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SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

Sari-Maarit Peltola, Seliina Päällysaho & Sirkku Uusimäki
(eds.)

# Proceedings of the ERIAFF conference ‘Sustainable Food Systems: Multi-actor Co-operation to Foster New Competitiveness of Europe’

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Sari-Maarit Peltola, Seliina Päällysaho &
Sirkku Uusimäki (eds.)

# Proceedings of the ERIAFF conference ‘Sustainable Food Systems: Multi-actor Co-operation to Foster New Competitiveness of Europe’

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Euroopan aluekehitysrahasto

Vipuvoimaa EU:lta 2007–2013

SeAMK
SEINÄJOEN AMMATTIKORKEAKOULU
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCE

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# FOREWORD

## South Ostrobothnia – Original Culture, Rich History, and Entrepreneurial Spirit

The region of South Ostrobothnia is one of the successful regions in Finland. Through cooperation between its municipalities and cities, as well as between different interest groups, the region has entered a growth path. The region is known for its agriculture and entrepreneurial activity. Despite of its cold climate and short summers, the region of South Ostrobothnia is called the Food Province of Finland.

The main elements for creating a strong base for the food sector in the region of South Ostrobothnia are expertise in the field of sustainable and effective solutions for food systems and bio-economy, intelligent and energy-efficient system innovations, and the renewing production of services and events. The region is actively working for sustainable innovations in agriculture as well as in the food and forestry sectors. The emphasis is on the entire agro-food production chain, including nutrition and human well-being as a whole.

The world is changing, and European regions are facing various challenges. However, we are sure that international multi-actor co-operation can open new opportunities and foster new competitiveness for Europe. We see the ERIAFF network as an important element for developing international co-operation, sharing knowledge and creating more sustainable solutions for food systems in the future. The development of sustainable food system concerns the entire European Union and its citizens. For this, we need cross-border co-operation between regions from south to north and from east to west.

**Asko Peltola**
Regional Mayor
Regional Council of South Ostrobothnia

**Tapio Varmola**
President
Seinäjoki University of Applied Sciences

# INTRODUCTION

The ERIAFF Conference was organised by a consortium of partners from the Satakunta and South Ostrobothnia regions together with the ERIAFF network. The event was held on June 10–12, 2014 and took place in the heart of the South Ostrobothnia Region, Seinäjoki, Finland.

The ERIAFF network (European Regions for Innovation in Agriculture, Food and Forestry) focuses on moving the regions towards a better coordinated multi-actor co-operation between its' regions within the agriculture, food and forestry sectors. Networks' main task is to create innovative actions for the growth and sustainability of the sector. At the moment there are 30 member regions, 19 observing regions participating in the actions of the ERIAFF network.

The focus of the ERIAFF Conference 2014 was to recognize and have a strategic discussion on the common innovation and research priorities in the field of food systems in the future, both on the national and regional as well as European level. The ERIAFF Conference also aimed to connect stakeholders from various sectors around project, research and business ideas and to encourage SMEs to take part in the international activities in the sustainable food systems. The selected theme stressed that innovation should happen all along the whole Agri-food Chain.

With its broad program the Conference was a mix of exchanging knowledge, creating innovative partnerships, networking with international organisations and participants. The conference took a foresight to the future and aimed to have an input to the European, national and regional policies in order to create a cooperation that meets the actual, bottom-up needs that arise from the various actors in the chain of sustainable food systems.

ERIAFF Conference created an essential link between international and national co-operation. Seinäjoki's 'Green Creative Garden – sustainable and efficient food system solutions' is part of the national Innovative Cities (INKA) program for bioeconomy in association with the urban areas of Joensuu (coordination responsibility) and Jyväskylä. The goal of the programme is to develop Seinäjoki into an internationally known breeding ground for the development of food systems and thus make Finnish companies into the forerunners of this industry, that is, providers of global food system know-how and solutions with high added value. The INKA-program began in early 2014, and it is managed by the Finnish Funding Agency for Innovation (Tekes).

This report contains proceedings of the ERIAFF conference and consists of full papers and short summaries. Finally, there is a Closing Speech of the ERIAFF Conference 2014 by Gianni Salvatori, Regional Minister of Tuscany Region.

Seinäjoki, October 2014

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# PART I
Full Papers

# Reproductive Safety of Food: Studies on Fetal Exposure Using Human Placental Models

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**Francesca Ietta, Chiara Mannelli & Luana Ricci Paulesu**
University of Siena

## 1 INTRODUCTION

Among long-term toxic effects cancer and reproductive toxicity are serious, cancer because it is still treatable only in part of cases, and reproductive toxicity, because it potentially affects future generations in addition to the exposed one. Genotoxic damage is an important mechanism of both of these, and typically human carcinogens are also teratogens, e.g. alkylating cancer drugs, carcinogenic polycyclic aromatic hydrocarbons and ethanol. Hormonally active compounds may have both of these effects as well, as an example diethylstilbestrol, which is teratogenic and carcinogenic in both female and male reproductive organs (e.g. Birnbaum & Fenton 2003).

In food, depending on the source and preparation, many carcinogenic and hormonally active compounds can occur. When a pregnant mother eats such food, the compounds are distributed through the maternal circulation into the placenta and typically through the placenta to the fetus (Vähäkangas et al. 2011). It has become obvious over the years that placenta does not provide much protection for the fetus against chemical compounds, although it has both xenobiotic metabolism and various transporter proteins (Vähäkangas & Myllynen 2009).

Human placenta is a complex organ with separate circulations for the maternal and fetal parts of the placenta. Blood never changes between these circulations and compounds go through minimum of two cell layers: syncytiotrophoblast on the maternal side and endothelial cells in fetal vessels are the only cell layers at term of pregnancy. This feto-maternal barrier is thicker first but grows thinner during pregnancy. Because cell culture cannot easily model whole placental structure, other models have been developed retaining better the structure.

# 2 MODELS IN USE TO STUDY REPRODUCTIVE TOXICITY-RELATED ISSUES EXPERIMENTALLY

## 2.1 Need for Human Placental in Vitro Models

Placenta as an organ is special because it varies from one species to another more than any other organ and animal placenta does not model well human placenta and its physiology (Benirschke et al., 2006). For instance, the development of human placenta, although it has been largely studied in animals, differs from that in all the other species. Thus, *in vitro* models utilizing human placenta need to be developed to investigate factors influencing human placental formation and development. For obvious ethical reasons studies on human placenta can be performed only in tissues obtained after natural or elective termination of pregnancy or after delivery.

For decades already there has been an effort to develop human models to study placental transfer and toxicity, e.g. human trophoblastic cancer cell lines. Other *in vitro* models of human placenta have been set up to study placental transfer. Some of these models exemplify the transfer across a single cell layer, while others retain all the placental barriers (syncytiotrophoblast, cytotrophoblast, basal membrane and endothelial layer) (Vähäkangas & Myllynen, 2006; Mørck et al., 2010; Myllynen & Vähäkangas, 2013).

The Italian and the Finnish groups, collaborating in this paper, have applied and developed *in vitro* models based on normal placental cells and tissues for the identification of chemicals which might be hazardous for the establishment and development of human placenta. These models can be used to study transplacental transfer, placental transporter proteins, placental xenobiotic metabolism as well as molecular toxicity in placental tissue.

## 2.2 Human Placental Cells

Primary cells from human placenta do not proliferate *in vitro* and thus cannot be cultured for long time (Depoix et al., 2013; Hunkapiller and Fisher, 2008). For this reason, many immortalized and carcinoma-derived cell lines have been set up to study selected aspects of the human placenta *in vitro* (Sastry, 1999). For example, the choriocarcinoma BeWo, Jeg-3 and JAr cell lines are used to study establishment of placenta and the endocrine features of the trophoblast, while the immortalized human trophoblast cells HTR-8 SVneo are used to study the process of trophoblast invasion (Evron et al., 2011; Wang et al., 2012).

Among the available human trophoblastic cell lines, BeWo trophoblastic cancer cells retain many biochemical characteristics of human trophoblast, and have been used by the Italian research group, to examine toxicity of environmental compounds in human trophoblast (Bechi et al., 2013) and by the Finnish research group, to examine the effect of the chemicals on placental transporters and molecular responses (Kummu et al., 2012; Repo et al., 2014). While cell lines enable the study of a single cell type at the time, the human placenta consists of many cell types. Some *ex vivo* models offer the opportunity to maintain all the main placental cell types in the same culture (Miller et al., 2005; Myllynen and Vähäkangas, 2013).

## 2.3 Cultures of Chorionic Villi from Human Placenta

Among human placental models, explants of human chorionic villi represent a powerful tool, close to the *in vivo* situation (Fig 1., Genbacev and Miller, 2000; Miller et al., 2005). Human placental villous explants represent the structure of placental barrier and they consist of many cell types: fibroblasts, myofibroblasts, smooth muscle cells, endothelial cells, blood cells, placental immune cells, cytotrophoblasts and the layer called syncytiotrophoblast (Miller et al., 2005; Benirschke et al., 2006). Villous explants, isolated from placentas after normal pregnancies, provide more valid and generalizable method to study human reproductive toxicology than widely used placental cancer cell lines. Villous explants of both first trimester and term placentas can be isolated (Figure 1) and cultured for several days. Explants of chorionic villi are used to study placental endocrinology and trophoblast invasion (Genbacev et al., 1993; Miller et al., 2005). They provide useful insights on first trimester and term placenta (Miller et al., 2005; Myllynen and Vähäkangas, 2013). This feature is of particular importance, because the human placenta shows striking differences between its developmental stages (Drolet et al., 2007; Lisman et al., 2007; Qiu et al., 2005).

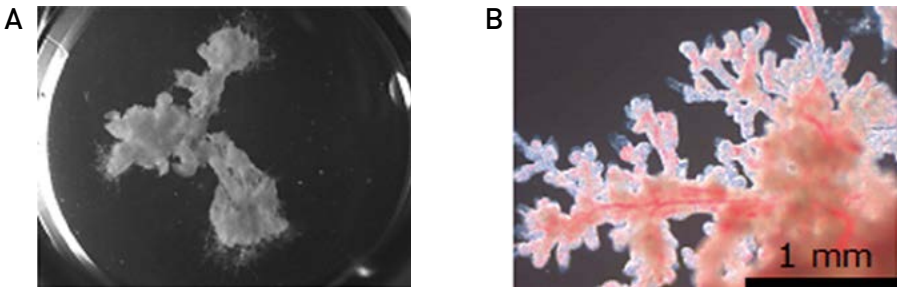


Figure 1. First trimester (A) and term (B) villous explants in cell culture medium at 24 hours. Photos taken by F. Ietta (A) and J. Repo (B).

