



EURO Summer Institute 2014

Lleida, Spain, July 19th-August 1st

OR in Agriculture and Agri-food Industry



FINAL REPORT

12 December 2014

Contents

1. Introduction

The EURO Summer Institute on OR in Agriculture and Agri-food industry (ESI 2014) was held in Lleida, Spain, between 19th of July and 1st of August 2014. In this document the Scientific and Organizing Committees present the final report of this EURO Summer Institute, with emphasis to the most relevant goals, activities and outcomes. This is the second time that such a EURO Summer/Winter Institute is organised and it has been as exciting as the first experience was for all people involved in.

The ESI2014 was promoted by the EURO Working Group (EWG) on OR in Agriculture and Forest Management who prepared the proposal by the end of 2011. Finally, the agreement and approval to prepare such a proposal was taken in 2012 during the meeting of the EWG held in Vilnius within the XXV EURO Conference.

Spanning the bridge between optimization theory and primary sector applications (mainly Agriculture and Forestry, but also Fisheries and Natural Resources in general) is one of the big challenges for the operations research community. Stochastic optimization and modern software implementations have become an indispensable resource in engineering sciences and economics. This high demand in interdisciplinary collaboration is, however, not adequately covered in most of the current curricula programs in applied mathematics or agronomic/food engineering.

Furthermore, nowadays, many Agricultural decision problems are imbedded in more global problems, particularly those found in Supply Chain Management and Logistics, as well as impacting on the Agri-food industry. Moreover, climate change, globalization, traceability of agricultural products, food safety and sustainability have led to extremely complex problems not only by their intrinsic characteristics but also by the amount of data that needs to be considered.

Having in mind all of the above mentioned aspects, the board of the EWG on Agriculture and Forest Management proposed to apply for organizing a EURO Summer Institute on Agriculture and Agri-food Industry. All participants agreed and the coordinator of the group on behalf of the board did present the application for preparing the ESI 2014 in Lleida (Spain).

This was the second EURO Institute combining pure OR topics of Mathematical Programming, Sustainable Supply Chains, Games Theory among others with decisional problems on Agriculture and Agri-food Industry. It was an opportunity to encourage people from the two areas to exchange their experiences and stimulate networking research.

2. Venue

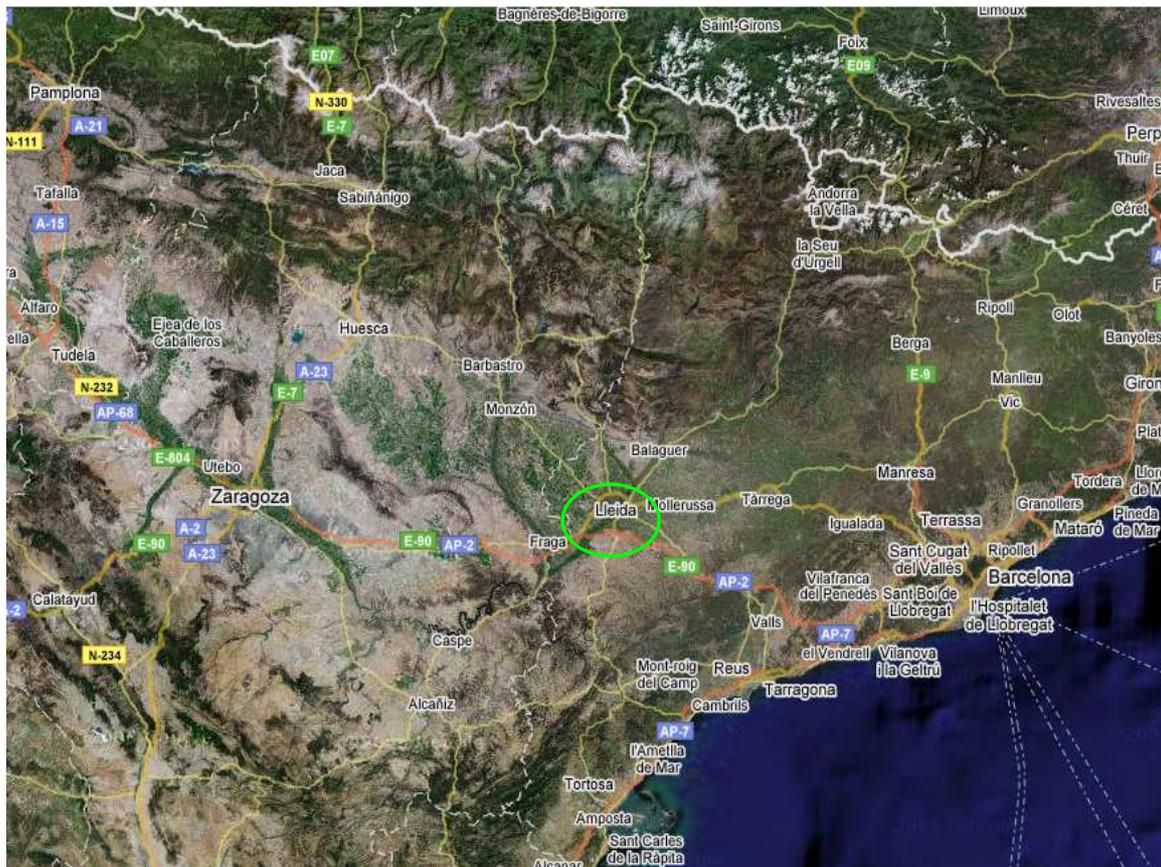
The EURO Summer Institute on Agricultural and Agri-food Industry (ESI2014) was held in Lleida, which is a small town of the inland Catalonia, 160 kilometres away from Barcelona and 450 from Madrid (Figure 1). The ESI2014 was just after the IFORS Conference held in Barcelona the week before. This was made on purpose to facilitate the attendance of reputed keynote speakers and to reduce the travel expenses of them.

