CURRICULUM VITAE

01 / 09 / 2014

A. Personal Details

Name:	George
Surname:	Dimokas
Father's Name:	Christos
Date of Birth:	19 September 1976
Tax Identification Num.	120405716
Work Address/ Zip Code	Antikalamos, Kalamata / 24100
Phone Number	+302421045055
e-mail	gedimokas@teikal.gr,gedimokas@gmail.com
Current Position.	Lecturer at T.E.I. of Peloponnese

Dr. George Dimokas was born in Thessaloniki, Greece in 1976. He received B.Sc., at Agronomist, M.Sc and PhD. from University of Thessaly - School of Agricultural Sciences - Department of Agriculture Crop Production and Rural Environment, Volos, Greece, in 2001, 2003 and 2009, respectively. Between the years 2002 and 2004 he worked at Prefectual Authority of Magnesia as Agronomist responsible for several National and European projects. He spent two months (June & July 2007) as a visiting researcher at the Department of INRA, Institut National de la Recherché Agronomique at Avignon, France. He has more than 10 years experience in Research activities in the fields of: i). greenhouse management, ii). climate control, iii). crop development and production, iv). development decision support systems, v). irrigation management, vi). development of climate and biological simulators. He has published more than 25 papers in journals and conference proceedings and he has 52 citations in this field. Additionally he has more than 3 year teaching experience in Technological Education.

Dr. George Dimokas establish in November 2011 A.F.C. as a personal business in Agriculture Farm Sector in order to offer services in the elaboration of Agricultural, Geotechnical & Environmental Studies, with indicative areas of activity: 1. Installation of young farmers, 2. Modernization of agricultural holdings, 3. Agro-environmental funding: 'Organic farming', 4. Agro-environmental funding: "Organic Livestock", 5. Agro-environmental funding: 'Protection of nitrate-sensitive areas", 6. Agro-environmental funding: "Conservation of endangered indigenous livestock breeds", and others. A.F.C. is a consultancy company (at Thessaly-Volos) that is having a cooperation with more than 300 growers that are producing agriculture products such as: corn, cotton, wheat, barley, clover, industrial tomato, vetch, oats, olives, olive oil, apples, chestnuts, almonds, lentil, kiwi, vegetable crops and flowers. Most of the producers are from Magnesia (90%) and 10% from Larissa, Pella, Pieria. From 19 / 06 / 2014 is staff of Technological Ekpaideutiko Idrima, of Peloponnese as a Lecturer Professor with subject "Greenhouse Crops and Floriculture".

The programming period 2004-2021 presents a great opportunity to boost Greek agriculture competitiveness, improve the environment and broadly develop a country's rural areas through financing support supplied by the European Agricultural Fund for Rural Development (EARFD). The rural development policy for Greece is implemented through the Rural Development Program 2014-2021 (RDP) focusing on the following Axes:

- Improvement of the Competitiveness of the Agricultural and Forestry Sector
- Improvement of the Environment and the Countryside
- Quality of Life in Rural Areas and Diversification of the Rural Economy
- Implementation of LEADER Approach

B. Degrees – Scholarships - Certifications

- 22 / 9 / 1995 – 31 / 10 / 2001. Bachelor of Science: University of Agriculture Crop and Animal production. University of Thessaly, Department of Agriculture, Crop Production and Agricultural Environment, http://www.agr.uth.gr
- 1 / 2 / 2002 – 13 / 11 / 2003. Master of Science: University of Thessaly, School of Agricultural Sciences, Interdepartmental Program of Postgraduate Studies: "Modern systems of Agricultural Production in the Mediterranean, with emphasis on Sustainable Production and Use of Novel Technologies. University of Thessaly, Department of Agriculture, Crop Production and Agricultural Environment, http://www.agr.uth.gr/pms/pms_gr.html
- 27 / 1 / 2004 – 01 / 07 / 2009. Philosophy Degree: «Development bio-physical simulator of tomato crop for climate management optimization in Mediterranean greenhouses during winter period» University of Thessaly, Department of Agriculture, Crop Production and Agricultural Environment, http://www.agr.uth.gr/pms/pms_gr.html
- Scholarship ITEMA (Institute of Technology and Management of Agricultural Ecosystems) of CERETETH 2010.
- Scholarship from Research Committee of TEI Thessaly (Institute of Technology and Management of Agro-ecosystems) 2013-14.
- 10 / 1 / 2003 – until today. License as Agriculturist from the Geotechnical Chamber of Greece with License Number **A.M.: 1-15278.**
- 1 / 5 / 2010 – until today. License as Agriculturist from the Geotechnical Chamber of Cyprus with License Number **A.M.: 857.**
- 29 / 12 / 2006 – until today. Certified "Field Officer" of GEO.TE.E. Geotechnical Chamber of Greece. License Number **A.M.: DCS – 1175.**
- 22 / 11 / 2006 – until today. Bachelor Scholar of the Ministry of Environment and Public Works Class A for categories 25 (Projects landscaping) and 27 (Environmental Study). Ministry of Development, Infrastructure, Transport and Networks, License with License Number **A.M.: 19121.** http://www.ypex-mele.gr/searchEponimo.asp
- 12 / 2 / 2008 – until today. Certified "Field Officer" of AGROCERT. Certification Body and Inspection of Agricultural Products (AGROCERT). License Number **A.M.: 0098.** http://www.agrocert.gr/pages/category.asp?catID=62
  - Environment
  - Public Health, Plant Health
  - Good Agricultural and Environmental Practices
- 4 / 7 / 2008 – until today. Certified "Import Registry Adult Educators" from EOPPEP. National Board Certification Qualifications and Vocational Guidance with License Number **A.M.: 21453** http://www.eoppep.gr/index.php/el/search-for/adult-educators
  - General Register of Adult Trainers
  - Register of Trainers Training SA (IEK-HPC)
  - Trainers register OGEEKA "Dimitra"
- 14 / 09 / 2009 – until today. Registered in the Main Register of Trainers Adult Ministry of Education with specializations:
  - Crop Production
  - Management of Environment & Natural Resources
  - Sustainable Development Greenhouse Crops and Floriculture

- 15 / 12 / 2010 – until today. Registered in the Register of the Principal Faculty EKDDA. Specialties:
  - Environment / Infrastructure
  - Training / Education
- 1 / 1 / 2014– until today. Registered in LAEK of OAED.

C. Extra Education

As part of my obligation to obtain the PhD successfully completed the following courses.

- Topics agricultural structures
- Topics Soil Science
- Topics agricultural engineering

Seminar "computer training" 400 hours of the Research Committee of the University of Thessaly: Microsoft Office 2000 (Word, Excel, Power Point, pointing to Access, Photoshop, Corel Draw, Toll book, Internet, Front Page, Pascal, Visual Basic, Introduction to Computers, introduction to Networks, introduction to Programming, computer Applications in Education). The program was implemented by 12/02/2002 - 02/05/2002 by the Research Committee of the University of Thessaly.

Seminar 400 hours in CVT courses: "Modern Organic Farming" as part of "Training unemployed Certified Vocational Training", with 190 hours of theoretical training and 210 hours of practical training. The program was implemented by 01/02/2005 - 12/05/2005, the Vocational Training Center "KEKANAM SA".

Seminar 100 hours in Continuing Professional Training "Research methodology" as part of the Program of Research (PENED 2003) Competitiveness Operational Program, Measure 8.3, Action 8.3.1. - Third Community Support Framework. The program was implemented by 07/09/2007 - 28/09/2007, from the Research Committee of the University of Thessaly.

Seminar 40 hours Program Strengthening Human Resources for SMEs on Extraversion, Action 2 "Training for the development of human resource skills of SMEs on Extraversion," as part of the Operational Program "Human Resources Development". The program was implemented by 03/07/2013 - 29/07/2013, of the HMA - Seve.

D. Professional Experience

- 13 / 2 / 2002 - 30 / 4 / 2002. Agronomist responsible for the cultivation in project with the title: “Development of new UV-films as new greenhouse covering materials in order to decrease the population of the insects”. PLASTIKA KRITIS S.A., Hrakleio, http://www.plastikakritis.com.
- 14 / 6 / 2002 – 30 / 11 / 2002. Agronomist, Responsible sector for Dacus Oleae Address of Ministry of Rural Development and Food, Prefectual Authority of Magnesia, http://www.pthes.gov.gr/main.aspx?catid=115
- 22 / 8 / 2003 – 21 / 8 / 2004. Agronomist responsible for Administrative and local control of projects OSDE and Equational Compensation. Contribution in database development in projects: Equational Compensation, Organic farming Address of Ministry of Rural Development and Food, Prefectual Authority of Magnesia, http://www.pthes.gov.gr/main.aspx?catid=115
- 1 / 6 / 2007 - 15 / 7 /2007. Agronomist – Work Contract. L'objectif de son séjour chez nous est de finaliser la validation du modèle de culture de tomates (TOMGRO modifié) et d'étudier des algorithmes d'optimisation (notamment en apprentissage

par renforcement) pour préparer leur utilisationINRA Institut National de la Recherche Agronomique, http://www.avignon.inra.fr

- 1 / 7 / 2005 - 30 / 6 / 2008. Agronomist – Work Contract. Agronomist – Work Contract. Work in 03ED526 research project, implemented within the framework of the "Reinforcement Program of Human Research Manpower" (PENED) that is co-financed by National and Community Funds (25% from the Greek Ministry of Development-General Secretariat of Research and Technology and 75% from E.U.-European Social Fund).Title of the project: "Optimization climate management during winter period in Mediterranean greenhouses". Research Committee, Argonauton and Fillelinon, http://www.uth.gr
- 1 / 2 / 2008 - 30 / 6 / 2008. Agronomist – Work Contract. "Work in research project founded by the General Secretariat for Research and Technology of Greece, under the framework of the Bilateral Greek-Egypt agreement with the title "Development of an e-tool for calculating the irrigation needs in Mediterranean greenhouses". Research Committee, Argonauton and Fillelinon, http://www.uth.gr
- 1 / 7 / 2005 - 7 / 7 / 2011. Contribution in Agriculture and Environmental advisement's: 1. Installation of young farmers, 2. Modernization of agricultural holdings, 3. Agro-environmental funding: 'Organic farming', 4. Agro-environmental funding: "Organic Livestock", 5. Agro-environmental funding: 'Protection of nitrate-sensitive areas", 6. Agro-environmental funding: "Conservation of endangered indigenous livestock breeds", and others.
- 1 / 10 / 2009 έως 2 / 7 /2010. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture and TEI of Larisa. Courses: i). Environmental Control of Agricultural Installations, ii). Horticulture, iii) Evergreen Fruiting Trees. http://www.teithe.gr/ , http://www.teilar.gr.
- 1 / 10 / 2010 έως 4 / 7 /2011. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture and TEI of Larisa. Courses:). Environmental Control of Agricultural Installations, ii). Horticulture, iii) Evergreen Fruiting Trees. iv) Floriculture and Landscaping, v) Growing Horticulture Plants http://www.teithe.gr/ , http://www.teilar.gr.
- i1 / 10 / 2010 - 31 / 05 / 2011. Agronomist – Work Contract. Project Title: **LIFE+** "Adapt agricultural production to climate change and limited water supply" TEI of Larisa, http://www.teilar.gr.
- 1 / 5 / 2011 - 31 / 12 / 2011. Agronomist – Work Contract. Project Title: "**SIRRIMED**" (KOI. 210002) με τίτλο "Sustainable use of Irrigation Water in the Mediterranean Region" CERETETH, http://www.cereteth.gr/
- 3 / 11 / 2011 έως 20 / 2 / 2012. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture. http://www.teithe.gr/
- 2 / 11 / 2011 until today. Owner of A.F.C. as a personal business. Contribution in Agriculture and Environmental advisement's: 1. Installation of young farmers, 2. Modernization of agricultural holdings, 3. Agro-environmental funding: 'Organic farming', 4. Agro-environmental funding: "Organic Livestock", 5. Agro-environmental funding: "Protection of nitrate-sensitive areas", 6. Agro-environmental funding: "Conservation of endangered indigenous livestock breeds", and others.
- 2 / 11 / 2011 until today. Staff of Technological Ekpaideutiko Idrima, of Peloponnese as a Lecturer Professor with subject "Greenhouse Crops and Floriculture".