The model of human placental villous explants has been set up and largely used by the research group of the University of Siena (Table 1). This model includes dissection of terminal villi with five to seven tips from human placental tissues. Placental villi can be cultured either in cell culture medium (1st and 3rd trimester placenta) or in Matrigel (only 1st trimester placenta). For the latter type of cultures, villi are gently placed on Millicel culture dish inserts pre-coated with a thick layer of Matrigel then left until tissue adhesion before to be exposed to chemicals. Unlike isolated trophoblastic cells, the chorionic villous explants have the advantage that they maintain the cell-cell and cell-matrix interactions, thus preserving all mechanisms of paracrine regulation. The application of this model is useful for the study of the effects of chemicals that can interfere with the processes characterizing human placental development in early gestation as well as at term (Miller et al., 2005).

In particular, by this model it is possible to monitor several biological parameters for human placenta such as the secretion of the hormone human chorionic gonadotropin (hCG) and different cell processes involved in placentation such as the secretion of metalloproteinases 2 (MMP-2) and MMP-9, markers of placenta invasiveness in the maternal uterus.

**Table 1. Variation in β-hCG, MMP-2 and MMP-9 secretion by human chorionic villous explants after chemical exposure at the concentrations selected.**

| Compound | Concentration | β-hCG | MMP2 | MMP9 |
|---|---|---|---|---|
| Atrazine (ATR) | 1 μM | ↔ | ↔ | ↔ |
| Bisphenol A (BPA) | 1 nM | ↑ | ↔ | ↓ |
| Diethylstilbestrol (DES) | 1 nM | ↔ | ↑ | ↔ |
| Diethylstilbestrol (DES) | 1 nM | ↑ | ↑ | ↓ |
| Resveratrol (RES) | 1 μM | ↑ | ↑ | ↓ |
| 17β-Estradiol (E2) | 1 nM | ↑ | ↔ | ↔ |

**Significant difference: ↑ = increase, ↓ = decrease,**

**not significant difference: ↓ = decrease, ↔ = not change,**

**vs control (vehicle exposed) cultures.**

## 2.4 Human Placental Perfusion

Perfusion means keeping tissue alive through artificial circulation. Perfusion of one cotyledon of human placenta after birth was first described by Panigel (1962) with further developments by Schneider and coworkers (1972) and Miller and coworkers (1989). The model retains the full structure of human placenta and imitates the physiological conditions in the placenta with separate maternal and fetal circulations. It is the only experimental model where transplacental transfer of compounds can be studied through the natural materno-fetal barrier (Vähäkangas & Myllynen, 2006; Myllynen & Vähäkangas, 2013). It has been extensively used to study human placental transfer of clinical drugs, environmental compounds and social drugs (Vähäkangas et al., 2011).

For human placental perfusion term placenta is collected directly after the birth from the hospital after getting a signed informed consent from the mother (e.g. Annola et al., 2008; Partanen et al., 2010; Veid et al., 2012). After flushing placental blood vessels with heparin-containing medium to prevent blood clotting, part of the placenta with cannulated vein and artery is hooked into the perfusion equipment. Maternal and fetal circulations are perfused separately. The compound of interest is typically inserted into the maternal circulation. By taking samples from both circulations and analyzing the concentrations of the compound, transplacental transfer of the compound can be determined and compared (Table 2). Strict criteria for a successful perfusion experiment, including a reference compound antipyrine used in all perfusions, are followed (Vähäkangas et al. 2011). In addition to transplacental transfer of drugs and other xenobiotics, their acute effects on the placental tissue can be studied. Perfused placenta retains also xenobiotic metabolism as shown by the formation of benzo(a)pyrene-DNA-adducts (Karttunen et al., 2010) and Aflatoxin B1 metabolites (Partanen et al., 2010) during placental perfusion.

Table 2. Transplacental transfer of toxic food contaminants and social drugs in perfused human placenta.

| Compound | FM-ratio[a] | Perfusion time (h) | Toxicity of the compound | Reference |
|---|---|---|---|---|
| Acrylamide | 1.05 | 4 | Neurotoxic, mutagenic, carcinogenic, fetotoxic, toxic to reproduction | Annola et al. 2008 |
| Aflatoxin B1 | 0.6 | 6 | Carcinogenic, toxic to liver | Partanen et al. 2010 |
| Benzo(a)pyrene | 0.75 | 6 | Carcinogenic, teratogenic | Karttunen et al. 2010 |
| Ethanol | 0.98 | 3 | Carcinogenic, teratogenic, neurotoxic | Veid & Karttunen et al. 2011 |
| Gold nanoparticles (Pegylated) | 0.00 | 6 | Potentially inflammatory | Myllynen et al. 2008 |
| IQ | 0.97 | 4 | Carcinogenic | Immonen et al. 2010 |
| Melamine | 0.6 | 6 | Toxic to kidneys | Partanen et al. 2012 |
| Nicotine | 0.88 | 3 | Addictive, toxic to cardiovascular system and fetus, neurotoxic, possibly carcinogenic | Veid & Karttunen et al. 2011 |
| Nitrosodimethyl-amine (NDMA) | 0.98 | 4 | Carcinogenic, teratogenic | Annola et al. 2009 |
| Ochratoxin A | 0.02 | 6 | Nephrotoxic, teratogenic, carcinogenic, neurotoxic, immunosuppressive | Woo et al. 2012 |
| PhIP | 0.72 | 6 | Carcinogenic | Myllynen et al. 2008 |

a FM-ratio means feto-maternal ratio and is calculated as the ratio of the concentration in fetal circulation divided by the concentration in maternal circulation.

# 3 CHEMICAL COMPOUNDS OF INTEREST

By using the chorionic villous explants, the research group of Siena has investigated the effect of several chemicals characterized by estrogen-like activity e.g. Atrazine (ATR), Bisphenol A (BPA), Diethylstilbestrol (DES), Para-nonylphenol (p-NP), Resveratrol (RES) and 17β-Estradiol (E2), especially in early human placenta (Table 1; Bechi et al., 2006, 2010, 2013; Mannelli et al., 2014). The Finnish group has long experience in human placental perfusion and among other molecules, various food carcinogens, such as benzo(a)pyrene (Karttunen et al. 2010), acrylamide (Annola et al. 2008) and aflatoxin B1 (Partanen et al 2010) have been studied. A typical feature of these compounds is that most of them go very easily through human placenta and thus reach the fetus (table 2). One known mechanism of inhibition is the placental ABC-transporters (Vähäkangas et al. 2011). Currently the groups have joined forces to set up culture of term placental villi in Kuopio to compare the effects of nicotine and ethanol in early and term placenta.

# 4 CONCLUSIONS

We can safely say that by far the most compounds go easily through the human placenta although there is variation between the compounds as has been shown in human placental perfusion studies. Perfusion of term human placenta is the only experimental method that retains the full structure of the human materno-fetal barrier. It is possible to culture both early and term human trophoblastic villi so that they retain functional biochemical characteristics. This model, which retains all cell types of human placenta in structurally correct organization, enables the comparison between human placenta of different developmental stages. Although BeWo cells do not contain all human placental transporters, they are useful for studies on those transporter and toxicity related proteins that exist in these cells.

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# From Consumers into Food Citizens Through Education

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## 1 INTRODUCTION

Education has to follow the changes taking place in the society, both globally and locally, this is especially true what comes to higher education preparing graduates for their future careers. Finnish universities of applied sciences (UAS) have been given by the Ministry of Education and Culture three main tasks (L 9.5.2003/351): in addition to education they need to be involved in regional development and applied research in the disciplines they organise studies. Consequently, this has to be kept in mind and when planning new UAS curricula. The studies should not only prepare students with the competences needed in the prevalent societal situation but they should also give them competences for developing their branch according to the requirements emerging from the changes in the society.

Young graduates are faced with a much more challenging and complex world than before and their education should prepare them for it, the situation is rather similar regardless of the field of study. Both sustainability and food systems are very complex and global by nature, therefore graduates need new kind of competences to cope. They need a more global mindset than before; even the local issues must be seen in a broader context. The new situation calls for more holistic trans-disciplinary approaches, which have been found to be helpful in moving towards more sustainable food systems (Hinrichs 2010).

This article deals with the Sustainable Gastronomy specialisation at JAMK University of Applied Sciences (JAMK) in Finland. The specialisation comprises of 116 cr (European Credit Transfer System credits) of the total 210 cr in the Bachelor Degree Programme in Hospitality Management. The goal of the specialisation starting in autumn 2014 has been defined as a question: In what ways can we support students in sustainable gastronomy to become curious, innovative and responsible agents of change in the dynamic context of food in society? (Adapted from Lieblein et al. 2012). The move from a consumer into a food citizen is an important part of the learning process in Sustainable Gastronomy.

# 2 REASONS AND REALITY FOR THE SUSTAINABLE GASTRONOMY SPECIALISATION

The future focus of JAMK food studies had to be planned keeping in mind the current teaching staff and JAMK's focus on business, entrepreneurship and management. The decision was made to focus the new specialisation on the whole food system and look at the food chain from farm to fork, naturally concentrating still more towards the end of the chain as there was our strongest expertise. This chapter summarises the relevant both national and global developments which had to be also carefully considered.

### a. Higher Education Reform in Finland

The most comprehensive national reform in the decades of the higher education, research and innovation system in Finland, was launched by the Government in 2007. It started gradually and included both the parallel higher education (HE) sectors, research universities and universities of applied sciences (also called 'polytechnics'). The finances, administration and steering of HE institutions would be reformed and the structure, research system, infrastructures and financing would be developed (Strategy 2009). It was evident that the number of HEIs would be decreasing and the competition for the survival would be harder. (Polytechnic reform 2011–2014) In 2012 the Ministry of Education and Culture cut down the number of student places in UASs drastically, the loss was especially big in the field of tourism and hospitality studies including food (from 1593 to 1023 places, –35.7%). (Minedu press release 2012) This forced also JAMK to consider what to do with the remaining student places in the field of tourism and hospitality (cut from 129 to 80, –38%). It was decided that one Bachelor programme out of three would be run down and the remaining 80 places were divided between the two remaining programmes 40 place each – Degree Programme in Tourism and Degree Programme in Service Management, the latter including food studies.

### b. National Food Related Strategies

In order to make wise decisions, national and regional strategies and policies concerning food sector such as National Food Strategy in 2010 had to be considered, moreover in 2013 separate national policy papers and development plans for local food and organic sector were drawn - all these have a timespan until 2020. The various strategies and policies are very unanimous and can be summarised as follows: the goal should be tasty, wholesome, safe and sustainable food. It can be achieved through increasing the appreciation of food and its production, developing new structures in food policies, enhancing cooperation and communication between different actors in food networks, and sharing the view of the food sector as a growth sector in the society. Special

emphasis should be put on local and organic food. (Selonteko 2010, Food for Tomorrow 2010, Lähiruokaa 2013, Lisää Luomua 2013, Pro Ruokakulttuuri 2013). The central role of the more active and conscious consumer in the fast changing food sector is also brought into attention.