Lleida is a small town, it is the capital of the Province of the same name, surrounded by orchards and other crops and with a hot and dry weather in summer. The University of Lleida offered several facilities helping the organisation of this event. For instance, the campus of Cappont has in a reduced area many buildings available for lectures, computer exercises and even the student's residence and many near restaurants. At the same time, the campus is settled in a walking distance of the city center.

All facilities were guaranteed in Lleida for the two weeks since October 2013. This included accommodation in the Students' Residence, a lecture room and a computer lab. The Residence had mostly single rooms and a few of double rooms, enough to cover the needs of participants. Furthermore, the students' Residence had a Restaurant and it was open to everybody and willing to book the service to all the participants upon demand of organisers. This way, all the activities were prepared in a small area avoiding unnecessary transfers from one place to another through the campus. So on, discussions either in the lecture room or in the restaurant were more relaxed.

Transport to Lleida is easy either from Madrid or Barcelona. High speed trains were available to reach Lleida and recommended. Direct connections from Barcelona or Madrid airports to the corresponding central stations made easy and comfortable travelling to Lleida. The train station in Lleida is not far from the Student's Residence. A taxi can pick people up there and bring them to the Residence for 5€. However, some participant with light baggage preferred to cover the distance on foot and starting to be familiarised with the warm environment.

Figure 1: Lleida is settled inland, near Barcelona.



3. Organization details

The application for organizing the EURO Summer Institute on OR in Agriculture and Agri-food Industry was submitted at the beginning of December 2011. By the end of January 2012, the EURO Executive Committee was formally informed about the submission of the proposal by the corresponding EURO Vice-president. Later on, by the beginning of July 2012 the EURO Council formally approved the proposal and notified the Organizing Committee that the ESI2014 could be organized.

In the following weeks several actions were taken:

- A Confirmation of invited speakers was requested in view of the preliminary programme submitted for approval.
- A poster was created and distributed in several OR meetings.
- A web page was created (http://orafm.udl.cat/?page_id=233) and permanently updated in order to contain the most relevant up-to-date information.
- An e-mail account was created (esi2014@matematica.udl.cat), which was checked on a weekly basis so that all queries were promptly answered.
- A first Call for Papers (CfP) was issued to announce the ESI2014 and distributed among the ORAFM members.

The Institute was largely advertised:

- All the national OR Societies belonging to EURO were contacted through the EURO Secretary in order to announce the event amongst their members;
- The CfP was available in the website of the ESI2014 and also through the website of the EWG-OR in Agriculture and Forest Management (<http://www.orafm.org>) where all members were kept informed;
- Different mailing lists were contacted to distribute the CfP;
- The editor of the EURO Web site was contacted to announce the ESI2014 on the EURO web site;
- The local organising committee of IFORS in Barcelona was contacted to advertise the ESI2014 and include a permanent link in their website.

Several applications for financial support were submitted:

- * University of Lleida, where the main ESI2014 activities were going to be developed.
- * Local Administration (city/province council), supporting proposals seeking the international promotion of the city and province of Lleida.

This time the success was rather scarce due to the hit of economic crisis in Spain at that time.

4. People involved

The ESI2014 was possible to many people involved in the organisation and participation. All of them were taking part in one or more Committees or belonging to the final list of laureates or acting as invited lecturers of the EURO Summer Institute on OR in Agriculture and Agri-food Industry.

4.1 Committees

Two different committees were considered for the preparation of the ESI2014. A Scientific committee devoted to deal academic questions related with the selection of participants and the management of invitations for invited lecturers. This committee was integrated by the Advisory Board of the EWG-ORAFM related to Agriculture plus the coordinator of the EWG and four reputed researchers invited as speakers and also enrolled in the EWG. In total seven people were involved in this committee whose role was important during the reception and selection of applications.

The Scientific Committee was the following:

- Laureano Escudero (Spain)
- Frederik Garcia (France)
- Ilan halachmi (Israel)
- Andrew Higgins (Australia)
- Anders R. Kristensen (Denmark)
- Jacqueline Bloemhof (Holland)
- Lluis M. Plà (Spain)

The second committee created was the Local Committee that was in truth the organising committee of local activities, both social and academic. The Local Committee was integrated mostly by people from the University of Lleida. The coordinator of the

EWG-ORAFM was also part of this committee and acted as bridge between the two committees.

The Local Organizing Committee was the following:

Silvia Miquel Fernandez (Spain)
Xavier Ezcurra (Spain)
Adela Pagés (Norway)
Lluís M. Plà Aragonès (Spain)
Marcela Gonzalez (Chile)
Sara V. Rodríguez (México)

The resulting committees were lead by Dr. Plà who coordinated all the actions developed by both committees. The inclusion in the local committee of visiting colleagues and past PhD. students was useful to give daily support to the organisation and more specifically to participants and invited lecturers at any moment. They were crucial for the success of the ESI2014.

4.2 Laureates

The deadline for the candidates to apply to the national OR societies was February 2014; the deadline for the national OR societies to notify the Scientific Committee of the ranking of the candidates approved in the corresponding countries was delayed to March the 31st.

Several applications were received directly to the ESI2014 website but they were suggested to redirect the applications to corresponding OR-Society. Similarly it happened with international applicants that were redirected to IFORS. In total 23 applications were received and forwarded to the Scientific Committee representing 17 countries: Austria, Germany, Norway, Uruguay, Chile, Peru, Egypt, Iran, Nigeria, Israel, Poland, United States, México, Pakistan, India, Turkey and Spain.