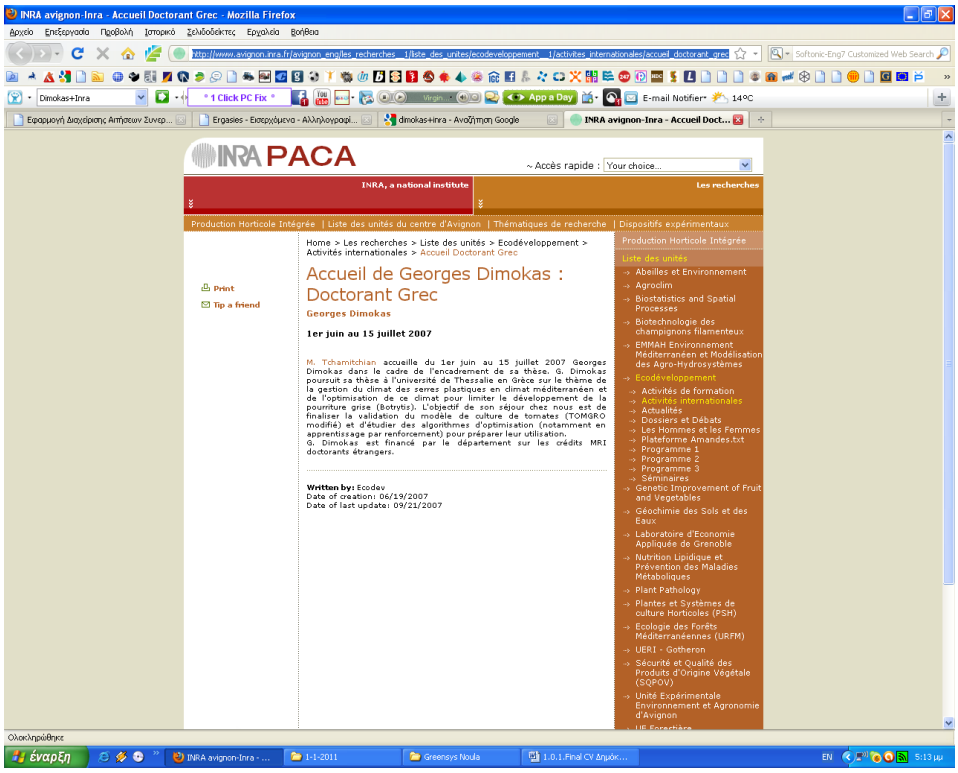
E. Teaching Experience

- 1 / 10 / 2009 έως 2 / 7 /2010. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture and TEI of Larisa. Courses: i). Environmental Control of Agricultural Installations, ii). Horticulture, iii) Evergreen Fruiting Trees. http://www.teithe.gr/ , http://www.teilar.gr.
- 1 / 10 / 2010 έως 4 / 7 /2011. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture and TEI of Larisa. Courses: i). Environmental Control of Agricultural Installations, ii). Horticulture, iii) Evergreen Fruiting Trees. iv) Floriculture and Landscaping, v) Growing Horticulture Plants http://www.teithe.gr/ , http://www.teilar.gr.
- 3 / 11 / 2011 έως 20 / 2 / 2012. Assistant Professor (not permanent). TEI of Thessaloniki Course: Horticulture. http://www.teithe.gr/

F. Research Activity

My research activity started in 2001, the year in which I was received by the Graduate Program of the Department of Agriculture, Crop and Animal Production, University of Thessaly as a graduate student and continued from 2004 until the end of June 2009 as a PhD candidate in the Department of Agricultural Structures and Environmental Control of the University of Thessaly. An important part of my research conducted under National and European programs of the Laboratory of Agricultural Structures and Environmental Control Department of Agriculture Crop Production and Rural Environment, University of Thessaly.

A small part of my research activity conducted at INRA in Avignon (INRA Institut National de la Recherche Agronomique of France under the research program. During my research activity in the above research institute worked on the development of simulation software development and production of growing tomato plants in greenhouses and climate control emissions using automated systems.



From my research activity resulted original research papers which were published in international journals or announced at international and national conferences. The objects of my involvement in research projects in which I participated as well as general items these are discussed below.

Research activity continued after the acquisition of a doctorate by participating in several research projects or by delegating work to perform part of the work either in the form of scholarship.

Research Activities, Operational Projects and Published Work

Research Projects

- Contribution in three (3) European Research Projects
- Contribution in one (1) Transnational Research Project
- Contribution in two (2) National Research Projects.

Operational Projects

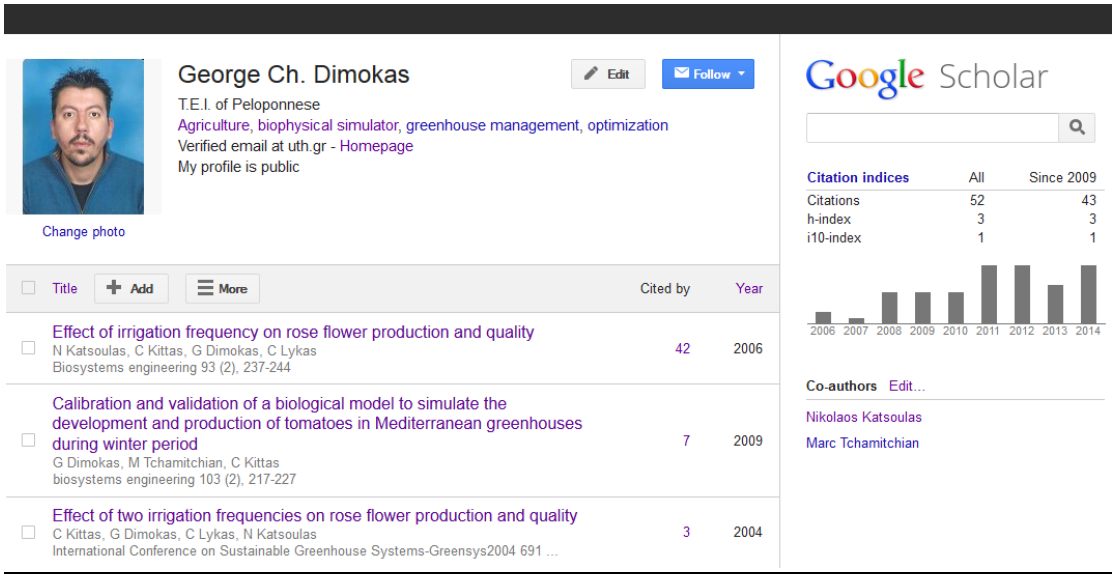
- Contribution in thirteen species (13) of Operational Projects

Published Theses - Scientific Notes

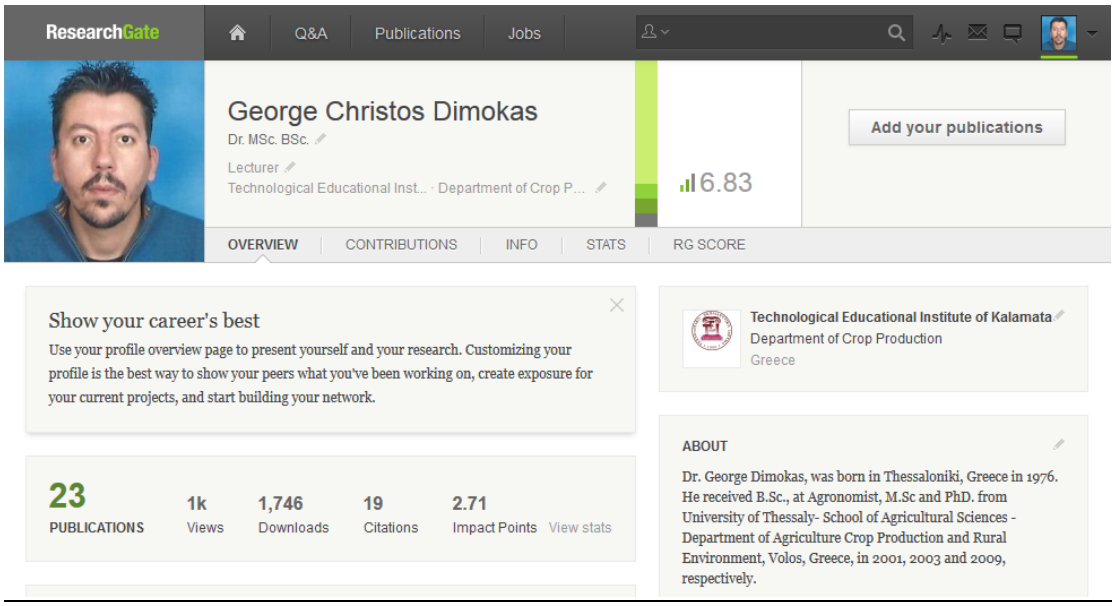
- Bachelor Theses (2001)
- Master Theses (2003)
- PhD Theses(2009)
- Scientific Notes "Integrated heating greenhouses with alternative forms of energy" University of Thessaly (2003)
- Scientific Notes "Robotics and harvesting machines horticulture greenhouse units' University of Thessaly (2008)
- Scientific Notes "Control of Agricultural Environment Facility" ATEI Larissa (2009)
- Scientific Notes "Horticulture" ATEI Thessaloniki (2010)

Published Papers

- Three (3) paper publications in international journals.
- Three (3) papers have been submitted for publication in international journals.
- Ten (10) papers in proceedings of international conference proceedings.
- Twelve (12) papers in proceedings of national conference proceedings.



http://scholar.google.com/citations?user=tcKfjNQAAAAJ



https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

F. 1. Contribution in European Research Projects

F.1.1 Project Title: "CLOSYS: Closed System for Water and Nutrient Management in Horticulture'

Period of employment: 1/11/2001 - 31/1/2005

PLANT RESEARCH INTERNATIONAL
WAGENINGEN UR

This work was supported by the European Union under the 5th Framework support. Part of a program involving researchers from five European countries and 7 research centers and universities, implemented by the Department of Agricultural Structures and Environmental Control Department of Agronomy, University of Thessaly.

Purpose of the project was the development of a closed hydroponic system in which it will be continuous monitoring of the concentration of nutrients in the nutrient solution and the amount of water available to plants. The aim of the project was to optimize the management of nutrient solution that feeds the crop and limit the discharge of chemicals in the environment and saving water and fertilizers. Additionally, the program aimed at developing new substrates, sensors and systems for production optimization and management of the hydroponic system.

My involvement in this project was through my bachelor thesis and was to study the effect of irrigation frequency on growth and biomass production of flowers and two rose varieties in hydroponic systems. The purpose was to optimize irrigation assessment of plants and the determination of the absorption of nutrients in hydroponic rose. The above described by the project partners with the mathematical model which was based on measurements of transpiration and the content of the various plant parts (leaves, stems, flower, root) nutrient. The mathematical model

developed is applied to optimize the management of nutrient solution and for nourishment, development and production of hydroponic roses.

F.1.2 Project Title: "SIRRIMED: Sustainable use of Irrigation Water in the Mediterranean Region"

Period of employment: 1/5/2011 - 31/12/2011

This work was supported by the European Union under the 6th Framework support and involved researchers from 15 research centers and universities. Partner country was CERETETH.

Purpose of the program was the proper use of water in the Mediterranean region, in order to propose the Integrated Management of Irrigation Water level to: a). Farms, b). Area Irrigation, c). Basin. Program parts were: **WP1.** "Keys" to save water by using new techniques and technologies of irrigation at the farm level, **WP2.** Knowledge of appropriate practices at farm level, **WP3.** Region characterization & benchmarking, **WP4.** Development Information System by region, **WP5.** Development Information System for Catchment basins, **WP6.** Economic impact analysis using new approaches to reduce water consumption and better management, **WP7.** Dissemination of information and transfer of knowledge and technology, **WP8.** Management activities.