### c. Sustainable Development and Food

The importance of sustainable development, and the role of young people in it, is emphasised at all levels, for example in the UN 'The Future We Want' outcome document from Rio +20 Summit in 2012 and in EU's Sustainable Development Strategy. In Finland a petition to educational institutes on each level to be active regarding the commitment followed the national commitment of the society to the sustainable development was published by the Ministry of the Environment in January 2014. (UN, EU, YMa, YM 2014a, YM 2014b) Educating young people, the ones usually fastest to act and looking into future, could to some extent answer these concerns. The central issues in sustainable food education to be considered are the challenges brought by the climate change, 'peak oil' and the depletion of freshwater resources, understanding the rise of the global food system and its consequences for the environment, exploring the opportunities for bigger localisation and reshaping of consumption, and recognising the vital role of those involved in food communication in promoting the shift to more sustainable diets (Sage 2013).

## 3 DEVELOPING A SPECIALISATION IN SUSTAINABLE GASTRONOMY

### a. Content Choices

The planning process was begun with the decisions made on the compulsory JAMK studies during 2012 and then continued in the programmes independently. In spring 2014 the new curriculum is ready to be implemented and the first students in Sustainable Gastronomy begin their studies in autumn 2014. The contents of the specialisation were considered thoroughly considering all the data about the current situation, trends and needs both nationally and globally. Even though sustainability is a widely discussed topic in food and responsibility has been accepted as a competitive asset in food business, these issues can be seen surprisingly little in the curricula. In Finland there seem to be no higher education programmes focusing on food systems and the whole food chain. Some programmes use the slogan 'from farm to fork' in their advertising, however it cannot be clearly seen in their curricula. In secondary education, Helsinki

Culinary Institute has offered an elective module 'Sustainable Gastronomy' since 2011. Internationally the United States seems to be leading in food system studies, in Europe there are new more holistic programmes emerging now – for example MSc in Integrated Food Studies at Aalborg University in Denmark since 2011 and MSc in Gastronomy at Queen Margaret University in Scotland since January 2014. The European 'pioneer' in multidisciplinary sustainable food studies is undoubtedly the University of Gastronomic Sciences at Pollenzo, Italy. The study modules of the specialisation cover the whole food chain and reflect various disciplines such as social sciences, natural sciences, humanities, economics, and law. Some themes such as sustainability, responsible business, communication, understanding the food system, locality-globality dimension, run through the whole specialisation. The big number of electives gives the student the possibility to specialise even within Sustainable Gastronomy using the various possibilities provided by JAMK, international partner universities or virtual studies, company projects, anything matching the student's personal study plan and future career aspirations. With their individual degrees the graduates can find employment in food business, production, hospitality and food communication and, also have an active role in food related education and non-profit sector and social enterprises.

The process of creating and supporting Sustainable Food Systems (SFS) is multi-layered and dynamic and calls for understanding both local and global, both from the consumer's and provider's perspective, this dialogue we would also like to enhance through the specialisation. According to Blay-Palmer (2010:226) the sustainable food lens offers

> *'a holistic vision of sustainability that goes beyond economic and ecological concerns and priorities by imagining a food system that nourishes one's body as well as one's cultural, spiritual and pleasure needs, to embrace priorities such as accessible, affordable, culturally appropriate, healthful foods.'*

Sustainable Gastronomy specialisation has the following modules, all of them seen through the Sustainable Food Systems lens, in total 116cr out of the total 210cr (Bachelor in Hospitality Management):

| | |
|---|---|
| Food Culture | 10 cr |
| Food Production | 5cr |
| Food and Consumer | 5cr |
| Quality Factors on Food | 7 cr |
| Responsible Food Business | 10 cr |
| Operational Management of Food Services | 10 cr |
| Strategic Management of Food Services | 10 cr |
| Basics of Wine and Other Alcoholic Beverages | 5 cr |
| Elective Studies | 24 cr |
| Practical Training 2 | 15 cr |
| Bachelor's Thesis | 15 cr |

The rest of the studies consist of more general topics such as business and entrepreneurship, management, tourism & hospitality industry, languages and communication, ICT, R&D&I skills.

**b. Pedagogical Choices**

Having defined the contents, the planning continued with pedagogical considerations. It was clear that the study methods used should enhance students' learning and accumulation of the desired skills and competences, ways to operate and think. Some methods of experiential learning had already been used before with successful results (for example study tours and excursions, practical training, real life cases, events). Co-creation and service design were both familiar to our teaching staff, both of them experiential by their nature. However, these methods had not been used systematically. We had not really studied thoroughly Experiential Learning Theory (ELT), neither had we discussed the accumulation of learning nor organised the studies to facilitate students' learning in the best possible way. It was decided that in order to ease the implementation of the new curriculum and guarantee the quality of education and students' active role in their learning (according to JAMK strategy 2010) the experiential learning pedagogy was to be used for the specialisation. This was also confirmed by the positive student feedback and results in literature and from those practiced it before for example in agroecology. (Lieblein et al. 2004, 2012, Malinen 2014, Østergaard et al. 2010)

The focus of learning has to be on the student who brings his past experiences, knowledge and skills to the learning situation. He should learn skills necessary to handle complexity and change, link theory to real life situations, communicate and facilitate in an effective way, and be autonomous in their learning. (Lieblein et al. 2004, 2012) The graduates able to fit pieces together from many disciplines, systems specialists or integrators, are needed to confront and solve tomorrow's complex challenges (Op.Cit.). The student's active role is emphasised.

It is the task of education is to create a learning landscape and establish a dialogue-space where the students and teachers can meet with the stakeholders outside of university, the student bridging two 'worlds' of the food sector and education and their stakeholders in a dialogue. Figure 1 summarises the planned pedagogy, or the learning landscape: the student's learning following Kolb's cycle in the centre, starting from the individual student and his background then moving to the student's real life experience. The student is trying to understand the situation, find key issues ('what is there?') and start working on them ('what does it mean?'). On the way the student builds scenarios and considers different perspectives ('where do we want to go?), explores the relevant theory and methods. Finally the student suggests a solution or a development idea ('how can we get there?') to the chosen issue and presents his findings to the client. After that the student reflects his learning in the process. (Lieblein et al. 2004, 2012, 2013)

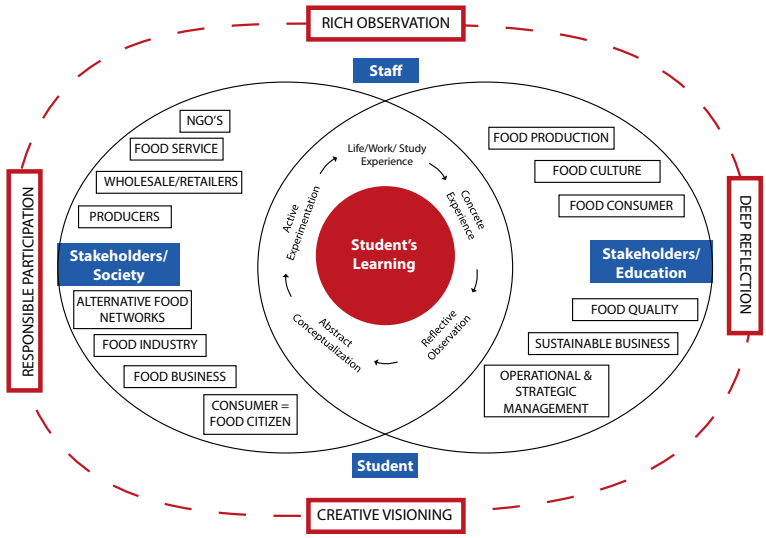


**Figure 1. Learning Landscape in Sustainable Gastronomy (Junttila, M. & Väisänen, K. (2014), adapted from Lieblein et al. (2012) and Kolb (1984)**

Throughout the process students study relevant theory and consider the methods to be used to get to the goal, naturally teachers are available as coaches and mentors, facilitating the learning and pushing the students forward. The tools for the different stages (observation/experience, participation, visioning, and reflection) in the learning process have to be practiced at the beginning of the studies. With this learning landscape we believe to reach the set learning goal.

## 4 DEFINING A 'FOOD CITIZEN'

It is a fact that due to the current food system and agricultural policies the distance between production and consumption has grown much bigger and, at the same time, the consumer has become more passive, uncritical and dependent. It seems though that this has been noticed and new developments are under way. A famous citation by Wendel Berry (1989) about 'eating being an agricultural act' is referred to in the Slow Food movement where the term 'co-producer' is used for a more active and conscious consumer who goes beyond the passive role of consuming and takes an interest in those who produce our food, how they produce it and the problems they face in doing so (Slow Food Terminology 2014).

In literature, the term 'citizen-consumer' is used for consumers increasingly driven by citizens' (ethical) values instead of consumers' (selfish) preferences. This group, born as a reaction to an unsustainable agricultural system, seems to be increasing in number and gaining more influence in the market. They are also often associated with alternative food systems due to their willingness to changes in the current ways of food production, distribution and consumption. (Lehner 2013)

As the goal of our education is to educate active responsible agents of change in the dynamic context of food in society, the word describing them best is probably 'food citizen'. Food citizenship is seen as 'the practice of engaging in food-related behaviours that support, rather that threaten, the development of a democratic, socially and economically just, and environmentally sustainable food system' (Wilkins 2005: 271). The word citizen refers to belonging to a place, it also carries duties and responsibilities along with various rights. The central role of education in building the food citizenship was acknowledged in the USA in 2003 by the Polson Institute for Global Development. (Wilkins 2005)

# 5 THE CHALLENGE AHEAD

The changes taking place in the society set great challenges to higher education preparing graduates for their future careers. In today's world there are no fixed answers, teachers are no longer authorities for learning, and the dialogue between education and the society has to be enhanced. The graduates have to be equipped with the right attitude, understanding of the complex systems, and tools for coping with the change. They also have to see to the future in order to be able to develop their branch.

The Sustainable Gastronomy specialisation at JAMK University of Applied Sciences in Finland tries to tackle with these challenges, both through the content and pedagogy chosen. Experiential learning seems to be suitable for more complex topics involving different stakeholders and requiring more holistic perspective. The specialisation offers its students on one hand a more holistic but on the other hand also a very specific perspective, looking into the food system through the Sustainable Food Lens. As the goal is to become 'curious, innovative and responsible agents of change in the dynamic context of food in society' it, in practice, means to grow into being a responsible food citizen.

Only the future shows to which extent the chosen content and pedagogy serve the learning goals, however, in its education offer on Sustainable Gastronomy JAMK University of Applied Sciences on its part will try to come up with one potential solution to the many challenges the food system faces today.

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# ‘You Feel Like My Blood, So I Buy Your Food’ –Can Consumers’ Experience of Kinship Account for Preferring Local Foods?

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## 1 INTRODUCTION

At the moment, academic research concerning social responsibility thrives. Choosing local foods is one of its form that is becoming more and more popular, at least in the Western world (e.g. Pearson et al., 2011). One indicator of the local food hype is the number of farmers’ markets available. To illustrate, in 2010, there were 6132 of them in the US, three and half times as many as in 1994 (Nie & Zepeda, 2011). However, due to the lack of clear definition of local food, exact consumption statistics are hard to retrieve. Usually, local food has been defined in terms of geographical proximity, even though other more subjective and comprehensive approaches exist (Jones, Comfort, & Hillier, 2004). Also in this study, local food is understood as grocery products that are produced or processed and consumed within the same geographical region (Kim, Eves, & Scarles, 2009).