Six candidates were excluded by the Scientific Committee or declined his/her participation because they were not getting enough financial support. The final list included 17 laureates:

1	Poland	Magdalena Hędrzak
2	Poland	Dominika Cywicka
3	Denmark	Reza Pourmoayed
4	Turkey	Ozan Evkaya
5	Spain	Esteve Nadal
6	Spain	Jordi Mateo
7	Germany	Ann-Kathrin Mueller
8	Israel	Nir Halman
9	Uruguay	Gaston Notte
10	Peru	Vladimir Caceres
11	Chile	Wladimir Soto
12	Iran	Morteza Zangeneh
13	Iran	Narges Banaeian
14	USA	Nicholas Mason
15	Pakistan	Ali Asghar
16	Norway	Thakur Upadhyay
17	Israel	Yael Perlman

In June Ann-Kathrin Mueller communicated the cancellation of her participation at ESI2014 by personal reasons. By the end of June beginning of July Magdalena Hędrzak and Dominika Cywicka notified the Committees the cancellation of his participation at ESI2014 due to laboral problems. Their supervisor tried to encourage them to take part at ESI2014, but in the end they decided to confirm the cancellation. By the end of June, Ozan Evkaya notified the Committee of personal problems that forced him to reduce his stay at ESI2014.

In the end, 14 laureates were expected to attend the ESI2014. The Scientific Committee was surprised by not having received applicants from Greece, Denmark, France, Italy and The Netherlands.

4.3 Invited lecturers

The task of selecting invited lectures was a progressive refinement where topics and names lead one to another. A first brainstorming was done by Scientific Committee members where several names and topics of interest arise. These topics were:

- Stochastic Programming
- Dynamic Programming
- Simulation
- Games Theory
- Heuristics
- Forest and fire management
- Decision Graphs
- Supply Chain Management Optimisation
- Multicriteria decision methods

Therefore, the Scientific Committee had already in mind several renowned scientists covering some of these topics who were invited to make a high level tutorial during the Institute. Some of initial candidates declined the invitation for several reasons but proposed another colleague of the same research group or of the same level to cover the topic proposed. In the end, invited lectures who accepted the invitation were:

Ilan Halachmi
Bloemhof, Jacqueline
Linda C. van der Gaag
Anders Kristensen
Rene Villalobos
Andrew Higgins
Frederick Garcia
Marcela Gonzalez
Victor Albornoz
Concha Maroto
Silvia Miquel
Gloria Fiestras Janeiro
Angel Juan
Laureano Escudero
Lluis M. Plà Aragones

Fifteen lecturers were invited preventing some unforeseen casualty. All the invited lecturers were invited to stay in Lleida more than the necessary time to make their presentations. This way, it was assured that the laureates could interact with them for several days, exchanging ideas and deepening discussions that hardly could have been taken place during a 1-day visit to the ESI2014. By the beginning of June Javier Faulin cancelled corresponding lectures by personal reasons. Previously, Frederick Garcia and Andrew Higgins had done the same. On the other hand, Professor Silvia Miquel meet unforeseen matters and requested the substitution for a colleague he proposed Dr. Cori Vilella. The Scientific and Local Committee accepted the proposal. Other unexpected participations were Dr. Jana Ries who was visiting Dr. Angel Juan and took the opportunity of giving a short presentation. Similarly, Dr. Octavio Sanchez was visiting Prof. René Villalobos and also prepared a short presentation of a joint collaboration regarding Supply Chain optimisation in the USA.

Furthermore, given the broad background of participants and the wide variety of interests, all keynote speakers were invited to give a speech longer than one hour. The instructions given to them was to prepare a short introduction to the OR methodology they were to present and later on, going ahead with the application. The emphasis was not to introduce very complex concepts but looking for a deeper understanding and involvement of participants. This was revealed very beneficial given the active discussions leading each invited lecture.

5. 'Towards' Lleida for two weeks

By the end of April all laureates were notified of their selection, as observed in past summer/winter Institutes the Local Organizing Committee tried to maintain regular contact with them and to make sure that they felt increasingly involved with the Institute. On the other hand the committee offered also support providing letters of acceptance to participants. This was specially requested by non EU-participants needing of VISA.

The web page of the Institute was permanently up-to-date with all the relevant information and venue details. Concerning accommodation, the idea that the laureates shared a room was considered but not possible given available facilities at the Students' Residence (i.e. single rooms).

All participants were arriving the weekend. Some of them arrived from Barcelona, following the closure of the IFORS Conference. Sunday evening all participants except Ozan Evkaya and Ali Asghar were arrived without problems to Lleida. Ozan Evkaya informed his personal matters were getting worse and he found impossible to attend the ESI2014. At the end, Ali Asghar didn't attend the ESI2014 nor never warned the organisation even when he had insisted on getting financial support from the organisation and a letter for VISA purposes was sent.

6. Activities

A clear goal of a EURO Summer Institute is to promote the exchange of scientific knowledge and experience between the laureates and between the laureates and the senior scientists. Another goal is to promote friendship, which can make it easy to raise future cooperation between the laureates.

The Local Committee assisted by the Scientific Committee considered these aspects when designing the program of the ESI2014. Furthermore, it was also considered different ways to involve past participants in ESI2009 and at the same time cover the confirmed number of laureates, less than expected. The parallel organisation of the meeting of the EWG ORAFM as a workshop was the clue. Hence, the workshop on OR in Agriculture and Forest Management was prepared with several goals:

- To celebrate a meeting of the ORAFM members
- To open the meeting to participants at ESI2014
- To allow the attendance of past laureates at ESI2009
- Powering and enriching exchanges among participants in both events
- Reinforcing the activities of ESI2014

Additionally, a balanced number of Scientific and social activities were organized. In the next subsections all the activities are described. An overview of the program can be seen in figures 3a) 3b) and 3c).

Lunch breaks were scheduled of one hour and a half. This was more or less respected in Lleida because the restaurant was in the same Campus and the menu was ordered in the morning so the Restaurant collaborated also with the organisation. The rest of the meals, breakfast and dinner, were free without a specific time. However, the range of time where breakfast and dinner were available made in a natural way that people meet up around the table.