Mr. George Chr. Dimokas involve to the project most by dealing with the characterization of the region Lake Karla & benchmarking, in order to propose the best management practices in the region and simultaneously provide interested parties an appropriate method to assess the performance of irrigation means the process of 'benchmarking'. For this purpose, data were collected: 1). Climate of the region, 2). Soil properties, 3). Water quality, 4). Irrigation systems & water transport infrastructure, 5). Agronomic characteristics, crop, 6). Irrigation and water balance - culture, 7). Dynamic soil and cultivation, 8). Quantity & quality products, 9) Economic Data.

F.1.3 Project Title: "Transnational network for SME support in the animal breeding and horticulture sector"

Period of employment: 1/5/2013 έως 30/11/2013

This work was supported by the European Union under the 6th Framework support and involved researchers from eight research centers and universities. Partner country was CERETETH. Under the project the company A.F.C. of Mr. George Chr. Dimokas worked on updating the best practices developed in the framework of cooperation with enterprises of the agricultural and livestock sector. More specifically, the company A.F.C. of Mr. George Ch. Dimokas delivered elements for:

1. **Description & characteristics of the good practice**

- General description of the practice
- Description of services provided by business support organization
- Innovative elements used
- Added value elements

2. **Description of the necessary resources to assure the services**
   - Economic resources
   - Staff
   - Know-how
3. **Obstacles & success factors**
   - Technical, financial problems, knowledge barriers, etc. that have occurred
   - Adopted measures in order to overcome the obstacles
   - Success factors that facilitate service delivery
4. **Starting point and situation now**
   - (Detected necessity) identified needs and starting point
   - Current situation and results of the practice
5. **Transfer of the practice**
   - Results that can be transferred Current situation and results of the practice
6. **Documents of interest**
   - Annexed documentation
   - Miscellaneous

4. **Agriculture Farm Consulting-Greece**
Gainni Dimou 116B
Phone: +302421045055, **Fax:**
e-mail: gedimokas@gmail.com
e-mail: gedimoka@uth.gr
website: www.linkedin.com/profile/edit?trk=hb_tab_pro_top
website: www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf
Contact Person: Dr. MSc. George Ch. Dimokas

Products: 1. Installation of young farmers; 2. Modernisation of agricultural holdings; 3. Agro-environmental funding:"Organic farming"; 4. Agro-environmental funding: "Organic Livestock"; 5. Agro-environmental funding: 'Protection of nitrate-sensitive areas"; 6. Agro-environmental funding: "Conservation of endangered indigenous livestock breeds"
Example of services provided in other countries:
Greece and all Europe Union Countries

Files:

http://database.agro-start-see.eu/index.php

F. 2. Contribution in Transnational Research Project

F.2.1 Project Title: "Software development for computation of water needs for greenhouse crops in Mediterranean climate"

Period of employment: 1 / 2 / 2008 – 30 / 6 / 2008

Purpose of the project was to develop software for calculating the needs of greenhouse crops in water and its incorporation into a microcontroller for scheduling irrigation in the greenhouse. The software was originally developed for tomato crops, cucumber and rose rooted in hydroponic and soil, while there will be the possibility to adapt the software to other horticultural crops. The use of microcontroller for control of irrigation in the greenhouse is expected to improve the efficiency of use of water and fertilizer in greenhouses, to improve the quality and increase the quantity of products, to reduce environmental pollution by reducing water and deriving fertilizer from the greenhouse to reduce problems of salinity etc.

My participation in this program involved to the assessment of crop transpiration using an integrated energy balance of the crop, identify the needs of plant nutrients for the various stages of development, evaluation of production (qualitative and quantitative) and the assessment of the burden of substrates salt. The above information was possible through the microcontroller to led to a controlled

supply of water and nutrients as plant requirements so as to ensure optimum production of quality products and a high rate of water use efficiency.

F. 3. Contribution in National Research Project

F.3.1 Project Title: "Optimization of greenhouse climate in Mediterranean greenhouses during winter period"

Period of employment: 01/ 07 /2005 - 30/ 06 /2009

Purpose of this project was to develop and optimize a biophysical (physiology - biological and physical) simulators greenhouse for growing tomatoes for optimal climate management in greenhouses throughout the winter depending on the needs and goals of the producers. The development of the model was the composition of the equations describing the two sub models using programming language C++ as this method enables selection of the method of integration of differential equations in order to make the optimization of simulation. Optimizing biophysical simulators was performed using the method of branching and barrier (Branch & Bound) , enabling the identification of the different probabilities with application in simulation, is one of the most versatile methods used extensively in recent non- stationary systems with limited horizon as greenhouses. Main phases of the project were:

a) development of biophysical simulators
b) calibration and validation
c) system optimization

F.3.2 Project Title: "Establishment of specific standards for rating and branding extra virgin olive oil, based on its properties as a natural nutraceutical food"

Period of employment: 1/11/2012 - 31/5/2015

The object of the proposed project is part of improving production processes, quality control and storage of food. Extra virgin olive oil is a food that has attracted great interest of consumers because of beneficial health properties, but also for the characteristic organoleptic properties. As a result virgin olive oil with characteristics began to appear on the international market to meet the nutritional needs beyond the desire of consumers for foods of high nutritional value and with excellent qualities. It is known that the oxidation, so when it happens to the consumption of food, and when performed inside the human body, it is harmful to our health, because the oxidation reactions assist in the genesis and progression of various diseases.

F. 4. Contribution in Operational Projects

F.4.1 Project Title: "Installation of Young Farmers"
Period of employment: 01/08/2008 έως 15/08/2009
Number of Projects: Six (6)

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
Ειδική Υπηρεσία Διαχείρισης του Προγράμματος "Αγροτική Ανάπτυξη της Ελλάδας 2007 - 2013"
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

The aim of the scheme is to revitalize the rural population and the improvement of human resources to strengthen the competitiveness of the agricultural sector. In this context, followed by providing financial assistance to facilitate the establishment of young farmers under the age of 40 years who have sufficient professional capacity, installed for the first time as the head of the farm and implement business plans for the development of agricultural activities. As application period aid - application packs defined the period from 16.2.2009 to 31.12.2009 and as such the approval period after 16.2.2009 period, as specified.

F.4.2 Project Title: "Modernization of Agricultural Holdings"
Total budget: 3.265.369€
Period of employment: 21/12/2010 - 30/06/2015
Number of Projects: Twenty two (22)

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
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ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

The purpose of this project is to establish the necessary institutional framework for effective management, implementation and monitoring of aid schemes under Article 2 of this support for investment in agricultural holdings under Measure 121 "Modernization of agricultural holdings" Axis 1 "Improving competitiveness of agriculture and forestry "Program" Rural Development in Greece 2007-2013 ".

F.4.3 Project Title: "Organic Farming**"**
Number of Projects: 37 Farms – 413.3 hectares
Period of employment: 01/01/2012 - 31/12/2016

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
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"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

The aim of the action 1.1 'Organic farming' measure 2.1.4 are:
• protection of natural resources (soil, water, air) and the conservation of biodiversity
• sustainable development
• offer guarantees to consumers for safe agricultural products

F.4.4 Project Title: "Organic Livestock**"**

Number of Projects: 10 Farms – 2586 sheep and goats
Period of employment: 01/01/2012 - 31/12/2016

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
Ειδική Υπηρεσία Διαχείρισης του Προγράμματος "Αγροτική Ανάπτυξη της Ελλάδας 2007 - 2013"
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

Objective Action 1.2 "Organic Livestock" measure 2.1.4 are:
• The protection of natural resources and conservation of biodiversity
• Sustainable management of grassland
• The improvement of animal welfare
• The offer guarantees to consumers for safe animal products.

F.4.5 Project Title: "Protection of nitrate-sensitive areas"
Number of Projects: 30 Farms – 370.1 hectares
Period of employment: 01/01/2012 - 31/12/2016

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
Ειδική Υπηρεσία Διαχείρισης του Προγράμματος "Αγροτική Ανάπτυξη της Ελλάδας 2007 - 2013"
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

The aim of the action 2.1 "Protection of nitrate-sensitive areas" measure 2.1.4 is the restoration of the environment through:
• the reduction of fertilizer applied in relation to the provisions of the respective Action Plans
• reduction of water consumption
• the creation of ecological compensation areas.

F.4.6 Project Title: "Conservation of endangered indigenous livestock breeds**"**
Number of Projects: 11 Farms – 56 Horses - 804 Sheep and Goats
Period of employment: 01/01/2012 - 31/12/2016

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
Ειδική Υπηρεσία Διαχείρισης του Προγράμματος "Αγροτική Ανάπτυξη της Ελλάδας 2007 - 2013"
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Αειφορία

The aim of the action 3.1 "Conservation of endangered indigenous livestock breeds' measure 2.1.4 is support for farmers to maintain or even increase the number of threatened abandonment of indigenous livestock breeds until a minimum acceptable security number to:
• Maintain biodiversity of indigenous livestock at risk of extinction.
• The preservation of traditional extensive farming systems.
• The achievement of the target will help strengthen both male breeding animals and female breeding animals and the action "Conservation of genetic resources in livestock."

F.4.7 Project Title: "Granting 2nd & 3rd Installment Payment of Young Farmers"

Period of employment: 01/05/2012 - 30/06/2014
Number of Projects: Fifteen (15)

ΥΠΟΥΡΓΕΙΟ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ & ΤΡΟΦΙΜΩΝ - ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΚΟΙΝΟΤΙΚΩΝ ΠΟΡΩΝ & ΥΠΟΔΟΜΩΝ
Ειδική Υπηρεσία Διαχείρισης του Προγράμματος "Αγροτική Ανάπτυξη της Ελλάδας 2007 - 2013"
ΠΡΟΓΡΑΜΜΑ ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΤΗΣ ΕΛΛΑΔΑΣ 2007 - 2013
"ΑΛΕΞΑΝΔΡΟΣ ΜΠΑΛΑΤΑΖΗΣ"
Ποιότητα-Ανταγωνιστικότητα-Ασφορία

The aim of the scheme is to revitalize the rural population and the improvement of human resources to strengthen the competitiveness of the agricultural sector. In this context, followed by providing financial assistance to facilitate the establishment of young farmers under the age of 40 years who have sufficient professional capacity, installed for the first time as the head of the farm and implement business plans for the development of agricultural activities.

F.4.8 Project Title: «Creation of George Ch. Dimokas Company»
Number of Projects: One (1)
Period of employment: 20/06/2012 - 19/06/2014

The proposed motion and the effect of the business plan is to create a business that will provide the link between primary production and export of agricultural value added products. Knowing the competition prevailing in world affairs that the company hopes will be able to assist producers in the region of Magnesia to produce products with their name and the proven quality will conquer markets abroad. To achieve this goal, the company is committed to providing support services to producers in the region, such as:

- Analyze and manage with modern methods (biophysical simulators, software and equipment, precision agriculture) depending on the characteristics of the region (climate, soil, water resources), the type of crop and the profile of the producer, with an aim to maximize production while reducing inputs (fertilizers, plant-protection formulations, water resources, energy).
- Seek investment opportunities to buy both cropland and equipment for the further development of agricultural enterprises.
- Making analysis of suppliers and purchased products (fertilizers, plant-protection formulations) that really needs the farm business, according to analyzes conducted in accredited laboratories.
- To carry out financial studies and exploit investment plans for better funding of venture funds will come from the funds of the European Union.
- To contribute to the vertical integration of production and improved management of agricultural business, purchase equipment that will standardize, maintain and store the resulting products.
- Provide quality systems certification services that will increase the added value of products.

- Provide services for rural economy, farmers will need more specialized information and daily information on the selling price of agricultural products, the value of many of this longer market value.

F.4.9 Project Title: "Establishment of hydroponic greenhouse"
Company Name: I.M. Mpalamotis S.A.
Period of employment: 01/07/2012 - 30/06/2014
Total budget: 1.600.000€

The purpose of the program were to create a hydroponic greenhouse company IM Balamoti SA filed in late August, the file for the payment of project implementation by 50 % "Establishment of hydroponic greenhouses "with Protocol qualification decision: 2480/29436/PO5/5/00349/R/N 3299/04. On 7/12/2012 was hanging with file number 3460, online payment of installment of 50 % and an assignment of the amount of 360.000 euros to Piraeus Ban : "We transmit documents on which was paid in Piraeus Bank the amount of Euro: "Three hundred sixty thousand euros" to check 54260083-8 issued to Piraeus Bank. The payment was made pursuant to the provisions of Law 3299/04 of the Decision IE/2480/29435 /PO5/5/00349/25-09-2009 GG Thessaly and assignments between Piraeus Bank and I.M. Balamoti SA.