So far, local food consumption has not attracted extensive interest among consumer researchers. Yet, two important insights have been produced. First, the profile of local food shoppers has been tackled revealing that consumers’ socio-demographic variables play a limited role in differentiating local food favourers from non-favourers (Cranfield, Henson, & Blandon, 2012), the former group tend to be more interested in food issues generally, prefer to prepare meals from unprocessed raw material and show more worry for environmental and social problems (Mirosa & Lawson, 2012; McEachern, Warnaby, Carrigan, & Szmigin, 2010). The second key topic of attention has surrounded consumers’ self-stated motives for buying local food. It is known that functional qualities such as freshness, taste, healthiness and availability represent the criteria consumers refer to when asked about the reasons for their local food choices (Weatherell, Tregear & Allinson, 2003). More recently, experiential and hedonistic local food shopping motivations have been uncovered (Megicks, Memery, & Angell, 2012). Lastly, a myriad of ethical motives such as animal welfare, reduced food miles and packaging, chemical-free food and support for local suppliers and retailers have been identified (McEachern et al., 2010; Pearson et al., 2011).

It is this last group of local food consumption motivations that will be elaborated from a novel perspective here. It is argued that evolutionary psychology can help in understanding the ultimate reasons for why some consumers prefer local foods and 'seek a relationship with farmers based on reciprocity, trust and shared values' (Bingen, Sage, & Sirieix, 2011, p. 416). A growing number of marketing and consumer studies have applied evolution-theoretic ideas during the last years (Saad, 2013).

Among the evolutionary explanations for altruistic and pro-social behaviour, the kin selection theory is one of the most prominent. It can be applied in consumer research as well. Its basic premise is that people are more likely to share resources with kin than non-kin and with close kin more than distant kin (i.e. genetic kinship) (Dunbar & Barrett, 2007). Inspired by this theory, modern evolutionary-informed marketing scholars have put forward the concept of psychological kinship (Griskevicius, Cantú, & van Vugt, 2012) which does not necessitate the existence of genetic relation between the parties (they can even be strangers to each other) engaging in altruistic interaction (e.g. sharing resources and helping). In this paper, for the first time, consumers' experience of kinship is used to understand their preferences for local food products.

This study embarks on these new developments and in doing so seeks to contribute to food consumption research in three ways. First, local food consumption has not yet been viewed from the evolutionary perspective generally or through the lens of kinship theory specifically. Thus, a fresh explanation of what may lie beneath consumers' ethical and social local food consumption motives, is put forward. Second, it offers the first initial empirical evidence for this yet unexplored phenomenon. Third, it introduces the distinction between the genetic and psychological kinship experience and confirms its relevance in understanding local food consumption.

The rest of the paper is organized as follows. Below, the concepts of genetic and psychological kinship experiences, their connection with the pre-existing theoretical ideas and preferring local foods are discussed. Next, the research methodologies, data collection procedures and results of two large surveys are reported. Finally, the study implications and limitations together with ideas for future research are discussed.

# 2 THE KINSHIP EXPERIENCE: ITS DEFINITION AND LINKS TO PREFERRING LOCAL FOODS

The kin selection theory is closely related to the concepts of inclusive fitness (Hamilton, 1964) and, thus, to genetic kinship. The core idea is that humans, as well as many other animal species, are more willing to share resources or accept risks to help kin than non-kin (Dunbar & Barrett, 2007). From the evolutionary point of view, this kind of behaviour has evolved because individuals sharing same genes have a common interest when competing in the 'genetic markets' of the future generations. Kin selection is a key driver of evolution of pro-social and altruistic behaviour in animal species.

The human-specific dimension of altruistic behaviour, however, is that in some situations it can be directed at non-kin individuals (e.g. Warneken & Tomasello, 2006) (cf. psychological kinship). This has mainly been explained by reciprocal altruism: the bilateral trading of unselfish services between individuals (Fletcher & Zwick, 2006). The reciprocal altruism explanation rests on the assumption that individuals are members of the same community and thus are able to monitor the behaviour of others. In modern everyday life, this is not always the case and people often have to decide in seconds whether to behave altruistically or selfishly in various social situations (Silk, 2002). According to Park and Schaller (2006), people seem to, consciously or unconsciously, use cues of emotional and attitudinal closeness with the person they encounter when making these decisions. This feeling of closeness (that may trigger altruistic behaviour) is referred to here as the psychological kinship experience (cf. Griskevicius, Cantú, & van Vugt, 2012). Whether the ultimate evolutionary driver behind this behaviour is linked to the instantaneous evaluation of the potential of reciprocal altruism or to other socially created fitness benefits is still under discussion (Fletcher & Zwick, 2006). In this paper, it is proposed that the kinship experience plays a relevant role also in consumer decision making and that this is especially true in the situations where purchasing motivations include intentions of altruistic acts and/or resource-sharing in relation to the producers or sellers of products or services. Favouring local foods is a prime example of this kind of situation as both the food producers and consumers live in the same regional territory and, consequently, are likely to share the same local identity.

It is acknowledged that conceptualizations resembling consumers' psychological kinship experience such as consumer ethnocentrism and consumer tribes have been thoroughly discussed in prior consumer research. However, there are also important differences between these concepts. First, the notions of protecting domestic economy and patriotism makes consumer ethnocentrism

a national rather than a regional level construct (Shankarmahesh, 2005). Second, consumer tribes typically come and go unpredictably and, thus, do not offer a base for stable social identities and altruistic interaction (cf. Maffesoli, 1996). Consumers' experience of psychological kinship would not be possible without such a base (i.e. regional identification).

## 3 STUDY 1: ACQUIRING INITIAL FIELD EVIDENCE FOR THE ASSOCIATION BETWEEN THE KINSHIP EXPERIENCE AND PREFERRING LOCAL FOODS

The first empirical goal was to provide initial evidence for the association between the experience of kinship and preferring local foods. The data were gathered as a part of a large grocery shopping intercept study (n = 501) in the winter of 2012. The grocery stores were located in five municipalities in the province of Southern Ostrobothnia in Finland. This province is known of having a population with a strong sense of local identity (Paasi, 2002) thus providing a suitable context for studying the kinship experience. The shoppers were asked questions concerning their food choice behaviours. The interview was guided by a structured and pre-tested questionnaire.

For the purposes of this paper, the key question involved showing the respondents the pictures of five pairs of cheese, biscuit, tinned meat, cereals, and jam brands and asking which one of the two they would buy and take home, if they had to decide now. In each of the pair, one of the brand represented local food and another brand non-local food. The experience of (non)locality of the brands was confirmed in a pre-test (14 food brand pairs) that drew its sample from the population similar to that of the actual study. In the pre-test, 23 respondents indicated how local they perceived each of the food brand (1–9 scale) to be. The means for the five local and non-local food brands included into the actual study were 7.04 and 2.37, respectively. In addition to analysing each brand-pair separately, a local food preferring index was also calculated (hereafter LFPI) for each respondent based on their buying preferences. Consumers' kinship experience was measured (1–9 scale) using the items 'I identify myself with other Southern Ostrobothnian people' (psychological kinship) and 'Most of my relatives are born in Southern Ostrobothnia' (genetic kinship). The authors developed these measures using ideas from the literature on reciprocal altruism (e.g. Fletcher & Zwick, 2006).

The sample can be characterized as follows. As expected, recruiting the respondents from grocery stores resulted in the over-representation of women (73 %). The average age of respondents was 58 years. Roughly every other respondent lived in a two-person household and the majority (72%) did not have children living at home. This is logical, since almost half of the respondents were pensioners. Another large respondent group was blue-collar workers (21 %).

The analysis occurred in two phases. First, the correlation between the local food preferring index and kinship experience was statistically tested. A sum variable for the kinship experience was formed using the two items mentioned above ($r$ = .534, $p$ < .0001). The Pearson correlation revealed a statistically significant relationship ($r$ = .135, $p$ = .003) between the LFPI and the kinship sum variable. Second, the individual brand choices were treated as dichotomous dependent variables and the logistic regression analysis was performed. The results revealed that, as expected, preferring local biscuit ($\beta$ = .07, $\chi^2$ = 8.4, $p$ = .003), cheese ($\beta$ = .04, $\chi^2$ = 3.85, $p$ = .049), tinned meat ($\beta$ = .087, $\chi^2$ = 15.31, $p$ = .000) and cereals ($\beta$ = .048, $\chi^2$ = 4.05, $p$ = .051) brands were positively associated with the kinship experience. However, in the case of jam ($\beta$ = -.035, $\chi^2$ = 2.96, $p$ = .085), the association was marginally in favour of preferring the non-local brand.

# 4 STUDY 2: ANALYSING THE SIGNIFICANCE OF CONSUMERS' GENETIC VS. PSYCHOLOGICAL KINSHIP EXPERIENCE IN PREFERRING LOCAL FOODS

After having established a general linkage between consumers' kinship experience and preferring local foods in Study 1, the possibility that consumers' genetic and psychological kinship experiences, despite their conceptual inter-relatedness, can be differentially connected with preferring local foods was turned to. To that end, the second data were gathered in March 2013 as a part of a large web survey concerning food-related behaviours and attitudes of Southern Ostrobothnian consumers (n=828) in Finland. The sample mainly consisted of middle-aged (the average age was 44 years) urban consumers (only 29% of the respondents lived in rural areas). Women were again over-represented (81.5%) and roughly 40% of the respondents lived in the two-person households. Almost half of them (49.5%) had at least one child living at home.

Consumers' psychological kinship experience with local food producers was measured (1 – 7 scale) using the items 'I identify myself with Southern Ostrobothnian food producers' and 'I can trust Southern Ostrobothian food producers' (combined into a sum variable $r$ = .435, $p$ < .0001). The genetic kinship

experience was measured (1 –7 scale) with the item 'Most of my relatives are born in Southern Ostrobothnia'. This time the measurement of dependent variables was more extensive. First, as in Study 1, the local food preferring index (LFPI) was calculated based on the respondents' stated preferences for local vs. non-local cheese, biscuits, cereals, tinned meat and jam brands. Second, the respondents' attitudes toward these brands were recorded enabling the creation of local food attitude index (LFAI). Third, one item (1 –7 scale) measured the willingness to pay extra for the food produced in Southern Ostrobothnia and finally, one item (1 –7 scale) concerned the general attitude toward locally produced food.

The analysis proceeded in two stages. First, the significance of correlation between the psychological and genetic kinship and dependent variables was tested by the Spearman correlation analysis. It revealed a statistically significant relationship between the LFPI ($r = .290$, $p < .0001$), the LFAI ($r = .325$, $p < .0001$), the willingness to pay ($r = .420$, $p < .000$), the attitude towards locally produced food ($r = .324$, $p < .0001$) and the psychological kinship experience. However, there was a non-significant correlation between the genetic kinship experience and the LFPI ($r = .011$, $p =$ n.s.), the LFAI ($r = .042$, $p =$ n.s.), the willingness to pay ($r = .068$, $p =$ n.s.) and the attitude towards locally produced food ($r = .036$, $p =$ n.s.). Second, the stepwise regression analysis was used to test how independently the psychological vs. genetic kinship explained the variation in the dependent variables. In all of the cases, the experience of psychological kinship was included in the model and had a significant effect on the dependent variables while the genetic kinship experience did not. Thus, both of these analyses indicate that consumers' experience of psychological kinship with local food producers is more strongly associated with preferring local foods than their experience of genetic kinship.