Figure 3a): ESI 2014 Program overview - first half of week.

Figure 3b): ESI 2014 Program overview - second half of first week.

Figure 3c): ESI 2014 Program overview - second week.

6.1. Scientific Activities

The scientific activities of the EURO Summer Institute on OR in Agriculture and Agri-food Industry were the following:

- The talks of the laureates;
- Lectures presented by the invited speakers and by members of the Scientific Committee;
- Special discussions and debates;
- Workshop on OR in Agriculture and Forest Management;

6.1.1 Talks of the laureates

Each laureate had 1 hour for presenting his/her work (including time for immediate questions/discussion). These presentations referred to the original paper with which they applied to the ESI2014.

The fact that the Institute was held for two weeks made possible to extend the discussions when the schedule permitted, or even recover them in other moments of free time.

The full list of papers submitted by the laureates is the following:

Magdalena Hędrzak	Assumptions for the simulation model of the dynamics of changes in the number of the common hamster (<i>Cricetus cricetus</i>)
Dominika Cywicka	The model of exploitation of the red deer (<i>Cervus elaphus</i>) population within the hunting districts surrounding the given National Parks
Reza Pourmoayed	A hierarchical Markov decision process modelling feeding and marketing decisions of growing pigs
Ozan Evkaya	Nonlinear Optimization of the Indemnity Level under Drought Hazard and Basis Risk
Esteve Nadal	Optimal planning of a pig supply chain under uncertainty
Jordi Mateo	Paralellisaton of the CBD algorithm to speed up the optimisation of supply chain models
Ann-Kathrin Mueller	Optimization of Biomass Value Chains for Material and Energetic Utilization
Nir Halman	Fully Polynomial Time Approximation Schemes for Stochastic Dynamic Programs
Gaston Notte	Food Resources Allocation in Pastoral Dairy Production Systems
Vladimir Caceres	OR for Sustainable development of rural areas in Peruvian Andes.
Wladimir Soto	Model for transport planning in fruit logistic centers
Morteza Zangeneh	Optimal location of farms
Narges Banaeian	Genetics algorithms for solving planning problems in agriculture
Nicholas Mason	Coordination of Perishable Crop Production using Auctions Mechanisms
Ali Asghar	Development of low fat muffins using carbohydrate based fat replacer
Thakur Upadhyay	Importance of biomass qualities in biomass supply chains for bioenergy production: A goal programming approach
Yael Perlman	Analysis of Pricing Strategies in a Supply Chain under Uncertain Demand

On the other hand, the scheduling for participants' presentations was combined with invited lectures in the best way and resulted in the following schedule:

Participant	Contribution	Week	Day
Nir Halman	1	1st	Monday
Magdalena Hędrzak	2	1st	Tuesday
Dominika Cywicka	3	1st	Tuesday
Reza Pourmoayed	4	1st	Wednesday
Wladimir Soto	5	1st	Thursday
Nicholas Mason	6	1st	Thursday
Gaston Notte	7	1st	Friday
Morteza Zangeneh	8	1st	Friday
Ozan Evkaya	9	1st	Monday
Ali Asghar	10	2nd	Monday
Narges Banaeian	11	2nd	Tuesday
Vladimir Caceres	12	2nd	Tuesday
Thakur Upadhyay	13	2nd	Wednesday

Yael Perlman	14	2nd	Wednesday
Esteve Nadal	15	2nd	Thursday
Jordi Mateo	16	2nd	Thursday

6.1.2 Lectures presented by the invited speakers

In the preliminary programme each lecture had allocated one hour (including time for immediate questions/discussion) for presenting a lecture. However, most of the lectures included specific topics requiring more than a basic knowledge in one OR technique. It was expected that laureates would know some of the OR methods, but surely not all of them. So, in the final programme it was considered interesting to request invited speakers to organise his/her speech giving at the beginning a comprehensive introduction about the methodology on which they were going to present the subsequent application. Thus, it was decided to offer an additional slot of time. In the end, invited talks consisted in two hours lecture with an optional break in the middle. All speakers agreed. Given the number of invited talks, several days there were more than one presentation from key note speakers.

Dr. Ilan Halachmi started presenting on Monday simulation models and examples of application in fish farming. Professors Bloemhof and van der Gaag gave their speech on Tuesday. Even the topics presented were very different, the clarity of presentation and comprehensive introductions in all the cases was very appreciated by participants. Prof. Kristensen's talk took all the Wednesday sessions and combined methodological and practical sessions including computer exercises what was very much appreciated by participants. On Thursday Dr. Villalobos assisted by Dr. Octavio Sanchez gave his presentation. Prof. Marcela Gonzalez completed the invited talks of the week. The following week Prof. Cori Vilella and Gloria Fiestras introduced and developed game theory topics and some applications to the Agriculture. Though the topic was not known by many, the presentations exploring a relative unknown method were appreciated by most of the participants. On Tuesday, Prof. Victor Albornoz talked about stochastic programming and an application in crop production and Prof. Plà gave some examples of applications of OR models in Agriculture based on his experience. The last invited participants were Prof. Concha Maroto and Angel Juan on Wednesday and Dr. Laureano Escudero closed the list of keynote speeches. Finally, the lecturers (given in the programmed order) as well as the corresponding titles of the lecture were the following:

Ilan Halachmi	Simulation optimization in agriculture: methodology and case studies'.
Bloemhof, Jacqueline	Sustainable Food Logistics Management
Linda C. van der Gaag	Different types of Bayesian networks in veterinary
Anders Kristensen	Markov decision processes for sequential decision problems
Rene Villalobos	The Strategic Design of the Supply Chain of Perishable Agricultural Products
Marcela Gonzalez	Optimization Models for Planning Harvest in Apple Orchards
Victor Albornoz	Decomposition methods in optimization and a novel application in agriculture for zoning management
Concha Maroto	Discrete multiple criteria decision making techniques