F.4.10 Project Title: "Subsidy program for businesses hiring unemployed graduates of higher education institutions and university technology sector, to 35 years"
Company Name: George Ch. Dimokas
Period of employment: 08/01/2013 - 09/04/2015

The purpose of the program to the enterprise of Mr. Dimokas was hiring an agronomist able to help provide services to producers in the region of Magnesia to the following areas:

- Analyze and manage with modern methods (biophysical simulators, software and equipment, precision agriculture) depending on the characteristics of the region (climate, soil, water resources), the type of crop and the profile of the producer, with an aim to maximize production while reducing inputs (fertilizers, plant-protection formulations, water resources, energy).
- Seek investment opportunities to buy both cropland and equipment for the further development of agricultural enterprises.

- Making analysis of suppliers and purchased products (fertilizers, plant-protection formulations) that really needs the farm business, according to analyzes conducted in accredited laboratories.
- To carry out financial studies and exploit investment plans for better funding of venture funds will come from the funds of the European Union.
- To contribute to the vertical integration of production and improved management of agricultural business, purchase equipment that will standardize, maintain and store the resulting products.
- Provide quality systems certification services that will increase the added value of products.
- Provide services for rural economy, farmers will need more specialized information and daily information on the selling price of agricultural products, the value of many of this longer market value.

F.4.11 Project Title: "Integrated intervention to support women's employment by enhancing Entrepreneurship"
Number of Projects: Six (6)
Period of employment: 18/01/2013 - 30/06/2015

The Operational Program "National Contingency Reserve" (OP NCA) is one of the approved Operational Programs under the NSRF. According to Article 51 of Regulation (EC) 1083/2006, pursuing and looking OP EAA, first addressing the immediate consequences of a crisis, secondly to create the conditions for social and economic reconstruction and activation of local communities that exist the consequences, so you regain a dynamic and reintegrate both the socio - economic fabric of the country and the European economic environment.

The strategy of the OP NCA has short and medium - term integrated character, seeking first- time direct support new businesses and jobs to, to meet the needs of the population affected by the crisis and in the second year of growth in an attempt reversal of the recession and its consequences. The objectives of the program are the following:
• Promoting human resource employment and reintegration into labor market.
• Contribute to restore the social and economic fabric.
• Creating the conditions for holding the local population.
• Maintaining social cohesion.
• Development and sustainability of the local economy.
In areas affected by unforeseen local or sect oral crises linked to economic and social restructuring, including any restructuring caused by natural disasters, or the effects of trade liberalization.

F.4.12 Project Title: "Strengthening Media active in Manufacturing - Tourism - Trade and Services under the NSRF 2007-2013"

Number of Projects: Two (2)
Period of employment: 25/02/2013 - 09/05/2013

This notice relates to business investment plans taking place in thirteen (13) administrative regions of the country, the relevant Axes of five (5) Regional Operational Programs.

The aim here is to strengthen existing businesses and new / under formation of micro, small and medium enterprises [as defined in Annex I of Regulation (EC) No. 800/2008 of the Commission (L214/3/9-8-200)] for investment -oriented innovation , environment and information technology and the direct stimulation of business in a crisis. In addition to this funding sought and job creation, as support is directed at companies under establishment.

F.4.13 Project Title "Platform Software and Mobile Applications Development for agriculture products CO_2 footprint calculation"
Companies: Alterra S.A., PREDICTA S.A., Anthesis Ltd, CE.RE.TE.TH / CERTH
Total budget: 570.000€

The economic crisis which is experienced in many European countries is estimated to affect the eating habits of the population that suffers the consequences. Our country lacking the heavy industry and expertise that exist in the Northern countries of the European Union should focus its development, either in tourism and agriculture, or in small flexible companies that can help the country by innovating to export its products.

It is clear nowadays that food purchased by the consumer not only contributes to the nutritional needs, but also the way of their production significantly affects the environment. Therefore the food market trying to meet the daily needs of consumers has a direct impact on the reduction of energy resources and the environmental pollution. So companies in the food industry in the technologically advanced countries, adopting the new market trends and legislation governing the food production, make efforts to capture the cycle of carbon in the production process.

Purpose of the proposed project is to develop innovative algorithms that through a software platform will calculate the carbon footprint produced in agricultural products providing the consumer with an image of the whole production process. Furthermore, another aim is the development of applications for android mobile phones that will provide information on the steps usually made by a user-farmer field during the manufacturing process. To achieve the objectives and the proper management of the proposed project is to collaborate the following companies: i). Alterra S.A, ii). PREDICTA S.A, iii). Anthesis Ltd. and finally iv). as the contractor CE.RE.TE.TH / CERTH.

The proposed project will contribute to: i). Increase the production capacity, ii). Increase extroversion, iii). Reduce unit costs, iv). Improve the quality of products and services, v). Save energy and protect the environment, vi). Increase employment vii). Develop green technologies.

G. Published Thesis - Papers

G.1 Thesis
G.2 Papers published in international scientific journals of SCI
G.3 Papers submitted for publication in international scientific journals of SCI
G.4 Papers of international conference proceedings
G.5 Papers of national conference proceedings
G.6 Scientific Notes

G.1 Thesis

G.1.1 **George Ch. Dimokas, 2009.** Development of a biophysical simulator for tomato crop in order to optimize climate management for Mediterranean greenhouses during winter period. **PhD Thesis**, University of Thessaly, pages 332.http://thesis.ekt.gr/thesisBookReader/id/17532#page/1/mode/2up

G.1.2 **George Ch. Dimokas, 2003.** Effect of irrigation frequency on growth and biomass production of flowers and two rose varieties in hydroponics. **Master Thesis**, University of Thessaly, pages 85.

G.1.3 **George Ch. Dimokas, 2001.** Study of the effect of greenhouse climate on morphological development of rose plants. **Bachelor Thesis**, University of Thessaly, pages 62.

G.2 Papers published in international scientific journals of SCI

G.2.1 Katsoulas, N., Kittas, C., **Dimokas, G.**, Lykas, Ch., 2005. Effect of Irrigation Frequency on Rose Flower Production and Quality. Biosystems Engineering 93 (2), pp. 237-244.
https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.2.2 **Dimokas, G.**, Tchamitchian, M., Kittas, C., 2009. Calibration and validation of a biological model to simulate the development and production of tomatoes in Mediterranean greenhouses during winter period. Biosystems Engineering 103 (2), pp. 217-227.
https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.2.3 **G. Dimokas**, N. Katsoulas, C. Kittas and M. Tchamitchian, 2014. Case studies of a modified biological simulator (TOMGRO) in greenhouse tomato crop. Geotechnical Scientific Issues 23 (I), pp. 4-11.
https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.3 Papers submitted for publication in international scientific journals of SCI

G.3.1 **Dimokas, G.**, Katsoulas, N., Tchamitchian, M., Dimokas N., Kittas, C. XXXX. Validation of a greenhouse climate model for Mediterranean greenhouses during winter period. Biosystems Engineering XX (X), pp. XXX-XXX.

G.3.2 **Dimokas, G.**, Tchamitchian, M., Dimokas, N., Katsoulas, N., Kittas, C., XXXX. Development and validation of a bio-physical simulator for Mediterranean greenhouses during winter period. Biosystems Engineering XX (X), pp. XXX-XXX.

G.3.3 **G. Dimokas**, N. Dimokas, C. Kittas and M. Tchamitchian, XXXX. Calibration and validation of a climate weather generator as a prediction tool for greenhouse cultivations during winter period. Geotechnical Scientific Issues XX (X), pp. XXX-XXX.

G.4 Papers of international conference proceedings

G.4.1 Kittas, C., **Dimokas, G.**, Lykas, C., Katsoulas, N., 2004. Effect of two irrigation frequencies on rose flower production and quality. **ISHS** Acta Horticulturae 691: International Conference on Sustainable Greenhouse Systems – **GreenSys 2004,** pp. 333-340. http://www.actahort.org/books/691/691_39.htm

G.4.2 **Dimokas, G.**, Kittas, C., Tchamitchian, M., 2006. Model-based Climate Management during Winter Period in Mediterranean Greenhouses. Proceedings of 3rd International Conference **HAICTA 2006** on Information Systems in Sustainable Agriculture, Agro-environment and Food Technology, Volume III, pp 949-958.
https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.4.3 **Dimokas, G.,** Tchamitchian, M., Kittas, C., 2008. Calibration of a biological simulator in tomato development in Mediterranean greenhouses during winter period. Proceedings of 4th International Conference **HAICTA 2008** on Information & Communication Technologies in Bio & Earth Sciences, pp 98-108. https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.4.4 **Dimokas, G.**, Katsoulas, N., Tchamitchian, M., Kittas, C., 2008. Validation of a greenhouse climate simulator (SimGreC) in Mediterranean greenhouses during winter period. Proceedings of 4th International Conference **HAICTA 2008** on Information & Communication Technologies in Bio & Earth Sciences, pp 173-181.
https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.4.5 **Dimokas, G.**, Tchamitchian, M., Kittas, C., 2008. Validation of a tomato crop simulator for Mediterranean greenhouses. **ISHS** Acta Horticulturae 797: Proceedings of the International Workshop on Greenhouse Environmental Control and Crop Production in Semi-Arid Regions, pp. 247-252. http://www.actahort.org/books/797/797_34.htm

G.4.6 **Dimokas, G**., Tchamitchian, M., Kittas, C., 2009. Development and calibration of a Bio-physical Simulator for Mediterranean Greenhouses. International Symposium on High Technology for Greenhouse Systems, **GreenSys**, 14-19 June 2009, Québec, Canada. http://www.actahort.org/books/893/893_53.htm

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G.4.8 **G. Dimokas**, St. Kostoula, Ch. Lykas, N. Katsoulas, E. M. Khah, C. Kittas, 2009. Effect of Irrigation Scheduling on Greenhouse Tomato Crop Development and Production. VI International Symposium on Irrigation of Horticultural Crops, **VI ISIHC**, 2-6 November 2009, Viña del Mar, Chile. https://www.researchgate.net/profile/George_Dimokas/?ev=hdr_xprf

G.4.9 **Dimokas, G.**, Kittas, C. and Tchamitchian, M., 2011. Case studies of a modified biological simulator (TOMGRO) according to short cropping period. International Symposium on Advanced technologies and management towards sustainable greenhouse ecosystems, **GreenSys**, 5-10 June 2011, Halkidiki, Greece. http://www.actahort.org/members/showpdf?booknrarnr=952_39

G.4.10 Nikolaidou, P., **Dimokas, G.**, M. Martika – Vakirtzi 2011. Implementation of management principles on greenhouse vegetables near the city of Thessaloniki. International Symposium on Advanced technologies and management towards sustainable greenhouse ecosystems, **GreenSys**, 5-10 June 2011, Halkidiki, Greece. http://www.actahort.org/members/showpdf?booknrarnr=952_40

G.5 Papers of national conference proceedings

G.5.1 **G. Dimokas**, Ch. Lykas, P. Giaglaras, C. Kittas, 2003. "Estimation of morphological characteristics of rose plants for crops modulation according the bending technique". Proceedings 20th National Conference of **EEEO**, pp 298-301.

G.5.2 **G. Dimokas**, G., Lykas, Ch., Katsoulas, N., Kittas, C., 2005. "Effect of irrigation frequencies on rose flower production and quality with the use of hydroponic techniques". Proceedings 22nd National Conference of **EEEO**.

G.5.3 Kittas, C., **Dimokas, G.**, Tchamitchian, M., 2006. "Experimental verification of biological simulator in tomato crop development and production in Mediterranean greenhouses during winter period". 5th National Conference of **EGME**, pp. 445-452.

G.5.4 **Dimokas, G.**, Kittas, C., Katsoulas, N., Dimokas, N., 2007. Simulator calibration and verification for climate management during winter period." 5th National Conference of **EGME**, pp. 453-461. G.5.5 Zonzilou, G., **Dimokas, G.**, Lykas, Ch., Kittas, C., 2007. "Effect of bending technique in development and production of hydroponic rose crop." 23rd National Conference of **EEEO**, pp. 471-474.