## 5 DISCUSSION AND CONCLUSIONS

To supplement the current proximate explanations for consumers' preferences for local foods (e.g. choice motives such as taste, healthiness, support for the local suppliers etc.), the present study has offered the first pieces of empirical evidence for an evolutionary-driven ultimate reason (kinship experience) for this behaviour (cf. Saad, 2013). In addition to this contribution, the two types of consumers' kinship experience, genetic and psychological, were introduced and the latter was shown to be more relevant in explaining consumers' local food preferences.

At least two theoretical issues requiring more elaboration emanate from this research. First, the factors contributing to the activation consumers' psychological kinship experience and the nature of this process (conscious vs. unconscious) needs to be identified and addressed. For example, knowing the locality and reputation of the product and/or farmer may play a role. To illustrate, Caporale et al. (2006) showed that consumers' taste perception of virgin olive oils originating from the same province (Lucania) can be impacted by recognising the more specific within-province production region (Vulture vs. Bradano vs. Ferrandina). Second, many studies have shown that the social visibility of one's choices to others increases pro-social behaviours (see e.g. Griskevicius, Tybur, & Van den Bergh, 2010). It could not be a contributing factor in Study 2, because its respondents answered the questions alone at their computers and yet showed altruistic tendencies. This raises the more general question whether various forms of responsible consumption (e.g. favouring local foods vs. donating to charity) are prone to social and reputational influences to a different degree.
Managerially, the study suggests that the sense of psychological kinship can be harnessed to promote local food products. Local farmers and region names can be used in marketing of local foods to enhance consumers' experience of psychological kinship with them. This kind of marketing is well-advised to promote the benefits of local food for the well-being of one's own living area and social community. Second, as mentioned above, consumers are willing to act in socially responsible ways especially when the act is visible to others. In addition to making selling location of local foods more visible and public, creative retailers can develop conspicuous materials (shopping bags, badges, stickers etc.) that consumers can use in signalling about their socially responsible local choices to others in order to stimulate more business.

A few study limitations must be acknowledged. First, factors other than consumers' kinship experience can also explain preferring local foods to non-local ones. In Study 2, it was possible to control the strength of association between the gender, age, income and place of residency (urban vs. rural) and the dependent variables. Gender was not statistically significantly related to any of the dependent variables, while income was positively related to one, age negatively to three and urban residency positively to three dependent variables. Moreover, the significance of brand and price images (cf. the anomalous jam results) leaves room for speculation. Thus, more refined analyses as regards to the relative role of various factors in consumers' preferences for local foods are needed. Second, in the absence of validated multi-item scales, the measurement of kinship experience was based on few untested statements derived from the more general literatures on kinship and reciprocal altruism. More robust instruments for tackling consumers' genetic and psychological

kinship experiences are therefore desirable. Third, the verification the association between consumers' kinship experience and preferring local foods was restricted to one geographical location (Southern Ostrobothnia in Finland) and non-representative samples. Clearly, more empirical support from diverse populations in other places with strong regional identities (e.g. Catalonia, Spain) must be gathered to confirm the relevance of the phenomenon studied.

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# Small Smart Farm: Support Systems to Small Holdings and Family Farms in Food Production and Land Care

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## 1 INTRODUCTION

Small Holdings and Family Farms can be considered a significant model of sustainable food production system and landcare. During periods of diffuse economic crisis, due to their intrinsic capacity to quickly reorganize themselves, small cooperative Family Farms offer better resilience and better social inclusivity than conventional farm enterprises. To be sustainable and competitive in the market, these rural activities require, on other hand, the same tools and resources as the bigger, better structured farms. Reliable, agile, productive and profitable management approaches should be developed in order to enhance working practices; this can be done by employing new techniques and technologies that only an innovative services system could offer. Ancillary regional service platforms could play an essential role in providing integrated communication systems for Smart Intelligent Agriculture and Precision Farming on small scale farms too. Monitoring, Decision Support Systems and Automation could be provided by these new Smart Technologies and we can today avails of the natural know how of the emerging young generation; so, as a consequence, agriculture could become an attractive and profitable employment for the next generation.

In many European regions, that are aware of the importance of elements described above, are developing territorial platforms to better manage the mentioned available high technologies. The goal is to help farms, and especially SHF (small holdings) and FF (family farms) to use new smart technologies to their advantage. AgriSmaRT, following these principles, is a developing case in the Tuscany area and nowadays is applying in winery and mountain farm production. AgriSmaRT is a multi actor consortium that includes organizations of many types (Research Centers, SMEs, Farmers and others) gathering multiple competences, ranging from farming to earth observation. It is characterized by the use of Smart Technologies by which manage productive farming resources: soil, water and air. Other aims are to create optimum conditions for maintaining slope stability, best water content maintenance, best biological a biochemical

activity on soil, optimum nutrient efficiency; best crop health in order to obtain the best assumption of nutrients, micronutrients, chemicals; best biodiversity conservation. As a result of this more profitable and sustainable process, FFs could produce more agricultural products and food, of higher quality and with less inputs.

Smart Small Holdings and Family Farm have also properties to better fit the increasing demands in landcare (www.landcareonline.com.au, www.landcareresearch.co.nz ) and in consumer participation to management choises (http://willvoteforfood.com). Family Farms, Youth, High technologies achieve the concept of GLOCAL farm production: rootedness and global projected.

## 2 THE ROLE OF SMALL HOLDINGS AND FAMILY FARMS AND INHERENT PROBLEMS

Family farming is the main form of agriculture in the European Union and worldwide. There are over 400 million family farms in the world – in Europe we have 12 million such farms, which contribute enormously to rural communities and to the Italian economy. The challenge of feeding a growing world population by producing food in a sustainable way is enormous. Farmers are being asked to produce more, with less use of inputs. They are being asked to manage the landscape and environment with ever-changing demands and rules (http://www.eppgroup.eu). Taking care of the land starts with taking care of the soil, the fundamental resource in any land-based agricultural system. An increasing number of farmers, natural resource professionals and scientists are focusing, for example, on treating soil as a long-term investment. They are working to implement management practices and cropping systems that support and enhance soil biology as the primary means of restoring the soil to a healthy functional state. They are proving that there is a need to test and implement practical and profitable ways to enhance soil health while meeting our economic and quality-of-life goals as individuals and as communities. (Land Stewardship project).

Smallholdings (SHF) and Family Farms (FF) are both a strength and a weakness for rural productive activities in Italy. In our national agricultural profile ancient forms of farming structures together with the high variability of orographic areas (see the multitude of valleys different and often isolated) have induced a high conservative status of farming.


**Figure 1. SWAT ANALYSIS on Small Holdings Family Farms in Italy.**

Figure 1 shows an overview of problems and opportunities related to sustaining SHF and FF against the risk of abandonment of agricultural land and activities. There are 5 major harmful factors. Firstly the very small scale of farms, which are on average 1–2 hectares. Secondly poor knowhow, which is related to wasteful use and unprofitability of adopted resources, for example small farms use three times the required amount of inputs (seed, chemicals, labour) while, at the same time, obtaining lower yields in comparison with rational farming. Another factor is the average age of farmers (69 y.o.) and a conservatively closed mentality. Last but not least, is the limited financial power of SHFs and FFs.. In addition, external threats are due to: orographic and structural difficulties; the lack of specific small scale farm mechanization; the widely recognized innovation divide. But also important and detrimental it is the division of the research institution that have assumed self-sufficiency and tendency to disqualify the importance of complementary sectors

Researchers found farmers used up to three times the required amount of nitrogen fertilizer, bringing no increase in their harvests, but resulting in 20 to 50% of the nitrogen applied leaking into the air and polluting the groundwater. (Raworth 2012).

Small Farms have effectively remained unaffected by innovation since the beginning of modern technological development: the history of farm machinery clearly reflects how great importance has been given to big size machinery such as the West (American) extensive farming model and poor relevance to the East Asiatic labour intensive model in which small size machinery has been widely developed for village or family farms. Moreover, family farms have been frequently characterized by poor know how and poor resources.

Lack of appropriate know how it is due mainly to the general simplification in farming, introduced since the decades after World War II, by the availability of basic strong effective inputs (chemicals, irrigation, hard mechanization, genetics). Nowadays, this unsustainable productive model requires responsible and appropriate know how on manage farming activities that can avail of Precision Farming techniques. But this implies high investments in equipment, tools, logistics and services that are not economically sustainable from a single farm especially SHF and FF.

The care and support to FF an SHF it is important for many reasons: their resilience in food security and job retention, the increasing need for land management especially in hilly and mountainous areas in order to avoid the risk of natural disasters, for example landslides; the great demand for quality food and typical products; the growing interest in rural activities by young people.. Further reasons related to the current opportunities are: the emerging need for 'urban farms' as a way for citizens to be involved in educational activities related to agriculture.

Significant opportunities can be offered by harnessing the know-how of young people relating to the globally developing Smart Technologies. Enhancement of SHFs and FFs moves indeed through the replacement of the old generation, with the young generation which has the know how to understand and use the new management, logistic and technological availabilities.

A potential factor is the cooperation with  services consortia that can create an integrated system, in which SHFs, FFs, pilot farms, SMEs, research and educational institutes, can integrate services and resources within a specific area, with the goal of creating a profitable, competitive, sustainable GLOCAL 'international & local based' enterprise.

# 3 FROM GREEN REVOLUTION TO SMART AGRICULTURE

In the XX century after the World War II the 'green revolution' replaced the 'industrial revolution' of the previous century. It defined simple strong effective factors to enhance food security: 1 chemical input, 2 mechanization, 3 irrigation and 4 genetic enhancement of crops.

The intensive and often inappropriate use of these factors have created serious environmental problems for the global systems of soil, water and air.

In 2003 at the Georgofili Accademia in Florence it was explained:

> *'The farm production system needs to rediscover, design and manage a technical-technological system truly compatible with all production, environmental and territorial factors. The development of operational tools is now addressed to information-technology and the capitalization of the knowledge and skills that together with simpler tools were part of rural autarchy – so sustainable - culture. ...the knowledge of the different characteristics in the different areas of land, the knowledge of climatic and agronomic factors implemented with careful daily observation skills and a historicity of events transmitted orally generation by generation were used to create a business model that we would now like to recreate using modern technologies ... traditional* ***farming not in a few acres but in hundreds of hectares.***'

The increasing holistic consciousness of the complex biosystem in which rural activities take place has spurred the developing high technological sector of research to offer solutions to better monitor biological, environmental, operative, logistic, economic factors in the whole farm production system, as well as to model the behavior of the different natural and biological factors and, by Decision Support Systems, to act a management more appropriate to the single site specific condition. At the end of the '90s it was called Precision Farming. Over the last decade several research projects have been conducted in order to focus on individual aspects of each branch of agricultural science.