Cori Vilella	Games theory in Agriculture
Gloria Fiestras Janeiro	Cooperation and inventory management
Lluís M. Plà Aragones	OR in Agriculture.
Angel Juan	Simheuristics: Combining Simulation with Metaheuristics for solving Complex Optimization Problems under Uncertainty scenarios
Laureano Escudero	On a Risk Averse strategy for Strategic Forestry Management under uncertainty

6.1.3 Special discussions and debates

Four special discussions and debates were organized by the Scientific Committee. None of the participants belonged to the EURO WG-ORAFM, so it was considered interesting to introduce several topics of interest for the ORAFM and discuss about. Then, the first discussion was devoted to explain the origin of the EWG- ORAFM, actual aims and goals as well as the number of members and affiliations. Participants were invited to join the EWG. A second discussion was focused in OR in Agriculture and Agri-food Industry. The background of participants and actual research lines were taken as example for discussing and it resulted very fruitful. A third discussion took place the second week about the interest in promoting a special issue in a scientific journal. People shared the interest but the scope of the journal either OR or applications in Agriculture were not agreed. The Scientific Committee was committed to look for different options. Finally, another exciting debated turned about the evaluation of the Summer School and the expression of wishes for future. Like in the past discussions people were motivated to share personal opinions in a constructive way. It was confirmed that a School of this kind is difficult to fulfil the expectations of everybody. On the other hand, there were laureates more interested in theoretical topics and others in more applied topics with a variety of backgrounds. Even though, laureates considered the experience as positive. In addition, the opinions of invited lecturers along the two weeks were also of great value and appreciated by everybody. Each discussion was moderated by Prof. Plà. Laureates recommended to have beforehand the presentations of the other colleagues to improve the fruit of discussions.

6.1.4 Workshop on OR in Agriculture and Forest Management

The working group of OR in Agriculture and Forest Management (ORAFM) had to have the annual meeting. Furthermore, the local committee would like to offer the opportunity to participants at ESI2009 to get again together in Lleida and interact with laureates of the ESI2014 strengthening relationships between present and future members of the group as well as among participants at ESI held in Lleida. For this purpose a Workshop open to ORAFM members was proposed overlapping the ESI2014. In addition, this initiative was doubly pertinent given the number of laureates at ESI2014, slightly lower than expected. At the same time, the scientific programme of the Workshop and ESI2014 for these days was complementary and reinforced. As invited speakers were covered by ESI2014, organisation participants at the Workshop paid a small fee covering the expenses generated by them in concept of social activities, coffee-breaks and meals. Accommodation was paid apart. This way the budget of both events were kept separated and not merged.

Eight participants took part only in the Workshop the first half of the first week of the ESI2014. Three of them participated at the ESI2009 held in Lleida and four belonged to the ORAFM working group. The limited number of participants increased the

involvement of everybody in each presentation and subsequent discussion making more fruitful the meeting. Furthermore, the participants not enrolled in ORAFM were interested to become members. In the end, the overlap of these activities was judged interesting and profitable for all participants. Maybe the dates following the IFORS Conference were not so good for potential participants because many of them attended the meeting in Barcelona and couldn't extend the stay in Lleida.

6.2. Social Activities

The social activities in a EURO Summer Institute are an essential component to make sure that strong links will emerge amongst the laureates and also between the laureates and the lecturers.

The social activities scheduled for the EURO Summer Institute on OR in Agriculture and Agri-food Industry included a variety of activities cultural, educational and sportive:

- Welcome reception
- Visit to the “Seu Vella” and “Suda” (Main attraction of Lleida);
- Closure party of the ORAFM meeting;
- Running competition (6 km);
- Visit to a dairy farm;
- Visit to a big farm in Lleida (1000Has)
- Visit to a fruit packing plant;
- Excursion to the beach;
- ESI2014 party;
- Visit to the “Museu Diocesà” of Lleida;
- City tour (Lleida);
- Closure party of the ESI2014;
- Barbecue;

6.2.1 Welcome reception

Given the different times of arrivals and the number of people was considered difficult to organise such a reception. Several participants wanted to spend the week end in Barcelona or Madrid, others not. Thus, the initial idea of a welcome reception was abandoned. The first dinner on Sunday was had by all participants together, and first instructions given for the setting up of the ESI2014. The keynote speakers present at that moment were invited apart to taste some typical dishes in the restaurant where was going to be celebrated the closure of ESI2014. None of them would be at this closure, so it was a consideration from the organisation. The registration and material included handing out the documentation, a folder, maps and badges. Some members of the local committee were also hosted at the same Residence as participants. There was always one of them available for any matter affecting participants and/or lecturers at any time. Their role was very important and appreciated (specially the support given by Sara Rodriguez Sanchez).

6.2.2 Visit to the “Seu Vella” and “Suda” (Main attraction of Lleida)

On Tuesday 22th July was the visit to the “Seu Vella”. Prior to that, on the way on foot, it was visited the “Paeria”, i.e. the city hall and the museum hosted in the basement of the “Paeria”. The term "paer" is derived from the Latin "patiari" meaning "man of peace", and dates back to the privilege granted by King James I in 1264. The building has a double facade: one overlooks the Paeria square and is built in the civil

Romanesque style, while the other neoclassical facade, with a neo-mediaeval refurbishment dating from 1929, faces the River Segre. The result is a perfectly balanced construction. The building was built in the early 13th century, and in 1383 the owners, the Lords of Sanaüja, donated it to the city as the seat of municipal government. Today the Paeria houses numerous treasures reflecting the city's identity like Roman and Arabic ruins, witnesses of the past history of Lleida.