G.5.6 **Dimokas, G.**, Christopoulos, N., Lykas, Ch., Katsoulas, N., Kittas, C., 2007. "Effect of irrigation treatment in development and production of hydroponic tomato crop." 23rd National Conference of **EEEO**, pp. 859-862.

G.5.7 **G. Dimokas**, C. Kittas, M. Tchamitchian, 2009. "Calibration and validation of a weather generator for climate production during winter period". 6th National Conference of EGME, Thessaloniki, 8-10 October 2009.

G.5.8 S. Kostoula, **G. Dimokas**, N. Katsoulas, Ch. Lykas, C. Kittas, A. Khah, 2009. "Effect of irrigation frequency in hydroponic tomato growth and production". 24th National Conference of **EEEO**, Veria, 20-23 October 2009.

G.5.9 S. Kostoula, **G. Dimokas**, N. Katsoulas, Ch. Lykas, C. Kittas, A. Khah, 2009. "Effect of graft in hydroponic tomato growth and production". 24th National Conference of **EEEO**, Veria, 20-23 October 2009.

G.5.10 **G. Dimokas**, C. Kittas, M. Tchamitchian, 2011. "Case studies of a modified biological simulator (TOMGRO) according to temperature effect". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

G.5.11 **G. Dimokas**, P. Nikolaidou, A. Papachatzis, G. Akritidis, B. Bidra and N Xouliaras 2011. "Comparative investigation of defoliation on tomato growth". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

G.5.12 P Nikolaidou, **G. Dimokas**, A. Papachatzis, L. Dicu, G. Akritidis, B. Bidra, N Xouliaras, N. Koutinas and A. Roumpos 2011. "Quantification of the outputs of family income in vegetable products". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

G.6 Scientific Notes

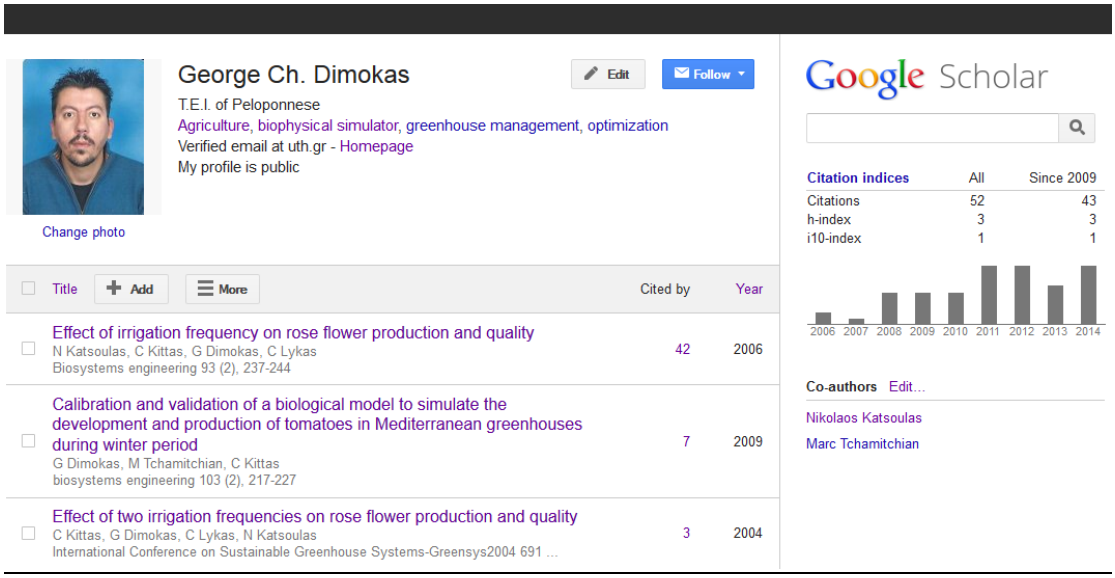
G.6.1 **George Ch. Dimokas, 2003.** "Integrated heating greenhouses with alternative forms of energy" University of Thessaly, (pages 40)

G.6.2 **George Ch. Dimokas, 2008.** "Robotics and harvesting machines horticulture greenhouse units' University of Thessaly, (pages 46)

G.6.3 **George Ch. Dimokas, 2009.** "Control of Agricultural Environment Facility" ATEI Larissa, (pages114)

G.6.4 **George Ch. Dimokas, 2010.** "Horticulture" ATEI Thessaloniki, (pages 130)

H. References to Scientific Work



http://scholar.google.com/citations?user=tcKfjNQAAAAJ

The following statements relate to others who have reported in my work (excluding self-citations).

➢ *Paper: «Katsoulas, N., Kittas, C., **Dimokas, G.**, Lykas, Ch., 2006. Effect of Irrigation Frequency on Rose Flower Production and Quality. Biosystems Engineering 93 (2), pp. 237-244» is reference by:*

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➢ *Paper: «**Dimokas, G.**, Tchamitchian, M., Kittas, C., 2009. Calibration and validation of a biological model to simulate the development and production of tomatoes in Mediterranean greenhouses during winter period. Biosystems Engineering 103 (2), pp. 217-227.» is reference by:*

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2. C. A. Medina-Ruíz, I. A. Mercado-Luna, G. M. Soto-Zarazúa and I. Torres-Pacheco and E. Rico-García, 2011. Mathematical modeling on tomato plants: A review. African Journal of Agricultural Research Vol. 6 (33), pp. 6745-6749.
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I. Additional Information's

1. Member of the Union of Agricultural Engineers (E.G.M.E.)
2. Member of Geotechnical Chamber of Greece (GEOTEE)

J. Recommendations

✘ **Dr. MSc. Panagiotis Skouras (**Scientific Cooperator at Technological Education Institute of Peloponnesos) March 5, 2012, Panagiotis worked with George at University of Thessaly

George Dimokas received PhD from University of Thessaly - School of Agricultural Sciences - Department of Agriculture Crop Production and Rural Environment, Volos, Greece, in 2009, at the same time with me (Dr. MSc Panagiotis J. Skouras). He has more than 6 years experience in Research activities in the fields of: i). greenhouse management, ii). climate control, iii). crop development and production, iv). development decision support systems, v). irrigation management, vi). development of climate and biological simulators. He has published almost 20 papers in journals and conference proceedings and he has 9 citations in this field. Additionally he has more than 2 year teaching experience in Technological Education.

Now, he is a college teaching at T.E.I. of Larissa, Greece, http://www.teilar.gr , Department of Plant Production and Department of Biosystems Engineering.less

✘ **Marc Tchamitchian** (Research scientist chez INRA UR Ecodéveloppement) March 25, 2014, Marc managed George at French National Institute of Agricultural Research

During his PhD George Dimokas has shown good aptitude to build and manage a scientific project, from the formulation of an adequate question to hypotheses, experimental setup and interpretation. Results were successfully published in peer-reviewed journals. He has also shown flexibility and curiosity to side disciplines.

K. Participation of A.F.C. at Agro-start project

Under the project **Agro-start** the company of Mr. George Ch. Dimokas dealt with the updating of good agricultural practices developed in the framework of cooperation with enterprises of the agricultural and livestock sector.

http://www.agro-start-see.eu/

4. **Agriculture Farm Consulting-Greece**
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Contact Person: Dr. MSc. George Ch. Dimokas

Products: 1. Installation of young farmers; 2. Modernisation of agricultural holdings; 3. Agro-environmental funding:"Organic farming"; 4. Agro-environmental funding: "Organic Livestock"; 5. Agro-environmental funding: 'Protection of nitrate-sensitive areas"; 6. Agro-environmental funding: "Conservation of endangered indigenous livestock breeds"
Example of services provided in other countries:
Greece and all Europe Union Countries

Files:

http://database.agro-start-see.eu/index.php

BULGARIA ECONOMIC FORUM

Bulgaria Economic Forum
Let's Talk about Bulgarian Economy Growth and Revenue Generators
14-15 November 2013, Sheraton Sofia Hotel Balkan

15 November 2013 (Friday)

15:15 - 16:15 Presentation of Business Practices and Cases in the Animal Breeding and Horticulture Sectors. Trends and Needs in the Provision of Business Support Services for SMEs in the Sectors. (Part II)

Format: Presentations with Q&A

Speakers:

Prof. Mariyana Ivanova, Vice-Rector, University of Agribusiness and Rural Development, Bulgaria (tbc)
Dipl. Eng. Angel Milev, Program Director, Enterprise Europe Network Consortium – Bulgaria
Dr. Cleanthes Israilides, Director, Institute of Technology of Agricultural Products, Greece
Dr. Gorgias Garofalakis, Senior Researcher, Knowledge 2 Innovation FP7 project - ETAT / Hellenic Food Authority, Greece (tbc)
Mr. George Dimokas, Director, Agriculture Farm Consulting – George Ch. Dimokas, Greece (tbc)
Mr. Massimiliano Piattella, Expert Analyst, Institute of Study, Research and Information on the Agricultural and Agrofood Market, Italy (tbc)

http://biforum.org/dwfiles/1381158424_Detailed%20Programme_BEF_ENG.pdf

II. ANALYSIS OF SCIENTIFIC WORK

G.1 Thesis

G.1.1 **George Ch. Dimokas, 2009.** Development of a biophysical simulator for tomato crop in order to optimize climate management for Mediterranean greenhouses during winter period. **PhD Thesis**, University of Thessaly, pages 332.

The aim of the thesis was the development of a decision support system that will be able to take control of greenhouse climate management for 24 hours during winter period.

Goal of the thesis was the optimization of greenhouse effectiveness according to grower's standards. Biophysical simulator developed with the connection of two simulators one responsible for the greenhouse climate and a biological simulator responsible for tomato crop development and production. The development of the climate simulator was according the parallel operation of five sub-simulators who are predicting the climate parameters distribution in the greenhouse according greenhouse geometry, construction and equipment. As a biological simulator a modified version of TOMGRO according Mediterranean greenhouse growers technique was used. Most specific the modification in the model was the topping of the plants. Parallel a weather generator was developed and validated during winter period. Simultaneously an analysis of case studies took place in order to estimate the effectiveness of climate change on tomato crop development and production. Finally software was developed for biophysical simulator optimization according the use of Branch & Bound algorithms.

G.1.2 **George Ch. Dimokas, 2003.** Effect of irrigation frequency on growth and biomass production of flowers and two rose varieties in hydroponics. **Master Thesis**, University of Thessaly, pages 85.

The greenhouses in Greece are in constant development. In recent years more and more greenhouses choose using hydroponic systems using automation that contribute to maximizing production. The University of Thessaly has been running for a few years research on the rational management of the environment and optimize production in hydroponic cultivation of roses. A part of this research is the prediction of production and rational use of fertigation system of plants, always in relation to climatic factors prevailing in the Greek territory.

This work was carried out to study the effect of irrigation frequency on growth and biomass production of flowers and two rose varieties in hydroponics. The work took place from 24.03.2003 up to 09.01.2003, in a glass greenhouse at Farm of the University of Thessaly, Magnesia in Velestino. Measurements of air temperature, solar radiation and relative humidity, which correlated with the growth rate, the growth of the culture at all levels, and the production of flower cultivation.

During the experiment shoot growth measurements were performed appearance of shoots, separating them into flowering and blind in main and side. In the experimental procedure of flower production, measurements of the number of shoots harvested from the corresponding fresh and their dry weight. Finally, measurements of leaf area and destructive measurements of plant and separation into two parts to better analyze the situation of plants throughout the course of their development, during the experimental procedure. The experimental procedure and the analysis and processing of data were made based on the literature; following the experimental data are the Netherlands, France, Spain.

G.1.3 **George Ch. Dimokas, 2001.** Study of the effect of greenhouse climate on morphological development of rose plants. **Bachelor Thesis**, University of Thessaly, pages 62.