Technological innovations have developed to such an extent that they can offer a continuous supply of new tools for site specific monitoring, mapping, decision making systems, prescription and driving operations also by automation and robot modules.

Precision Farming currently offers a wide variety of technologies and techniques for:

- Food security (where, how much, how to manage it, how to increase it, how to make it profitable [i.e. auto-steer gives a profit of +10%];
- Water availability 'rates of water extraction for irrigation are exceeding rates of many places';
- Soil quality 'soil quality is a critical factor globally' [i.e. erosion, salinization];
- Land availability 'the global crop land availability is in decline';
- Pesticide/herbicide waste and resistance 'growing number of cases of herbicide resistance' but more increasing technologies to detect disease [i.e. the scab disease];
- Energy cost and availability 'energy demand ... could double between now and 2050'
- PA increases yield by 16% reduces fertilizer input –5%, herbicide –65%, fuel –27% (Jensen et al 2012);
- Environmental protection: 'many of the current approaches will continue to degrade the environment and compromise the world's capacity to produce food in the future'

Precision agriculture techniques, developed by the researcher of all international istitutions, are nowadays a huge universe of different heterogeneous technical solutions for the several factors to be managed in the farming process. **The current main problem it is to integrate these very important tools in a coordinated efficient, productive and profitable system.** Multiactor territorial / regional services platforms could create this integration and offer to all farms, even single FF and SHF, correlated data to manage the complexity of rural productive activities.

## 4 CLOSING THE INNOVATION DIVIDE VIA SMART SMALL FAMILY FARMS

To apply Precision Farming possibilities to SHF&FF it is now urgently necessary to overcome innovation gaps, as clearly explained in the report EDUC-V-31 of the EC that mention the following needed actions (Markkula 2013):

- supporting the targets to be achieved on competitiveness and innovation by 2020, especially through continued investment in education and training;
- stressing the importance of balancing technological, design and social innovation in both the public and private sectors, all of which are influenced by far-reaching digitisation;

- striving for societal innovation, with living labs, testbeds and open innovation methods in regional innovation policy-making, while getting citizens on board;
- highlighting the role of a local and regional environment that supports the integration of higher education, research and business;
- implementing the Knowledge Triangle as a key principle in European university reform (greater synergies between research, education and innovation);
- underlining the key role of research infrastructure in knowledge-based innovation systems;
- focusing more on the active use of innovative public procurement, combined with simplification of procedures;
- stressing the importance of Europe-wide collaboration and transnational cooperation projects between regions, building on innovation support and smart specialisation strategies;
- highlighting the potential of cross-border cooperation, including inward investment to and outward investment from the EU;
- improving competences for innovation and fostering a new innovation mind-set built on dialogue, collaboration and co-creativity to learn from best practice.

In Tuscany we have applied and tested importance of these concepts in the MARS+ Transfrontalier Project (Cannizzo et al., 2012) as evidence of what was declared in the before mentioned EU report: Regions need new arenas as hotspots for innovation co-creation. These could be described as 'innovation gardens' and 'challenge platforms', which together form a prototype workspace for inventing the future. These are needed to address challenges - from small local challenges to major societal challenges at global level. RDI activity is therefore required that will pilot and create prototypes of (1) spatial configurations with physical, intellectual and virtual dimensions, and (2) orchestration and knowledge management toolkits needed to address challenges. There are exciting developments emerging in university laboratories around Europe, and even more globally, which tackle major societal and industrial challenges (Markkula 2013). However, the best laboratories for breakthrough innovations today are no longer traditional University facilities, but regional innovation ecosystems operating as test beds for rapid prototyping of many types of user-driven innovations, based on transformative and scalable systems. To transform science and technology research results into strong flows of new products, services, and processes, Europe needs to stimulate innovation in systems of production different from old-style manufacturing.

# 5 REGIONAL SERVICE PLATFORMS

As previously described Precision Farming opportunities comprise a huge universe of techniques, technologies and related competencies.

Nowadays, new innovative Precision Farming techniques are currently applied only on isolated and not integrated cases; and as consequence, it is not possible to achieve an effective, sustainable, durable production processes. This required integration needs high investments in equipment, tools, logistics and services that are not economically sustainable from a single farm especially SHF and FF.

The mission of the Regional Service Platforms (RSP) is to develop an open system that will be instantiated into decision support systems dedicated to sustainable, smart agriculture. The technological RSP should be based on a cooperative multi-actor approach. The architecture should be fully open in order to easily integrate components developed over the years by 3rd parties including additional knowhow for prediction models, models for variable rate applications, data collection components, onboard and ground sensors and others. Particular attention should be paid to the capability of the platform to extract integrate and correlate data from multiple heterogeneous sources in order to provide the various models with data based on a common and normalized cloud data flow. This will allow the creation of Smart Agriculture Services Platforms at Regional level. Such Regional Platforms will on the one hand serve agri-food companies in order to optimize production and provide automatic tracking and certification of products, and on more it will be used by Regional Governments to obtain reports and data on the usage of resource and the status of the environment. Development of the Regional Platform should need different skills, ranging from end-users (farming companies) to research institutions to SMEs.

With these aims in mind, the developing AgriSmaRT includes organizations of many types (Research Centers, SMEs, Farmers and others) gathering multiple competences, spanning farmers, farm machinery and mechanization, earth observation using space technologies, satellite navigation and communications, airborne and UAV assets, Geographical Information Systems, model design and validation and many others.

- The non-profit Association ToscanaSpazio with regional SMEs is facilitating this process, as the application of space technologies to agriculture has been recently identified among one of the smart specialization clusters of the Tuscany Region.

- University and Research Centres support research, instruction and training, participating in the feedback process.
- Pilot Farms give evaluation of innovation in testbeds.

# 6 REMARKS

Family farming is important for the European Union because the majority of the EU's 12 million farms are family farms, passed down from one generation to another, and they greatly contribute to the socio-economic and environmental sustainability of rural areas It is important to strive to support family farming due the social benefit of strengthening family values, solidarity, continuity and commitment, while the economic benefit is that , it improves entrepreneurial skills, strengthens business ownership, management and individual achievement. By supporting young people in promoting family farming, not only the agricultural sector, but society as a whole will benefit.

It is theoretically possible to narrow the innovation divide via Smart Small Family Farms The following suggestions can play a role in achieving this goal:

- Dissemination events with interactive and participative approach (such as Mars+) and Life Long Learning.
- Evaluation test beds in the virtuous pilot farms system
- Regional technological platforms between Small Family Farms, Pilot Farms, SMEs, Services, RES...

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# PART II
Short Summaries

# Food and Nutrition Expert Views on the Identification of Food Reformulation Issues Regarding the Healthier Food Products

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## 1 SHORT SUMMARY

The food reformulation is not a new concept, since food products with low content or no added fat or sugar have been for a long time on the market. However, according to the population health studies, European consumers still get too much sugar, salt and saturated fat in their diets. The aim of the study is to identify the key issues in relation to challenges of food reformulation in Finnish food industry. In the context of healthier food choices, food reformulation is defined as modifying the composition of existing foods by reducing non-healthy food components such as saturated fats, salt and sugar. Results presented in this study are based on views expressed in two focus group discussions with the aim of highlighting the main topics concerning food reformulation. The SWOT and STEEPV analysis were performed among representatives of the food industry, including SMEs, consumer organizations, and the research sector and policy makers.

SWOT analysis revealed that an obvious strength is the high standard of the Finnish food and nutrition research. The Finnish National Nutrition Council has active representatives from the food industry and consumer organisations. The Council creates the official nutrition recommendations which further communicate information in close co-operation to the various associations and organizations. The Finnish retail chains are highly concentrated, which has the advantage that similar product ranges are available throughout the country. Placed on food products sold in stores, the 'Heart Label' (by the Finnish Heart Association), helps consumers choose healthy products.

The Finnish food industry considers it a weakness that Finland is a small market area, and seeks business growth beyond national borders. In Finland, controversial nutritional issues raised by the fats debate already manifest in schools, e.g. as proposals to introduce dairy products with higher fat contents alongside fat-free milk. More media criticism should thus be taught at schools. A weakness caused by the concentration of retail chains is that retailers exclude even good innovations

from their product ranges because the required retail quantities are high. The stores also push hard their own private labels to the market. These private labels compete with low pricing, while in product development terms they lag behind when compared to the respective well-known brands.

Regarding the future states (opportunities and threats) the way forward seem to be that controversial food-related media debates, will make people pay more attention to their health and the food they are eating. Rapid changes in consumer behaviour create product development opportunities for the food industry. Presence in the social media is an important future challenge for the authorities and experts communicating accurate food information.

The Finnish experts perceive it as a threat that consumer trust in research and authorities is shaking, and even wider damage is done to the trust in the actors in the food chain. It was also seen as a threat that undefined major shifts are occurring in consumers' food choices, and alternative diets are a rising trend. It is also important to emphasise the social responsibilities of the actors in the food chain. This means that in their part, all actors in the food chain should commit to observing official nutrition recommendations, and responsibility for people's health cannot only be left to individuals themselves.

The STEEPV-analysis identifies the changes occurring in the food industry regarding the changes in social, technological, economic, environmental and political environment and changes in consumers' values. In the marketing and communication of healthy products, people need to be convinced that healthy food such as low-salt products can also taste good. Companies also face challenges regarding food reformulation. Especially the SMEs are short of resources and they require special attention and assistance in order to meet the demands of food reformulation and labelling. The opinion was that it is the food companies' first and foremost responsibility to give truthful and clear information about their products, while the main responsibility of healthy eating lies with the consumers themselves. The experts consider the amount and quality of fats and sugar in food as widely acknowledged facts, but salt content is often left with less attention. In order to make people consume more lightly salted products, consumers need to be informed of the dangers of salt more effectively.

The Finnish experts perceive it as a threat that we might lull ourselves into a false sense of security, believing that our nutritional situation is good. Even if the consumers thus possess a high degree of general knowledge and awareness regarding nutritional matters, population weight increase and the health problems associated with it, still remain issues that must be resolved.

# Dairy Development in North Savo Area

**Hilkka Kämäräinen & Ardita Hoxha-Jahj**
Savonia University of Applied Sciences

## 1 INTRODUCTION

There is a growing interest in increasing quantity and quality of milk production in Finland. Especially, to find new methods for efficient work in special climate and different working environment dairy farms. Therefore, any strategy to improve work efficiency will increase the quantity and quality of milk and its products, and other acids in human food that contains milk is appreciated. Traditionally, milk is very highly consumed in all Finland. An alternative strategy may be to develop 'diversified' rural living in order to produce food with higher developed processes realized in farms which may be convenient to consumers. Functional milk products comprise an example for this strategy.

## 2 PRIMARY PRODUCTION

Milk is in an essential strength of North Savo and of Central Finland. The meaning of milk in food production is essential because the beef production is closely linked to it. The most significant part of Finnish beef is produced in North Savo and in North Ostrobothnia.