The Seu Vella is the most outstanding building at the monumental complex that bears its name and its silhouette, the skyline of the city. It is the old cathedral of Lleida that was used as fortress for three centuries and recovered last century as monument for the city (part of the world heritage by UNESCO). Defined as one of the best artistic productions of 13th century Catalan architecture and, by extension, of European medieval architecture, the Seu Vella is a singular cathedral that leaves no one indifferent. Its architecture shares the limelight with high quality carvings that are preserved in capitals, cornices, corbels, portals, etc. The substantial remains of preserved mural paintings or the chapels built by prominent families or distinguished church members are a reflection of a prestigious building with a splendid past. Sobriety, grandeur and magnificence are some of its attributes. However, there are many more to discover. For instance, the climbing to the top of the clock tower (by a stair of 264 narrow steps) was an adventure shared by the group. They got on top a final reward in terms of an impressive view of the city and the surroundings.

The Castle of the King or “Suda” is located on the top of the hill. The popular name of Suda is an Arabic word which means a closed urban area. The Suda name referred to the Andalusian fortress built during the 9th century on the site now occupied by the Castle of the King. It was the palace where the king resided during his stay in Lleida. Its construction reflects different phases between the late 13th and 14th century, which is why Romanesque and Gothic forms coexist. At these periods, it was the most remarkable civil building in the city and an important centre for political decisions. Its walls were the scene of momentous events in the history of Catalonia and the Kingdom of Aragon. In addition to the various courts that were held, some of the most prominent acts were most likely the marriage between Petronila of Aragon and Ramon Berenguer IV, Count of Barcelona, in 1150; the recognition of James I as king in the Courts of 1214; or the imprisonment of Charles, Prince of Viana by his father, John II, in 1460.

6.2.3 Closure party of the ORAFM meeting

The afternoon of Wednesday 23th finished the meeting of the working group of OR in Agriculture and Forest Management. A party to say goodbye to the participants in the meeting not attending the ESI2014 was organised. The menu consisted in many different “tapas” giving a typical taste of the region. Furthermore, this day was the birthday of Prof. van der Gaag who was offered with a birthday cake and congratulated by everybody.

6.2.4 Running competition (6 km)

Just to change the activity and also to distress the participants, the participation to a special running competition was proposed to all laureates. The registration fee was covered by the organisation of ESI. The competition was special because it was at night and around the Seu Vella visited the day before during the day. Six laureates and one professor took part in the competition and fulfilled the best expectations.

6.2.5 Visit to a dairy farm

The weekend, on Saturday 26, different visits to show some farms in the surroundings of Lleida were proposed. The first one was an advanced dairy farm of two thousand cows and using high technology. The laureates put many questions to the person who assisted us during the whole visit. It was very amusing. It was possible to see also the birth of a calf.

6.2.6 Visit to big farm in Lleida (1000Has)

The next visit on Sunday was to a huge farm (considering the regular sizes in Spain) of more than one thousand hectares. A visit by car of different parts of the farms with orchards and crops like cereals was performed in a couple of hours. The special care to maintain the productivity rates of the farm, the irrigation system and the quality of soil were some of the aspects that attracted the attention of visitors. Afterwards, a lunch was offered in the same restaurant where the personnel of the farm have meals daily. Even though, the restaurant is also open at a reasonable rate to anybody who wants to taste their specialities. The owner of the farm assisted us at any moment giving information and explanations to any question raised by laureates.

6.2.7 Visit to a Fruit packing plant

The journey ended with a visit to a Fruit packing plant recommended by the second farmer. The fruit packing plant was operating at full capacity, although the market perspectives were not very good due to the chilly weather in Europe at the moment.

6.2.8 Excursion to the beach

On Sunday 27 an excursion to the beach was proposed and accepted by most of the laureates. The organisation provided train tickets to get one of the nearest beaches to Lleida. The day was sunny and all people were back in the evening.

6.2.9 ESI2014 party

This activity was proposed to be held on Monday 28th evening, just at the beginning of the second week in Lleida. As learnt by other ESWI, all people were asked to bring or prepare something typical from their original country. Drink (wine, spirits or some typical drink from the corresponding countries) or some simple meals were the main contributions. It is worthy to note the enthusiasm of several laureates who were willing to cook for the dinner well in the room well in the kitchen of an organiser. Several participants, very stimulated by the challenge, went to buy different products or tools to better prepare the dish he/she wanted to cook. All in all, the goal was to make a 'multi-cultural' party apart the regular dinner served at the Residence. This way all laureates, invited speakers and relatives could eat and taste something. The dinner took place in the underground floor of the Residence. It started at 20:30 and ended around 23:00 and everybody was surprised by the quality of the dishes offered.

6.2.10 Visit to the “Museu diocesà” (Lleida)

On Tuesday 29th July was the visit to the “Museu Diocesà”. It is the museum of history of the province of Lleida but with many other important expressions of religious art. It has more than 7000 square metres of exhibition space holding elements beginning with prehistory and continuing up to the modern era. It was possible to have a guided visit in English. An old map of Europe was one of the attractions of the visit. Everybody tried to find his country, at least the European participants!

The laureates could appreciate the combined product of two century-old collections, the aim being to bring together in one single building museum exhibits illustrating the city and its areas of influence. One features the sacred art drawn from the Diocesan Museum, bequeathed by the museum set up in 1893 by Bishop Messeguer. The other is the archaeological collection of the IEI (Lleida Studies Institute), dating back to the Antiquities Museum founded in the mid-19th-century, with its exhibits transferred to the IEI in 1942. The 974 pieces of art and archaeology housed in the museum's permanent collection include in particular collections from the Bronze Age, the eras of the Ancient Iberians and Romans, along with the Bovalar Visigothic collection, with the baptistery as its centrepiece. Mention should also be made of the rock crystal chess pieces (from the Fatimite period, 11th century); the Romanesque altar fronts; the stone sculptures; the murals of Pia Almoina; the Gothic paintings; the 14th-century sculpture of the so-called School of Lleida; the Flemish tapestries; and the liturgical vestments of Pope Callistus III

The evening, after the visit and before having the dinner some participants led by Sara Rodriguez went to discover “tapas” and have something to drink. “Patatas bravas” were discovered and enjoyed by many laureates (sort of typical hot potatoes).