The greenhouse crops in Greece are in constant development. In recent years more and more greenhouses choose using hydroponic systems, mainly to avoid diseases transmitted from the ground. The University of Thessaly has been running for three years research on the rational management of the environment in hydroponic cultivation of roses. One of the main thrust of this research is to develop mathematical model (models) that describe relations production environment. These models are used for strategic planning method of management of the environment and the daily guidance of air conditioning systems in greenhouses.

Within this context, this work was performed in which the influence of the environment (temperature, relative humidity, solar radiation) in shoot growth hydroponic rose crop were studied (cv. First Red), during the spring and summer 1999 winter 1999-2000 and spring 2000, in a glass greenhouse, Farm of the University of Thessaly, Magnesia in Velestino.

Measurements of temperature and relative humidity and crop growthwere used to calibrate a mathematical model that calculates the growth rate or duration of, shoot growth versus temperature. This model was calibrated for temperature ranges from 15 to 25 ^{o}C.

The calibrated model was verified experimentally for a temperature of 15 to 25 ^{o}C and above, with satisfactory results. However, for the practical application of the mathematical model to the conditions of the country, consists of the verification of the entire range of temperatures encountered in Greek greenhouses, from 10 to 35 ^{o}C.

G.2 Papers published in international scientific journals of SCI

G.2.1. Katsoulas, N., Kittas, C., **Dimokas, G.**, Lykas, Ch., 2005. Effect of Irrigation Frequency on Rose Flower Production and Quality. Biosystems Engineering 93 (2), pp. 237-244.

A better understanding of the effects of irrigation frequency on flower production and quality of rose plants can help to propose optimal irrigation scheduling.

For this purpose, experiments were conducted on a soilless rose crop (*Rosa hybrida, cv. First Red*), with a closed hydroponic system, in a greenhouse located near Volos, on the continental area of eastern Greece. The plants were grown following the bending technique, on rockwool slabs. Irrigation scheduling was based on crop transpiration, and irrigation was performed whenever accumulative solar radiation outside the greenhouse reached 1600 kJ m^{-2} (high irrigation frequency) and 3200 kJ m^{-2} (low irrigation frequency). The amount of water applied was 0.2 mm and 0.4 mm for high and low irrigation frequency, respectively. Accordingly, the total water applied was equal for both cases. In order to study the effects of irrigation frequency on rose crop, measurements of cut flower shoots' fresh and dry weight, number of harvested flowers and flowering stem's length, as well as measurements of microclimate variables were carried out. The total period of measurements ended 100 days after the last severe shoot bending (which was performed 60 days after planting).

The results showed that irrigation frequency influenced cut flower fresh and dry weight, since the total fresh and dry weight of cut flower shoots measured at the end of the experimental period was about 33% higher in the high irrigation frequency treatment. Statistical analysis revealed that there was no significant difference between

the mean fresh or dry weight of cut flower shoots of the two treatments. As far as the number of shoots harvested is concerned, the results showed that the higher the irrigation frequency, the higher the production, as the total number of cut flowers measured at the end of the experimental period was 20.7 and 16.2 per greenhouse m^{-2} for high and low irrigation frequency, respectively, namely about 28% higher in the high irrigation frequency. Furthermore, the results showed that the length of rose flowering shoots was not affected by the irrigation frequency. In conclusion, it seems that the higher irrigation frequency improved the biomass production but did not affect the quality of harvested flowers

G.2.2. **Dimokas, G.,** Tchamitchian, M., Kittas, C., 2009. Calibration and validation of a biological model to simulate the development and production of tomatoes in Mediterranean greenhouses during winter period. Biosystems Engineering 103 (2), pp. 217-227.

The aim of this work is the calibration and validation of the adaptation of the TOMGRO tomato crop simulation model to short term cropping technique and to Greek conditions. Indeed, a current practice in plastic greenhouses in the Mediterranean regions is to stop the indeterminate development of the plant after a limited number of trusses by removing the terminal bud of the plant (topping). Experiments were carried out in the farm of the University of Thessaly in the region of Volos (Greece), during the autumn and winter periods of 2005 and 2007. Crop development, growth and greenhouse climate were measured. Observations point out that dry matter partitioning in the plant is not altered by the topping of the plant but that the duration of the fruit life (from setting to maturity) is shortened. The TOMGRO model has been modified accordingly, calibrated over the winter 2005 data and validated against the winter 2007 ones. A good agreement has been observed between the measured and simulated plant development indicators, biomass and fruit production. Finally, a satisfactory agreement has been obtained for the plant leaf area which is classically one of the weak points of TOMGRO. On the basis of these results, we conclude that this adaptation of TOMGRO simulates properly short term tomato crops under greenhouses and therefore can be used in decision support to help growers operate the greenhouse.

G.2.3. **G. Dimokas**, N. Katsoulas, C. Kittas and M. Tchamitchian, XXXX. Case studies and analysis of sensitivity of a modified biological simulator (TOMGRO) in tomato crop. Geotechnical Scientific Issues XX (X), pp. XXX-XXX.

The aim of this work was the analysis of sensitivity of a modified biological simulator (TOMGRO) in tomato crop during winter period. The modified biological simulator (TOMGRO) that used for case studies of the experiment has been developed and validated according the cultivation technique and the needs of Mediterranean growers and the climate of the countries near Mediterranean. Analysis of sensitivity was necessary in order to test simulator's behavior according different climate data. Case studies were focused in the differentiation mainly of temperature and the influence of temperature in tomato growth and production.

For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino. Climate data were recorded inside and outside of the greenhouse area. Simultaneously biological data for tomato growth and production were recorded. Results showed that climate variation inside the greenhouse area causes modification in tomato growth rate and production.

G.3 Papers submitted for publication in international scientific journals of SCI

G.3.1. **Dimokas, G.**, Katsoulas, N., Tchamitchian, M., Dimokas N., Kittas, C., XXXX. Validation of a greenhouse climate model for Mediterranean greenhouses during winter period. Biosystems Engineering XX (X), pp. XXX-XXX.

Aim of this work was validation of a greenhouse climate simulator (SimGreC) for Mediterranean greenhouse conditions during winter. On this purpose, a physical simulator of the greenhouse climate comprising of five sub-models was developed. The sub-models are: the greenhouse air, crop, cover and soil energy balances as well as the greenhouse air water vapor balance. For the calibration of SimGreC, greenhouse and outside climate data were recorded during autumn and winter period of 2006 in a polyethylene covered greenhouse located in Central Greece. The results of SimGreC simulations were compared with measured data recorded for validation purposes in the same greenhouse during autumn and winter period of 2007. A good agreement was observed between the measured and the simulated values for air, cover, crop and soil temperature while measured and simulated values of air relative humidity did not gave satisfactory results. Furthermore, simulated transpiration rate values were lower than measured one during periods with 2007 climate conditions. The results showed that SimGreC could be used as a tool for strategic and tactical decisions in order to help growers to optimally manage the greenhouse microclimate for crop production increase and pests and fungi decrease.

G.3.2. **Dimokas, G.**, Tchamitchian, M., Dimokas, N., Katsoulas, N., Kittas, C., XXXX. Development and validation of a bio-physical simulator for Mediterranean greenhouses during winter period. Biosystems Engineering XX (X), pp. XXX-XXX.

The aim of this work was the development and validation of a biophysical model (BioSiGreC) by coupling a crop growth model and a greenhouse climate model. The crop growth model is a modification of TOMGRO to simulate topping, according a short term cropping technique, current practice in Mediterranean greenhouses. The climate model consists of five sub-simulators: the air, crop, cover and soil greenhouse energy balances, as well as the mass balance of greenhouse air. Using outside climate data and the above sub-models greenhouse air temperature and relative humidity, and the temperatures of the cover, the crop and soil can be calculated. Experiments were carried out in the experimental farm of the University of Thessaly near Volos in the continental part of eastern Greece, during the winter and autumn periods of 2005-2006. Crop growth and development, biomass production and greenhouse interior and exterior climate variables were recorded. A satisfactory agreement was observed between the measured and simulated values of air, cover, crop and soil temperatures. Simultaneously, a good agreement has observed between the measured and simulated values of plant development characteristics and the biomass and fruit production, during the validation process. The model was proven to be a valuable tool for greenhouse microclimate and crop growth simulation and could be used to help growers in managing the greenhouse microclimate. The simulator will be further used for greenhouse climate optimization studies.

G.3.3. **G. Dimokas**, N. Katsoulas, C. Kittas and M. Tchamitchian, 2014. Case studies of a modified biological simulator (TOMGRO) in greenhouse tomato crop. Geotechnical Scientific Issues 23 (I), pp. 4-11.

The aim of this work was to calibrate and to validate a climate weather generator with final target the use of this generator in a developed biophysical

simulator. Generator's operation is based on short duration's predictions (max and min values) of the climate parameters and calculates the daily variance. For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino. Validation results (air temperature, relative humidity, wind speed and solar radiation) were tested with measured data from the 2nd experimental period and a good agreement observed between measured and calculated values.

G.4 Papers of international conference proceedings

G.4.1 Kittas, C., **Dimokas, G.**, Lykas, C., Katsoulas, N., 2004. Effect of two irrigation frequencies on rose flower production and quality. **ISHS** Acta Horticulturae 691: International Conference on Sustainable Greenhouse Systems – **GreenSys 2004,** pp. 333-340.

Optimal irrigation scheduling of greenhouse soilless crops is very important since irrigation scheduling influences the rhizosphere environment, media water potential and salt accumulation, which in turn affects plant growth and photosynthesis and consequently crop production and quality. A better understanding of the effects of irrigation frequency on flower production and quality of rose plants can help to develop optimal irrigation systems. On this purpose experiments were conducted on a soilless rose crop (*Rosa hybrida*, *cv. First Red*), grown following the bending technique, on a closed hydroponic system in a greenhouse located near Volos, on the coastal area of eastern Greece. Irrigation scheduling was based on crop transpiration and irrigation was performed whenever accumulative solar radiation outside the greenhouse reached 470 kJ m^{-2} (high irrigation frequency) or 940 kJ m^{-2} (low irrigation frequency). The amount of water applied was 0.2 mm and 0.4 mm for high and low irrigation frequency, respectively. In order to study the effect of high and low irrigation frequency on rose crop flower production and quality, measurements of cut-flower fresh and dry weight, number of harvested flowers and flowering stem length, as well as measurements of microclimate variables were carried out. The total period of measurements ended 100 days after the last severe shoot bending (which was performed 60 days after planting). The results showed that irrigation frequency affected cut flower fresh and dry weight since the total values of cut flower fresh and dry weight measured at the end of the experimental period were 413 and 310 g m^{-2} for high and 120 and 89 g m^{-2} for low irrigation frequency, respectively. As far as the number of cut flowers is concerned, the results showed that the higher the irrigation frequency, the higher the production, since the total number of cut flowers measured at the end of the experimental period was 20.7 and 16.2 flowers per greenhouse m^{-2} for high and low irrigation frequencies, respectively. Finally, the results showed that the quality of rose flowering shoots was not affected by the irrigation frequency. In conclusion, it seems that the higher irrigation frequency improved the biomass production but did not affect the quality of harvested flowers.

G.4.2 **Dimokas, G.**, Kittas, C., Tchamitchian, M., 2006. Model-based Climate Management during Winter Period in Mediterranean Greenhouses. Proceedings of 3rd International Conference **HAICTA 2006** on Information Systems in Sustainable Agriculture, Agro-environment and Food Technology, Volume III, pp 98-108.

The international competition for high quality products leads the growers to limit the production and the environmental costs, mainly by a better management of the use. In the last two decades, crop modeling has become a major tool in horticulture as in other areas of plant production. Heating is after labour the main cost

of greenhouse crops but it is also one of the main controls used to steer the crop behavior according to the grower's objectives.

A combined model for crop production and climate control in greenhouses is presented. The physical model contains 4 sub-models that simulate the cover and the crop energy balances and the latent and sensible heat of the air. It will simulate the inside air temperature and humidity directly as a function of the outside climate and of control actions (ventilation, humidification or dehumidification, heating). It also includes plant transpiration and condensation. The biological model describes the effects of the management through its influence on total dry matter accumulation, assimilates distribution, organogenesis and development rates. Both these sub-models will be used to simulate the greenhouse climate-crop system and to give the necessary information to build the optimization criterion which measures the value of a given management through its energetic cost and its associated harvest gains, but also through the resulting humidity (or condensation on the cover) in the greenhouse.