The agriculture practicing primary production is falling upon many expectations from many directions of the society. The agriculture and dairying has a recognized role as a producer of primary products, but also as a provider of agricultural and environmental diversity and maintenance of infrastructure. In addition to positive effects the functions of agriculture are also causing environmental load. In the level of the farm, the developing of enterprise is almost every time linked to growing of unit size. The pursuit of advantages in economies of scale is forcing at the same time to rationalize the production processes used before. In dairy farms and cattle farms more and more operations models and technology is used, which are commensurable in their content and size and suitable for collaboration between farms. It is important that development of livelihood is able to strong international collaboration and exchange of information, in addition to national knowledge-based co-operation.

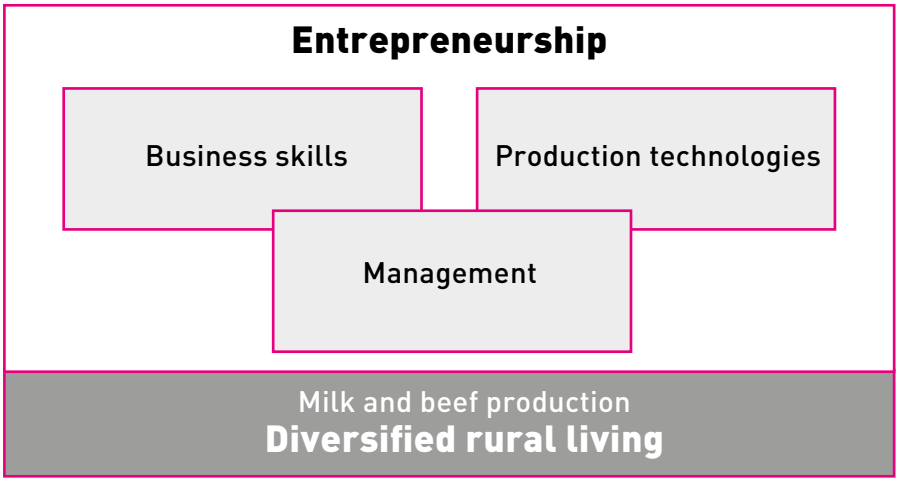


Figure1. The position of primary production in RDI-field.

The willingness of farms to continue their production and investment to growth is essentially dependent on the fact, how the profitability, work load, the well-being in work and the management of energy and environmental impacts is seen. It depends crucially on these action views, what kind of amount of raw-material is there in use for processing industry. Developing the farms is mostly happening through developing the processes realized in farms.

## 3 PRIMARY PRODUCTION AS A TOP RESEARCH

The aim of the primary production is to secure operational precondition of the livelihood and to develop critical success factors in concrete, livelihood based way. The aim of the focus area is to confirm collaboration between expert organizations and to secure availability of national and international know-how, transfer and presence in milk production, beef production and more widely in development needs of countryside.

The objective of the research- and development in primary production is to produce cost-effective and sustainable technology based solutions especially in primary production and more widely for the needs of the enterprises working in primary production chain. Focus of the primary production is to activate, plan and realize together with other expert organizations development themes in following success factors in dairy farms, dairying and beef production: commercial profitability, workload, and well-being in work, management of environmental effects, management of energy costs, animal health and food safety.

# 4 MATERIALS AND METHODS

**Steering group → give guidelines and approve or disapprove ideas**
Steering group is represented from key local organizations: Dairy Cooperative ItäMaito, Dairy Cooperative Maitomaa, ProAgria North Savo, Local Centre of Agriculture Advisor Services ProAgria, MTK North Savo, Local Union of Agricultural Producers and Forest Owners, Ylä-Savon Kehitys Oy, Development Ltd of Upper Savo municipalities, MTT Agrifood Research Finland, Savonia University of Applied Sciences, Ylä-Savo Vocational College, Savo Consortium for Education, Finnish Regional Research, North Savo Centre for Economic Development, Transport and the Environment and Project Manager.

**Main project group → rise up new ideas, identify problems and find major solutions**
Collect dairy oriented experts together, change ideas and open paths to solutions.
Thematic project groups → identify exact problems, find exact solutions and convert them into projects
Project management and coordination is centralized at one organization as much as possible.

# 5 RESULTS

North Savo is Finland's best area concerning milk production and processing. Area needs new ideas and efficient working methods. Sector in this area is in close cooperation with different organizations with EU -projects since 1997 and still is continuing.

In North Savo there are in total 1 261 dairy farms with average yield 9 292 kg/cow. This area is known as 2nd biggest milk producer in Finland. In total 318 Mkg, 14% of Finnish dairy production. Growth rate in average is 8% every year. Produced milk is mainly processed in Valio Cheese Dairy in Lapinlahti. Main products are Swiss cheese, Edam, Demi whey powder.

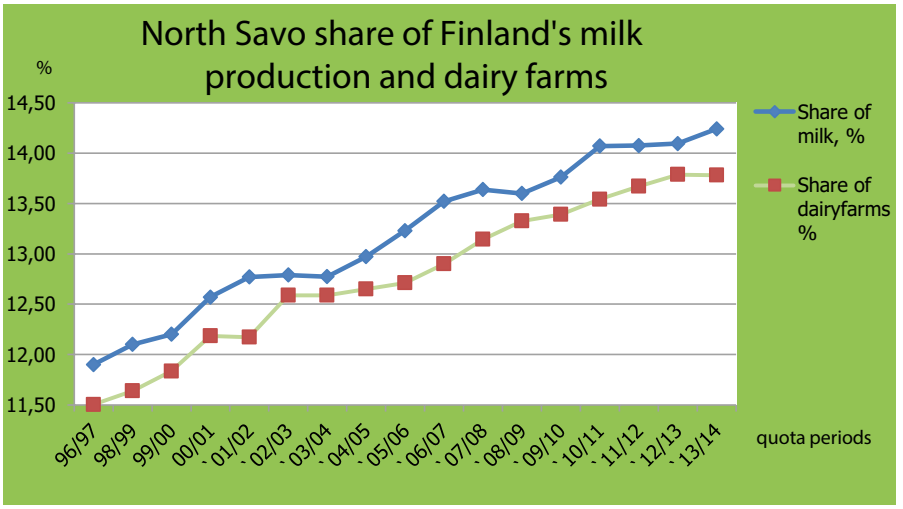


**Figure 2. North Savo share of Finland's milk production and dairy farms.**

In North Savo and entire Finland it is resulting that number of dairy farms is decreasing. In another hand size of the dairy farm is growing. But, it is very high demand for food industry raw material. This need is growing rapidly.

There are a lot of strengths and possibilities for dairy production in Finland, especially in North Savo.

Main result is that milk production has developed at North Savo area and farmers' skills have improved. Other valuable results are as follows:

- Co-operation of different organizations has improved step by step
- Strength-based roles at organizations are identified and taken into practice
- 1 + 1 > 2 when organizations work together
- Good project management:
  - High cost-efficiency
  - Low overlapping
  - Result-oriented and parallel actions
  - Easy One-stop shop principle to milking farms and experts

# 6 CONCLUSIONS

Farm size in Finland is increasing rapidly in next 10 years → information needs grow even more.

Organizations resources are not gaining → efficiency needed

Farm development via projects continues

Strategic focus at project efficiency improvement is test and implement knowledge transfer from research into practice.

North Savo's key organizations (ProAgria, MTT and Savonia) are very interested in Milk development in national level and build solid network at EU-level.

# Summary of Presentations of the Session III

**Risto Lauhanen**
Seinäjoki University of Applied Sciences

## 1 SMALL SMART FARMS

Professor Marco Vieri told us about 'Small Smart Farms of Rural Tuscany'. The region of Tuscany represents food, olive oil and wines. ERIAFF-conference landscape of South-Ostrobothnia is also known about food and agriculture as well as Koskenkorva-Vodka.

In the terms of arts there is one important culture person that links the town of Ylistaro in Seinäjoki city and the historical and beautiful city of Florence. That person is professor Mr Veikko Vionoja (1909–2001), who spent a part of his life in Ylistaro. The self-portrait of professor Veikko Vionoja is at Uffizi-Gallery in Florence.

But let's discuss about Dr. Vieri's presentation. The lack of labor on rural areas as well as the development of ICT systems mean that we should more and more apply and investigate Small Smart Farms. Dr. Marco Vieri presented the cases of Rural Tuscany. We should utilize new ICT and GIS technology to improve safety and quality during farm activities. In addition, environmental sustainability is an important thing. For example, agro-business should also promote recycling. The BAT (Best Available Technology) assessment for chemical utilization is needed. The solutions of new ICT should be used in this case, too. The erosion risk is well-known on sensitive sites and mountainous areas as well as the pollution risk of waters and groundwater. For these cases innovative sensors and biosphere detectors are needed. The society has discussion also on emissions and consumption measurement of farming machines. ICT tools can help in the online evaluation of emissions and fuel and lubricant consumption.

There are also different risks on small farms. Computer-aided decision support tools can be used in the risk assessment of small farms.

Fig. 1. Family farming and forestry is typical in South-Ostrobothnia region. The oldest logs in this wood house are from the year 1749. The field and forest area of the farm is over 100 hectares. (Fig. Margit Ristimäki)

## 2 WASTE MANAGEMENT

Janos-Istvan Petrusan represented IGV organization from Potsdam, Germany. The waste management is an important thing in today's society. On the other hand, we know the global lack of food and weak health status of people in poor and crowded countries e.g. in Asia and Africa. That is why it is insensible to waste food.

It is necessary to detect residues, by-products and wastes in the food and agriculture chain. The reduction of food waste means welfare and decreased logistic costs. The decrease in the waste of raw materials in food industry results also in profitability. The recycling of food materials as well as the reuse of by-products of food industry is sensible in many terms of food, feed and energy.

In the waste management we consider environmental, ecological, economical and safety aspects together. There are also lots of EU directives in this field of waste management. We heard also that IGV and Janos-Istvan Petrusan lead many FWP7 projects in this important target area.

Fig. 2. Finland is the land of the midnight sun festival in June. The air and waters are clean in Finland. The agriculture considers the water protection aspects, too. In the figure there is the river Kokemäenjoki in Satakunta region. (Risto Lauhanen).

Fig. 3. Finnish forestry and forest operations save the rare plants, animals and flowers. (Risto Lauhanen).

## 3 NEW PRODUCTS, SERVICES AND INNOVATIONS

Dr. Luciano Concezzi represented Umbria Agro-Food Technology Park in Italy. He talked about the innovative and operative groups for product development in Umbria. There are lots of forest areas in Umbria region that locates near Tuscany area.

New products, services and innovations are needed for agriculture, food and forestry. It is important to maintain the vitality of rural areas with the aid of new innovations and products. There were lots of innovative Italian projects and examples; food, energy, environmental protection, marketing, management, biodiversity, food safety, food quality, water resources and also forest biomass. In Umbria cases the good network contains universities, RDI-companies, SMEs, farmers, firms, advisors, researches, business people and forest owners. As a conclusion, the cases of Umbria are almost similar as EIP.

