERCO

### **B.2.2.2 Second Visit**

Following the first visit to the mounting locations of meteorological stations, another visit to the stations not easily approached during the first visit was considered appropriate from all aspects.

For this reason and following an initiative of the Decentralised Administration of Epirus and Western Macedonia, participants conducted a second visit on 03/03/2015 to selected plants in the valley of Arta, where they inspected the sufficient

accomplishment of the pursued targets, as drawn in the scheduling of the Project. Full data of the visit: the agenda included:

1. In situ inspection of spots where the meteorological equipment was to be installed.
2. Detailed examination of the site, so that the most adequate mounting location of the meteorological equipment could be identified.
3. Check of the installed equipment.

The locations tested were the following ones:

<b>Area</b>	<b>Location</b>	<b>Type of Plant</b>
Flampoura	Eurofarm SA	DAVIS VANTAGE PRO 2
Aneza	Photovoltaic Park of Pavlos	SYMMETRON STYLITIS 10
Vigla	Pumping station of GOEV (General Organisation of Land Reclamations)	ADCON A753
Glykorizo	Sewage Station of DEYAA (Public Enterprise for Water Supply and Sanitation)	SYMMETRON STYLITIS 10
Psathotopi	Aeroclub of Epirus	DAVIS VANTAGE PRO 2

During the visit, spot inspection of the positions and installation of plants were conducted, wherever it was possible. The conclusions of the visit are summarised below :

#### **Eurofarm SA- Flampoura**

The group of experts examined the premises of Eurofarma SA and concluded that the necessary prerequisites for the installation of equipment are fulfilled, while the site is adequately fenced. However, it was detected that internet connection lacked, but it would be promptly restored, as company managers assured. Lastly, the plant was immediately established in the site.

### **Photovoltaic Park of Pavlos - Aneza**

During a check conducted at the spot and the premises, it was revealed that the mounting location is appropriate for the establishment of the plant, the internet access –however-was weak. Company technicians restored this problem immediately.

### **Pumping station of the General Organisation of Land Reclamations (GOEV)- Vigla**

Premises of GOEV fulfill the necessary prerequisites for the mounting of meteorological equipment, while there is already properly fenced place that could be used. The deforestation of the fenced area would increase the smooth operation of the station. The company committed to install the meteorological equipment on the same day.

### **Sewage Station of Arta- Glykorizo**

The area fulfills the prerequisites of mounting of the meteorological equipment and it will be installed promptly.

### **Aeroclub of Arta- Psathotopi**

The premises of the Aeroclub of Arta, due to the existence of relevant infrastructure, constitute ideal mounting location of the meteorological equipment. Additionally, at the premises of the Aeroclub there is a fenced area, selected for the immediate installation of the plant.

### **B.2.3 Operation of the meteorological stations**

After the installation and connection of the plants, process during which the Contractor was continuously updated on the course of implementation, the stations began to broadcast the first results of their measurements. These results are included in the Deliverable 3.4 “One (1) Report on pilot operation of the Network of Meteorological Stations”, which also includes the assessment of the efficient/ non efficient operation of the network.

The supplier of the meteorological equipment bares the responsibility of its maintenance, whereas the Decentralised Administration of Epirus and Western Macedonia, in cooperation with the LP Project, conducts the continuous monitoring of its results.



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