Simulation based optimization, namely reinforcement learning, will be applied to this model. This optimization method allows searching for the best management strategy for a range of possible future climates to which the greenhouse may be submitted. Observing the model running for a given strategy and under a given climate, the method consists in mapping the state-action pairs to the associated change in the criterion final value.

G.4.3 **Dimokas, G.,** Tchamitchian, M., Kittas, C., 2008. Calibration of a biological simulator in tomato development in Mediterranean greenhouses during winter period. Proceedings of 4th International Conference **HAICTA 2008** on Information & Communication Technologies in Bio & Earth Sciences, pp 98-108.

The aim of this work is the calibration of the adaptation of the TOMGRO tomato crop simulation to short term cropping technique and to Greek conditions, so that it can be used later for the optimization of greenhouse microclimate, aiming at the optimum crop development and the reduction of energy and chemical inputs.

Indeed, a current practice in plastic greenhouses in the Mediterranean regions is to stop the development of the plant after 7 trusses by topping, which is the removal of the terminal bud of the plant in order to stop the development and to force the maturity of the fruits. For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino. In order to have an analytical description of tomato crop development and production, measurements were carried out during the autumn and winter period of 2005. Experimental data were collected for the development of the crop (number of leaves, trusses, green and mature fruits) and the biomass production (fresh and dry weight of leaves, stems, fruits and roots). Simultaneously the parameters of the greenhouse climate and the climate of the exterior region were collected.

Calibration results of the biological simulator were tested with the experimental data of winter 2005 and an agreement was observed between the measured and the simulated values in plant development, biomass production and fruits production. Finally satisfactory agreement is obtained for plants leaf area which was one of the weak points of TOMGRO. According to the results, the simulator can be used to determine strategic and tactical decisions in order to help growers increase the income of the production. Consequently, this model can be coupled with a climate simulator (SimGreC) and can be further used for the optimization of greenhouse microclimate and biomass production.

G.4.4 **Dimokas, G.**, Katsoulas, N., Tchamitchian, M., Kittas, C., 2008. Validation of a greenhouse climate simulator (SimGreC) in Mediterranean greenhouses during winter period. Proceedings of 4th International Conference **HAICTA 2008** on Information & Communication Technologies in Bio & Earth Sciences, pp 173-181.

The aim of this project was the validation of a greenhouse climate simulator (SimGreC), so that it can be used later for the optimization of greenhouse microclimate, aiming at the optimum crop development and the reduction of energy and chemical inputs. For this purpose, a physical simulator for the greenhouse climate has been developed comprising five (5) sub-simulators: the energy balance of the air, crop, cover and soil of greenhouse, as well as the mass balance of greenhouse air. The integration of the above sub-simulators leads to the calculation of the temperature and relative humidity of greenhouse air and the temperature of the cover, crop and soil. For the validation of the simulator, experimental measurements have been carried out in a greenhouse covered with a plastic film, in the farm of the University of Thessaly, in the area of Velestino. The measurements were carried out during autumn and winter of 2007 and involved the recording of climatic parameters in the internal and external greenhouse environment.

Measurements were used, for simulator validation under different management of the greenhouse controllers (window opening and heating). SimGreC results were compared to the experimental data. An agreement was observed between the measured and the simulated values in air, cover, crop and soil temperature. According to the results, SimGreC can be used to determine strategic and tactical decisions in order to help growers to manage the climate in the greenhouse and additionally to increase the income of the production. Consequently, this model can be further used for the optimization of greenhouse microclimate.

G.4.5 **Dimokas, G.**, Tchamitchian, M., Kittas, C., 2008. Validation of a tomato crop simulator for Mediterranean greenhouses. **ISHS** Acta Horticulturae 797: Proceedings of the International Workshop on Greenhouse Environmental Control and Crop Production in Semi-Arid Regions, pp. 247-252.

The aim of this work is the validation of the adaptation of the TOMGRO tomato crop simulation to short term cropping technique and to Greek conditions. Indeed, a current practice in plastic greenhouses in the Mediterranean regions is to stop the development of the plant after 7 trusses by topping, which is the removal of the terminal bud of the plant. Experiments were carried out in the farm of the University of Thessaly in the region of Volos, during the autumn and winter period of 2007. Crop growth and development, greenhouse climate were measured.

The modified TOMGRO has been calibrated over the winter 2005 data and validation occurred on the winter 2007. A good agreement has been observed between the measured and simulated plant development indicators, biomass and fruit production during validation process. Finally, a satisfactory agreement has been obtained for the plant leaf area which is classically one of the weak points of TOMGRO. On the basis of these results, we conclude that this adaptation of TOMGRO simulates properly short term tomato crops under greenhouses and therefore can be used in decision support to help growers operate the greenhouse.

G.4.6 **Dimokas, G**., Tchamitchian, M., Kittas, C., 2009. Development and calibration of a Bio-physical Simulator (BioSiGreT) for Mediterranean Greenhouses. International Symposium on High Technology for Greenhouse Systems, **GreenSys**, 14-19 June 2009, Québec, Canada.

The aim of this work was the development and validation of a biophysical model (BioSiGreT) by coupling a crop growth model and a greenhouse climate model. The crop growth model is a modification of TOMGRO to simulate topping, a short term cropping technique, current practice in Mediterranean greenhouses. The climate model consists of five sub-simulators: the air, crop, cover and soil greenhouse energy balances, as well as the mass balance of greenhouse air. Using outside climate data and the above sub-models greenhouse air temperature and relative humidity, and the temperatures of the cover, the crop and soil can be calculated. Experiments were carried out in the experimental farm of the University of Thessaly near Volos in the continental part of eastern Greece, during the autumn and winter periods of 2005.

Crop growth and development, biomass production and greenhouse interior and exterior climate variables were recorded. A good agreement has observed between the measured and simulated values of plant development characteristics and the biomass and fruit production, during the validation process. Simultaneously, a satisfactory agreement was observed between the measured and simulated values of air, cover, crop and soil temperatures. The model was proven to be a valuable tool for greenhouse microclimate and crop growth simulation and could be used to help growers in managing the greenhouse microclimate. The simulator will be further used for greenhouse climate optimization studies.

G.4.7 Ch. Lykas, **G. Dimokas**, C. Kittas, 2009. Alteration of NO_3-, PO_4- and SO_4-concentration on rose plants as affected by greenhouse climate parameters and their concentration in the nutrient solution. International Symposium on High Technology for Greenhouse Systems, **GreenSys**, 14-19 June 2009, Québec, Canada.

The objective of this work was to quantify temporal changes of NO_3^-, PO_4^{3-} and SO_4^{2-} concentration on leaves, shoots and roots of rose plants during a short growing period, in response to air temperature, light intensity and the concentration of the above mentioned anions in the nutrient solution. For this reason rose plants (*Rosa hybrida*, cv. Iceberg) were placed in glasshouse during September of 2004 and grown in nutrient solution according Deep Flow Technique (DFT). The plants were pruned in order to develop one main flower shoot. Measurements performed during December of 2004. The concentration of NO_3^-, PO_4^{3-} and SO_4^{2-} (mg L^{-1}) in the nutrient solution and on different plant parts (mg Kg^{-1}) as well as the fresh (*FW* gr) and dry (*DW* gr) weight of leaves, shoots and roots were measured every day, by destructive sampling of 6 plants each time, for a period of 28 days. In addition during the same period the greenhouse air temperature (T ^oC) and the intensity of the incoming solar radiation (G, W m^{-2}) were continually recorded. The concentration of NO_3^- and PO_4^{3-} in leaves was significantly affected by i) the intensity of the incoming solar radiation and ii) the concentration of NO_3^- and PO_4^{3-} in the nutrient solution. The concentration of NO_3^- and PO_4^{3-} in shoots was affected from above mentioned parameters and from the greenhouse air temperature. Alteration of NO_3^- concentration in the nutrient solution causes an instant alteration of NO_3^- concentration in leaves and a delayed alteration of NO_3^- concentration in shoots. In contrast alteration of PO_4^{3-} concentration in the nutrient solution causes a delayed alteration of PO_4^{3-} concentration in both leaves and shoots. The concentration of NO_3^- and PO_4^{3-} in roots and SO_4^{2-} in leaves, shoots and roots were not strongly related with the above mentioned greenhouse climate parameters and the concentration of NO_3^-, PO_4^{3-} and SO_4^{2-} in the nutrient solution.

G.4.8 **G. Dimokas**, St. Kostoula, Ch. Lykas, N. Katsoulas, E. M. Khah, C. Kittas, 2009. Effect of Irrigation Scheduling on Greenhouse Tomato Crop Development and Production. VI International Symposium on Irrigation of Horticultural Crops, **VI ISIHC**, 2-6 November 2009, Viña del Mar, Chile.

The correct supply of water and nutrients is important in hydroponic growing systems in order to use water efficiently, avoid stress situations and control production. The aim of this work was to evaluate the effect of irrigation scheduling on greenhouse tomato crop development and production. Experiments were carried out in the farm of the University of Thessaly in the region of Volos, during the autumn and winter period of 2007. Two tomato varieties were used; one non grafted (*cv. Belladona, Lycopersicon esculentum Mill.*) and one grafted (*cv. King Kong*). Irrigation frequency was based on crop transpiration and drainage. The amount of water applied was 0.3 and 0.45mm and occurred when drainage values was 5% and 30% for high and low irrigation, respectively. In order to study the effects of irrigation scheduling on crop growth, measurements on plant characteristics (stem's length, number of nodes, leaves, trusses) were carried out. Simultaneously fresh and dry weight of plant shoots, leaves, and fruits were recorded periodically. Measurements of internal and external greenhouse climate were also registered. The total period of experiments ended 140 days after transplanting date. Results on crop growth showed that only non grafted plants were affected from irrigation scheduling after the 60^{th} day of the experiment. High irrigation had almost 10% higher growth rate on crop characteristics and statistical analysis confirmed that there were significant differences between non grafted and grafted plants. Biomass production was not effected from irrigation scheduling. Results confirmed that there are no significant differences on stems, leaves. Statistical differences observed only on dry weight of stems at non grafted plants where high irrigation overpasses low irrigation. Finally fruits results confirmed that there are no significant differences on green and mature fruits, fresh and dry weight. In conclusion, it seems that high irrigation effected the plant growth but there were small influence on tomato production.

G.4.9 **Dimokas, G.**, Kittas, C. and Tchamitchian, M., 2011. Case studies of a modified biological simulator (TOMGRO) according to short cropping period. International Symposium on Advanced technologies and management towards sustainable greenhouse ecosystems, **GreenSys**, 5-10 June 2011, Halkidiki, Greece.

The aim of this work was sensitivity analysis of a modified biological simulator (TOMGRO) in tomato crop during winter period. The modified biological simulator (TOMGRO) that used for case studies of the experiment has been developed and validated according short cropping period, cultivation techniques and climate conditions of the countries and growers near Mediterranean. Sensitivity analysis was necessary in order to test simulator's behaviour according different climate scenarios. Case studies were focused in the influence of temperature in tomato growth and production. For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino. Climate data were recorded inside and outside of the greenhouse area. Simultaneously biological data for tomato growth and production were recorded. Results showed that climate variation inside the greenhouse area causes modification in tomato growth rate and production. It was found that temperature increasing leads to: i). increasing the number of nodes, leaves and trusses of the plants, ii). reduction of dry weight of leaves, stems, fruits and plant leaf area, iii). simultaneously reduction of mature fruits number and iv). early production. The management of greenhouse climate can be made more efficient by

using the case studies results from the biological model. A part of the conclusions will contribute to balance of earnings of a product's nominal value into the market, according to the management cost of the greenhouse equipment during the production process.

G.4.10 Nikolaidou, P., **Dimokas, G.**, M. Martika – Vakirtzi 2011. Implementation of management principles on greenhouse vegetables near the city of Thessaloniki. International Symposium on Advanced technologies and management towards sustainable greenhouse ecosystems, **GreenSys**, 5-10 June 2011, Halkidiki, Greece.