6.2.11 City tour by bus (Lleida)

This tour was held on Wednesday the 30th of July once academic activities were over. The tour was in bus, with English translation of a recorded system explaining main attractions of the city. It took one hour more or less and it linked with dinner time. The first bus was missed, but the second one was ok. During the waiting time for the second bus the participants had a drink or an ice cream next to the bus stop making more pleasant the wait.

The city tour ended in the Templar Castle of Gardeny with a relaxed visit of the of this castle and surroundings. The Gardeny monumental complex is one of the key examples of Templar architecture erected in Catalonia during the second half of the 12th century. Although substantial modifications were made between the 17th and 18th centuries, altering the former appearance of the mediaeval complex, numerous traces of the sovereign compound still remain. An area marked off by a perimeter wall and flanked by towers, inside which there was an arrangement of different buildings structured around a central courtyard. These buildings included in particular the residential tower, a solid two-storey construction which housed a number of different premises: storage areas, residential areas and the tower of homage. Other key features of the monument included the Romanesque church of Santa Maria de Gardeny, a landmark building inspiring considerable devotion at the time.

6.2.12 ESI 2014 Banquet

The ESI 2014 banquet took place in the Galeon Restaurant in Lleida. The Restaurant was excellent, with waiters speaking English and making easier the ordering of dishes. At 21:00 was the banquet. As starter there was a sample of typical cuisine of Catalonia before the main course that every one could choose. On the other hand, the banquet was very emotional in the end because participants wanted to thank the organisation of ESI2014 and there were talks and thanks giving in all senses. It was a sample of the hopes of going on touch after the end of ESI2014. After the banquet some people went to rest and other to have some drink.

6.2.13 *Barbecue*

The following morning on Friday, after the breakfast some people leaved Lleida, the rest of them were invited to a barbecue in the country side. The menu was Mediterranean salad and grilled meat of different kinds. Cheese and honey as desert. It was a very friendly ambiance and a nice end of Summer School. We spent all the day and everybody say goodbye to each other and wished the best for future.

6.3. *Detailed Program*

The detailed program drawn by the Scientific and Organizing Committees of the EURO Summer Institute on OR in Agriculture and Forest Management was the following:

Figure 3 a) First days in Lleida, overlapping ESI2014 and meeting of the ORAFM working group:

Week #1	Sunday	Monday	Tuesday	Wednesday
8:00-8:30		Welcome to participants		
8:30-10:00		Invited talk 1 Ilan Halachmi	Invited talk 2 Jacqueline Bloemhof	Invited talk 4a Anders R. Kristensen
10:00-10:30		Café	Café	Café
10:30-11:15		Presentation 1 Nir Halman	Presentation 8 Joanna Makulska	Presentation 11 Sara Rodriguez
11:15-12:15		Presentation 2 Michael Adedotun	Presentation 9 Magdalena Hędrzak	Presentation 12 Reza Pourmoayed
12:15-13:15		Presentation 3 Javi Navarro	Presentation 7 Rafael do Oliveira Silva	Presentation 13 Bulut Aslan
13:15-13:30		Joint discussion	Joint discussion	Joint discussion
13:30-14:00		Lunch	Lunch	Lunch
14:00-14:30				
14:30-15:00				
15:00-15:45		Presentation 4 Mahmoud Hozayn	Invited talk 3 Linda van der Gaag	Invited talk 4b Anders R. Kristensen
15:45-16:30		Presentation 5 Jitka Janová		Computer lab
16:30-17:15		Presentation 6 Maria Anna Huka	Visit of the city center: "Seu Vella" and "Palau del Rei"	
17:15-17:45	Reception	Café		Café
17:45-18:30		Presentation of EURO-ORAFM	Meeting of ORAFM Closure session	
18:30-19:00				
19:00-19:30				
19:30-20:00				
20:00-20:30		Dinner	Dinner	Special Dinner
20:30-21:00				
21:00-21:30				

Figure 3 b) Once the ORAFM meeting was over:

Week #1/2	Thursday	Friday	Saturday	Sunday	Monday
9:00-10:00		Invited talk 6	Excursion to a winery	Let's go to the beach!	Invited talk 7
10:00-11:00	Presentation 14	Marcela Gonzalez			Silvia Miquel
	Wladimir Soto				
11:00-11:30	Café	Café			Café
11:30-12:30	Invited talk 5	Presentation 16			Presentation 18
	René Villalobos	Gaston Notte			Ozan Evkaya
12:30-13:30		Presentation 17			Presentation 19
		Morteza Zangeneh	Ali Asghar		
13:30-13:45	Joint discussion	Joint discussion	Joint discussion		
13:45-14:00	Lunch	Lunch	Lunch+Wine tast	Lunch	
14:00-14:30					
14:30-15:00					
15:00-16:00	Presentation 15	Deabate: "OR in the agriculture and Agro-industry"	Way back to Lleida	Free time	
	Nicholas Mason				
16:00-16:30	Joint discussion				
17:15-17:45	Café				Café
17:45-18:30					
18:30-19:00					
19:00-20:00					
20:00-20:30	Dinner	Dinner	Dinner	Dinner	Dinner:
20:30-21:30					bring your typical dish/drink to share!
21:30-22:00					
22:00-23:00		Running Competition 6km			

Figure 3 c) Second week in Lleida

Week #2	Monday	Tuesday	Wednesday	Thursday	Friday	
9:00-11:00	Invited talk 7	Invited talk 8	Invited talk 10	Invited talk 12		
	Cori Vilella	Victor Albornoz	Concha Maroto	Laureano Escudero		
11:00-11:30	Café	Café	Café	Café		
11:30-12:30	Presentation	Presentation 20	Presentation 22	Presentation 24		
	Lluís M. Plà	Narges Banaeian	Thakur Upadhyay	Esteve Nadal		
12:30-13:30	Axeb Biotech Ltd.	Presentation 21	Visit to the Fruit Centre	Presentation 25		
	Javier Hijós	Vladimir Caceres		Jordi Mateo		
13:00-14:00	Lunch	Lunch	Lunch	Lunch		Lunch or Barbecue
14:00-14:30						
14:30-15:00						
15:00-16:00	Free time	Invited talk 9	Invited talk 11	Discussion: Special issue on ESI2014 papers	Departure of participants	
16:00-17:00		Gloria Fiestras	Angel Juan			
17:15-17:45		Café	Café	Café		
17:45-18:30		Visit of Museum of Lleida	Turistic Bus & Visit of the Gardeny Castle	Evaluation and Future actions		
18:30-19:00						
19:00-19:30						
19:30-20:45		Dinner: bring your typical dish/drink to share!	Dinner	Dinner		Banquet
20:45-21:45						

7. Outcomes

The main outcome of the ESI2014 is the friendship generated among participants. This could lead to fruitful collaborations. For instance, Prof. van der Gaag was committed to prepare a tentative draft for a proposal to the 2020 Horizon. On the other hand, to explore the preparation of a COST action was also considered among some keynote speakers and participants.

On the other hand, laureates were informed about the edition of a book collecting works of many of the participants in the ESI2014. The idea was to offer one volume to each participant, but the printing and completion of the book has been delayed to the beginning of next year. The book entitled: Handbook of Handbook of Operations Research in Agriculture and the Agri-Food Industry published by Springer will be offered to each participant once it will be printed.

A workshop on optimization under uncertainty in sustainable agriculture and agrifood industry is being prepared upon demand of laureates. It will be held in Lleida by the end of July 2015. The registration fee for ESI2014 participants will be free of charge.

Finally, it was agreed by all participants to make efforts to meet each other again in next EURO Conference in Glasgow 2015. Exploring alternatives for repeating this or similar experiences for not losing the contact and increase the visibility of the group was as well accepted.

8. Budget report: supports and expenses

The original budget presented at EURO was:

Incomes:

- EURO (25000€)
- The University of Lleida (3000€)

Additional application:

- Spanish Ministry of Education (6000€)
- Local Administration (6000€)

Expected expenses:

- Keynote Speakers (12000€)
- Participants (20000€)
- Committee expenses (2000€)
- Social Programme (6000€)

In the end these were the final results:

Incomes:

- | | |
|-------------------------------|-----------|
| ▪ EURO | 12000,00€ |
| ▪ Local Administration | 1500,00€ |
| ▪ Registration fee (non EURO) | 710,00€ |

Expenses:

▪ Keynote Speakers	2678,05€
▪ Accommodation- meals of participants	8228,30€
▪ Local Administration	1500,00€
▪ Excursion and social events	1653,34 €
▪ <u>Support from weak currency countries</u>	<u>1093,65€</u>
Total:	15153,34€
Total per laureate (17):	891,37 €
Total per attendant laureate (12):	1262,78 €

About expected incomes due to the economic crisis restrictions made impossible to get financial support from other institutions as initially expected. This fact made to cancel gratuities reserved for keynote speakers and only cover for them travel costs to Lleida from the departure city in Spain. This aspect had been already stated in the letter of invitation. The unexpected casualty of Dr. Silvia Miquel caused a low extra cost thanks to the availability of Dr. Cori Vilella from Universidad Rovira Virgili (Tarragona, Spain). Other speakers also contribute to lighten this chapter because they had personal budget for this activity. It was a little bit annoying several inconveniences found regarding unforeseen costs as the withdrawn of the local administration support (of 1500€) and the cost of casualties and cancellations of some laureates at the last moment, when several services were already booked. In the end, thanks to the support of EURO, either directly with the support to ESI2014 or indirectly through the ORAFM working group, all the expenses were covered.

9. Conclusion

The final conclusion is positive, a very positive experience for every body, even for the organisation. Many laureates were willing to repeat next year the experience! It was detected the general interest on topics treated during ESI2014 and a lack of meeting points to deal with them under an OR perspective. There is also an interest to go more in deep in different topics. For instance, a survey among laureates was done to check the most interesting method in which they would like to have more information. As result, the most popular topic was stochastic programming and a challenge to organise a Workshop on Stochastic Programming in Agriculture was launch. At this moment, an agreement between three EWG (ORAFM included) has been reached to organise such a Workshop next year in Lleida (more info at: <http://orafm.org/workshop2015>).

The organising committee would like to thank to the EURO Executive Committee members the trust and the opportunity you gave us of preparing such a rewarding event in many aspects.

Many thanks.

On behalf of the organising committee.
L.M. Plà
Chair.

Appendix 1. Some Pictures



Participants visiting the Seu Vella



After the running competition



In the party with the typical dinner



The banquet



In the barbecue, the last day

EURO Summer Institute. OR in Agriculture and Agrifood Industry



- Reza Pourmoayed
- Esteve Nadal
- Jordi Mateo
- Nir Halman
- Gaston Notte
- Vladimir Caceres
- Vladimir Soto
- Morteza Zangeneh
- Narges Banaeian
- Nicholas Mason
- Thakur Upadhyay
- Sara Rodriguez
- Lluís M. Pla



Abstract of main social activities