The aim of this work was to implement the management principles on greenhouse vegetables in Thessaloniki and to estimate the effectiveness on greenhouse crops. For this purpose a questionnaire was composed and filled in by the greenhouse growers (with formal, integrated and biological production) in the area near Thessaloniki. Before visiting the growers, a visit to the Directorate of Rural Development in Thessaloniki took place in order to provide to the research the necessary information's about the greenhouse growers and their reliability. Simultaneously with the questionnaires were filled in observation tables which are helping the finance results to be extracted. Results testified for greenhouse grower's separation and theirs explanation based on growers profile and theirs management ability. Finally, Data Envelopment Analysis (DEA) took place as a method for approximation of estimation of technical efficiency (TE), for greenhouse farms. Data Envelopment Analysis method is based on influx and efflux of farms and contributed to range greenhouse farms according their efficiency. The results showed that the strategy sets objectives, provides changes, make choices according to: i). the choice of the production method, ii). the determination of the production plan, iii). the definition of other investments iv). the desire of the farmer - trader to have some control over the growing procedures. However, these results can not be generalized, mainly because of the climate differences between cultivation periods and simultaneously the differences on influx and efflux values. In order to be achieved results efficiency a series of experiments with a lot of repetitions been proposed.

G.5 Papers of national conference proceedings

G.5.1 **G. Dimokas**, Ch. Lykas, P. Giaglaras, C. Kittas, 2003. "Estimation of morphological characteristics of rose plants for crops modulation according the bending technique". Proceedings 20th National Conference of **EEEO**, pp 298- 301.

The purpose of this work was to define criteria that could be decision-making tools for intrusion into the rose plants, with technical Bending, in hydroponics open and closed system. For this purpose counted, (i) the development of the shoots, the unfolding of the leaves and the increase of the diameter of the stems in the first five leaflets (ii) the total flowering stems produced with the quality characteristics and (iii) the parameters of the climate emissions.

G.5.2 **G. Dimokas**, G., Lykas, Ch., Katsoulas, N., Kittas, C., 2005. "Effect of irrigation frequencies on rose flower production and quality with the use of hydroponic techniques". Proceedings 22nd National Conference of **EEEO**. pp 131-134.

The purpose of this study was to investigate the possibility of optimization of irrigation hydroponic rose (Rosa hybrida, cv First Red). The automated irrigation occurs when water consumption by the crop is equal to the dose irrigation . The

calculation was based on the frequency of irrigation of the crop transpiration and irrigation applied dose was 0.2 mm and 0.4 mm for the high and the low frequency of irrigation respectively. To study the effect of high and low frequency irrigation on production and quality of roses , measurements were made of the number and rate of occurrence of shoots (> 1.5cm), the generated main flowering stem , the growth rate of the main flowering stem and leaf area of cultivation.

G.5.3 Kittas, C., **Dimokas, G.**, Tchamitchian, M., 2006. "Experimental verification of biological simulator in tomato crop development and production in Mediterranean greenhouses during winter period". 5th National Conference of **EGME**, pp. 445-452.

The aim of this work was the experimental confirmation of biological simulants in the development and production of tomato cultivation. The biological model quantitatively describes the development of culture, while presenting both the generated number and the produced biomass main constituents of plants such as root, shoot, leaf and fruit . For this reason we performed experimental measurements in greenhouses on the farm of the University of Thessaly in the Velestinou. The measurements were performed for the experimental validation of biological simulants were made during the autumn and winter of 2005 and separated in recording the number of leaves, inflorescences , the harvested fruits and green fruits and destructive measurements of whole plant for the recording of the biomass of the main components of the plant (root , stem , leaf fruit). Alongside climatic parameters recorded both within the greenhouse and in the surrounding space.

G.5.4 **Dimokas, G.**, Kittas, C., Katsoulas, N., Dimokas, N., 2007. Simulator calibration and verification for climate management during winter period." 5th National Conference of **EGME**, pp. 453-461.

The purpose of this study was to calibrate and confirm a microclimate simulators emissions, so it can then be used to optimize the microclimate of the greenhouse for optimal crop growth and reduce energy and chemical inputs. To this end, developed a physical model of greenhouse includes five (5) sub- simulated: the energy balance of wind, crop cover and soil warming and mass balance of air emissions. The completion of the above sub - leading analytical models to calculate the temperature and relative humidity of air emissions and the temperature of the cover of crop and soil emissions. For the experimental calibration and validation of the model performed experimental measurements in a greenhouse farm of the University of Thessaly in the Velestinou. Measurements were made during the autumn and winter of 2005 and were recorded climate parameters inside and outside the greenhouse environment.

G.5.5 Zonzilou, G., **Dimokas, G.**, Lykas, Ch., Kittas, C., 2007. "Effect of bending technique in development and production of hydroponic rose crop." 23rd National Conference of **EEEO**, pp. 471-474.

Purpose of this work was to compare the technical "bending" the classic technique, the development and production of flowering rose shoots in closed hydroponic cultivation system. For this reason we performed experimental measurements, the greenhouses of the University of Thessaly, in the Velestinou. Homogenising the culture performed successive bending of stems, at intervals of 30 and 60 days respectively from the transplanting of plants. Successive burn the main shoot contributed to creating the base of the test plants consisting of 4 to 6 its side shoots.

G.5.6 **Dimokas, G.**, Christopoulos, N., Lykas, Ch., Katsoulas, N., Kittas, C., 2007. "Effect of irrigation treatment in development and production of hydroponic tomato crop." 23rd National Conference of **EEEO**, pp. 859-862.

A better understanding of the effect of frequency of irrigation on growth and yield of plants can help create best irrigation systems. For this purpose during the winter of 2005, measurements of cultured tomato (*Lycopersicon lycopersicum* (L) cv. *Belladonna*), in an open hydroponic system with perlite substrate in greenhouses of the University of Thessaly, in the area of Velestino. The scheduling of irrigation based on the transpiration of the crop and irrigation made whenever the amount of water application was 0.2 mm 0.35 mm and 0.5 mm for high, normal and low frequency irrigation respectively . It should be noted that the total amount of water applied per day was the same for all three treatments.

G.5.7 **G. Dimokas**, C. Kittas, M. Tchamitchian, 2009. "Calibration and validation of a weather generator for climate production during winter period". 6th National Conference of EGME, Thessaloniki, 8-10 October 2009.

The purpose of this study was to calibrate and confirm generators outdoor climate data with the ultimate goal of using a biophysical model developed. The function generator is based on short-term forecasts (using maximum and minimum values) of climate data and calculates the daily variability. For this reason we performed experimental measurements in greenhouses on the farm of the University of Thessaly in the area of Velestino. The measurements were performed for the calibration and experimental validation of climate data generator, made during the winter season of 2005 and 2007. Included measurements of temperature, relative humidity and air velocity in the surrounding area of the greenhouse and the outer solar radiation.

G.5.8 S. Kostoula, **G. Dimokas**, N. Katsoulas, Ch. Lykas, C. Kittas, A. Khah, 2009. "Effect of irrigation frequency in hydroponic tomato growth and production". 24th National Conference of **EEEO**, Veria, 20-23 October 2009.

The aim of this work was to estimate the effect of irrigation frequency in tomato growth and production. For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino. Two varieties were used one non grafted (cv. *Belladona*, *Lycopersicon esculentum Mill*.) and one grafted (*cv. King Kong*). The results concern plant development showed that only the non grafted variety was influenced from irrigation frequency. Plants biomass and crop production was not influenced from irrigation frequency on both varieties. There were not statistical differences in dry weight of shoots, leaves and fruits.

G.5.9 S. Kostoula, **G. Dimokas**, N. Katsoulas, Ch. Lykas, C. Kittas, A. Khah, 2009. "Effect of graft in hydroponic tomato growth and production". 24th National Conference of **EEEO**, Veria, 20-23 October 2009.

The aim of this work was to estimate the effect of grafting in tomato growth and production under water stress conditions. For this purpose experiments were carried out in the farm of the University of Thessaly in the region of Velestino during autumn and winter 2007. Hybrids of tomato were used in three combinations: non grafted (*cv. Belladona, Lycopersicon esculentum Mill.*) and grafted to subjects of two tomato varieties YEDI and KING KONG. Water stress conditions derived from decreasing irrigation frequency, which based on plant transpiration and the irrigation dose was 0,45 mm (high irrigation frequency when plant transpiration was 0,30 mm). The results

concern plant development showed that grafted plants to YEDI differed from non grafted and grafted plants to KING KONG variety. In the early stages of development (up to 78 days after transplanting) the largest dry biomass resulting from the grafted plants but later there were no differences with non grafted tomato plants. Increased production resulting from grafted plants with 25%, which differed statistically significantly from the production of non grafted plants.

G.5.10 **G. Dimokas**, C. Kittas, M. Tchamitchian, 2011. "Case studies of a modified biological simulator (TOMGRO) according to temperature effect". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

The aim of this work was to study cases and the sensitivity analysis of the use of modified biological simulants (TOMGRO) in growing tomatoes in the wintertime. The above biological model is developed and calibrated in accordance with the requirements and the growing technical producers in the Mediterranean, and the climatic conditions during the winter season in these countries. The sensitivity analysis of the model was performed to examine the behavior of the model under different climatic conditions combined. The case study focused on diversification mainly temperature and the effect it has on the development and production of tomato plants. For the case study experiments were conducted at the farm of the University of Thessaly in the Velestinou and became record of climate and environment within the greenhouse space , and measurements of growth and production of tomato plants . The results showed that the modification of the climate inside greenhouses causes significant changes in growth rate and production of the crop.

G.5.11 **G. Dimokas**, P. Nikolaidou, A. Papachatzis, G. Akritidis, B. Bidra and N Xouliaras 2011. "Comparative investigation of defoliation on tomato growth". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

An important factor in optimizing the management of the crop and the role of leaf area and the amount of humidity that develops inside the greenhouses. The purpose of this study was to investigate the comparative effects of defoliation on the growth rate of tomato cultivation. For this reason we performed experimental measurements in greenhouses on the farm of TEI . During the experimental procedure used tomato plants (*Lycopersicon esculentum Mill, var. Belladonna*). The establishment of the crop held in culture outside soil hydroponic coir substrate, and the ground. During the experimental period made removal of a three leaf explants between two consecutive inflorescences. Irrigation made using the / Y according to the transpiration rate of the crop. Measurements were made during the autumn and winter of 2010 and were recording the length of the plant, number of leaves, inflorescences, flowers and fruits formed. Alongside climatic parameters recorded both within the greenhouse and in the surrounding space. The results showed little variation in all qualitative - quantitative characteristics of plant growth (length, number of leaves, inflorescences, flowers, fruits formed), recorded with a small superiority in plants that were not made to remove the leaves between inflorescences . In conclusion, the defoliation not resulted in substantial reduction in growth of tomato plants, both in hydroponic cultivation and the cultivation soil.

G.5.12 P Nikolaidou, **G. Dimokas**, A. Papachatzis, L. Dicu, G. Akritidis, B. Bidra, N Xouliaras, N. Koutinas and A. Roumpos 2011. "Quantification of the outputs of family income in vegetable products". 25th National Conference of **EEEO**, Cyprus, 1-4 November 2011.

The economic crisis experienced by most European countries is expected to affect the eating habits of the population suffered the consequences. Modern demands for consumption of quality products should be matched by a corresponding selling price, able to attract the most consumers. The possible variation in the dietary habits of consumers are expected to directly affect the targeting of the annuity producers and agribusiness. The purpose of this study was to evaluate the output of family income in Horticultural products. To serve the objectives of the investigation, appropriate written questionnaire so that responses of consumers to give the required information to configure the criteria.

G.6 Scientific Notes

G.6.1 **George Ch. Dimokas, 2003.** "Integrated heating greenhouses with alternative forms of energy" University of Thessaly, (pages 40)

G.6.2 **George Ch. Dimokas, 2008.** "Robotics and harvesting machines horticulture greenhouse units' University of Thessaly, (pages 46)

G.6.3 **George Ch. Dimokas, 2009.** "Control of Agricultural Environment Facility" ATEI Larissa, (pages114)

G.6.4 **George Ch. Dimokas, 2010.** "Horticulture" ATEI Thessaloniki, (pages 130)