## 4 BIO-BASED INDUSTRIES

Niklas von Weymarn is a Vice President in RDI department at the Finnish Metsä Fibre Ltd. This company represents international pulp and paper industry. The background of this Metsä Fibre Ltd. is in Metsäliitto Cooperative that is own by many Finnish forest owners.

VP Weymarn told about Bio-based Industries of PPP. In this case PPP means Post-Petroleum-Period. Bio-based Industries is a new funding model between big business companies, researchers, universities and EU.

Mr Weymarn presented the bio-economy chain as follows; Biomass and waste → Biorefineries → Biofuels and biomaterials and bio-chemicals. Bio-economy means sustainable growth, jobs, energy and products for Europe. We will live in the global bio-economy and in the post-petroleum society.

VP Wemarn also told that in Europe we can carry out applied research, but not so much new demonstrations and products. In the USA and in P.R. of China they can do lots of new products and demonstrations, and also carry out basic research and applied research.

After Mr Weymarn's presentation, there was a question about sustainable forestry and forest energy in Finland. In the discussion we concluded that firstly, we use sustainable wood for sawn goods, pulp and paper, and secondly we use wood for energy.

In Finland the sustainable chain of custody from forests to clients is documented in the databases. In addition, the new forest act and nature conservation act consider environmental issues. The available forest certification systems (FSC, PEFC) also promote environmentally-sound wood procurement. Farm-level forestry plans in timber management planning as well as the water protection systems and management give the acceptable label on environmentally-friendly forest operations and products. The environment and work quality assessment by forest companies and organizations and forest owners is carried out all the time.

# PART III
Closing Speech of the ERIAFF Conference 2014

# Closing Speech of the ERIAFF Conference 2014

**Gianni Salvadori**
Regional Minister of Tuscany Region

Dear Ladies and Gentlemen, Dear Participants, firstly, I really want to thank the South Ostrobothnia Region for having demonstrated, once more, its full involvement and commitment in the ERIAFF Network by organizing our annual Conference. My acknowledgement is surely addressed to the Regional Mayor, Dr Asko Peltola, who shared with me the creation of the Network from the very beginning. My gratefulness is also for the whole organizational team, which allowed such a lively and immersive event, full of opportunities for the participants.

## 1 THE PATH OF ERIAFF – BRIEF HISTORY

Before entering in the details of future ERIAFF activity, I would like to remind the reasons that brought us together and summarize what we've been doing as a Network.

The driving force that led us to aggregate (in an informal and not binding association) was the need to define new patterns for improving the innovative impulse and process in our agriculture, agri-food and forest systems. Namely, the need to generate a benefit for our rural system from the innovative potential that resides in the European Union.

By creating the European Innovation Partnership on agricultural productivity and sustainability (EIP AGRI), the European Commission has surely addressed our starting idea.

Indeed, we've acknowledged this European Networking concept, making it conformed to the needs of territorial administrations of regional level and addressing our action towards the exchange of ideas, knowledge and needs.
We are using the tools we have at our disposal (particularly Rural Development and Horizon 2020 funding) and, even if not all the ERIAFF partners are also Managing Authorities of Rural Development Programme, all the partners have a role as engine on the administered territories, as well as a close awareness about the needs of our agricultural, food and forest entrepreneurs.

Since 2012, this idea allowed the aggregation of more than 50 European Regions, with about 30 members and 20 observers from Croatia, Finland, France, Germany, Holland, Italy, Latvia, Portugal, Spain and United Kingdom.

A very fast growing network, considering that in Florence, in the ERIAFF kick-off conference of September 2012, we were 10 participating Regions out of 17 signatories of the joint statement approved at the meeting.

Today, I'd like to take advantage of this annual Conference to make the point on the accomplished actions which, after all, are the indicators of the actual functionality and liveliness of a Network.

About this aspect, I want to make it clear that ERIAFF is an operative Network, mostly oriented toward the involvement of actors and practitioners.

Allow me to briefly list the main initiatives we've promoted as ERIAFF Network and those where we've been invited to participate as an acknowledgment of our action.

Following our first Conference in Florence on September 20th 2012, we organized the 19 February 2013 a meeting to introduce the ERIAFF Network to the EU Commissioner for agriculture, Mr Dacian Ciolos, and to other EU Institutions. We also took part with a ERIAFF delegation to a Conference on the EIP AGRI organized by the European Commission DG AGRI on November 12 2012 in Brussels. I'd like to stress the fact that this meeting was the first official acknowledgment of the ERIAFF by the DG AGRI, which reserved 5 seats to our representatives. The Conference was aimed at setting EIP AGRI priorities and functioning mechanisms.

2013 was a year devoted to the preparation of the ERIAFF real operative launching, which ended up with the organization of the first ERIAFF European Conference in Brussels on October 2nd at the Committee of the Regions. The Conference, entitled 'Rural Innovation on the move!', was targeted on innovation areas connected with two themes of great interest for ERIAFF Regions: on one hand the Climate Change issue and, on the other, food systems and food safety. This latter theme became the main focus of the today Conference (which we can identify as the 3rd ERIAFF Conference). This demonstrates that we are taking seriously the issues arising from our common work, which become the subject for further deepening and actions aimed at encouraging the collaboration among our territories.

Our first European Conference was considered by many people a great success and, actually, I've received only positive critics. With the occasion we raised the interest of about 170 people who registered from 21 EU Countries, plus further 5 non EU Countries, with the actual presence of about 140 participants.

A reception followed the Conference. It was hosted by the Brussels offices of the Catalunya Region and it underlines the tight collaboration and full involvement of our Brussels representation offices.

This conference was definitely the final lever that opened the way for the consolidation of ERIAFF and its full recognition by the European Institutions, primarily by the European Commission, who attended the conference with 4 speakers and with the opening video-message from the EU Commissioner, Mr. Dacian Ciolos.

Following this first European event, the ERIAFF agenda quickly filled in with new initiatives and collaboration proposals, the latter particularly addressed to the involvement of Tuscany Region as ERIAFF Network first promoter:

- EUROMONTANA Network invited us to present our action during their Annual Assembly on November 7th 2013. We've started a strong collaboration with this Association.
- The European Commission DG AGRI invited us to present our ideas about cross-border and interregional cooperation among EIP AGRI Operational Groups during the Conference 'Programming Innovation in Rural development', which took place in Berlin on 25 and 26 November 2013.
- On January 16 2014, we collaborated with the ERRIN Network at the organization of a brokerage event concerning the Horizon 2020 first call for proposal on Sociatel Challenge number 2.
- AREPO (The Association of European Regions of Origin Products) invited ERIAFF to its Annual Assembly the 20 of February 2014 to present an update about the EIP AGRI and its relevant opportunities.
- Together with the European Forest Institute (EFI), the EUSTAFOR (The European Association of public forest owners), the CEPF (The European Association of Private Forest owners) and EUROMONTANA, we organized in Brussels on May 20th 2014 a workshop devoted to innovation in the forestry sector. This event, hosted by the Bavarian representative and with characteristics similar to the today's one, registered the interest from 186 people from 14 European Countries and the actual presence of 140 participants.

So, we've arrived to the today's conference, that, as said, we can consider the 3rd ERIAFF Conference. We already have data about the participation: over 130 registration from Finland, Sweden, Holland, Spain, Italy, Germany, Belgium, Georgia, Hungary and Latvia. Another success for our Network!

## 2 ASSESSMENT OF OUR COLLABORATION

Now, I think it's important to evaluate the efforts we've been carrying on with this shared initiative. An assessment which I consider extremely positive and which I'd like to summarize in 3 brief chapters:

**1. The aggregation of a great number of partners (which are still growing)**
Having promoted and developed a Network without juridical basis and no adhesion quota, based on the common will of collaborating at interregional level, has allowed us to build up a participatory platform where every partner Region gives on the basis of its expectations and possibilities. A system which, so far, has worked very well and I think we can continue to maintain.

Clearly, this assumes an increased effort by my Regional Administration, which had strongly wanted the leadership in this collaboration since the beginning. By my side I can affirm that we will keep on with our engagement at coordination level, asking your collaboration and support in the development of the initiatives which are still in the study and development phases.

We must soon activate our ERIAFF website in order to support the acknowledgement of the Network and facilitate the exchange of information among its partners.

We will keep a system of collaboration and information sharing based on meetings among our technical offices, keeping at the core the role of the Network in finding synergies at cross-border level and among our regional actors. **ERIAFF is first of all at the services of our territories.**

**2. Consolidation of our position before EU Institutions (particularly with the DG AGRI and within the EIP AGRI)**
Thanks to the work we've done until now, we've gained the trust by the European Commission, with particular references to the DG AGRI and the EIP AGRI Network. We've maintained a connection with the EU Commissioner, Mr Dacian Ciolos, who recognized our role and encouraged us to keep going on with this approach.

We've also opened good connection with the DG Research, which we should further reinforce.

Beside the acknowledgement received with the invitation of ERIAFF to the DG AGRI Conference in Berlin, we can also be glad with the invitation we've received, again from DG AGRI, to participate to the EIP AGRI stakeholder consultation workshop organized to starting defining the priorities within the Horizon 2020, Societal Challenge 2, 2016–2017 Work-programme. The workshop is taking place on next 20 June in Brussels and it represents a great chance for bringing also the ideas and priorities derived from the today's conference.

In order to honor in the best way such a participation, we are organizing a preliminary ERIAFF technical meeting on the day before (19 June), so to bring shared inputs and views to the workshop. The starting point is constituted by the results from our Conferences and, overall, by the cross-analysis of innovation priorities highlighted by ERIAFF partners and consolidated in the priority grid we have been updating on the basis of received inputs.

So far, 15 ERIAFF partners have sent their contributions. The result is showing a general convergence towards 'innovation needs' mostly related with the governance of the agricultural innovation systems, the energy related issues and the optimized use of resources.

More connected with this seminar, there is also a convergence towards innovation in traceability systems and product differentiation.

I encourage partner Regions to send their contributions by filling the priority grid which, even if not definitive and comprehensive, is a supportive tool to improve our collaboration.

### 3. The collaboration within European projects

This last chapter is about the collaboration we've started to develop interesting project proposals targeted to compete within European funding programmes. As said, our main target is enabling the collaboration among our actors and practitioners. So far we've registered a lively activity involving our territories which has led to some Horizon 2020 project proposals. I don't have the full list, because it's not easy to keep track of everything, but I can count at least the following proposals (that are fully endorsed within ERIAFF Network or promoted by ERIAFF partners):

- 4 Thematic Networks were proposed: On protein crops, on Mountain agriculture, on Brokerage services and on Precision farming.

- A multi-actor project on precision farming (unfortunately it did not succeeded in passing the first stage).

I cannot tell you if this can be assessed as a positive result but, in my perception, this is a first step towards what I expected from this collaboration.
Besides that, we have to consider that the main elements of cooperation within the EIP AGRI are not yet active, namely the Operational Groups of the EIP.

I'm sure we will benefit even more of our collaboration when such Groups will be deployed.

For the moment, through our initiatives, we will keep offering occasions to our actors for activating good contacts, possibly resulting in actual European projects. I really hope that the today's brokerage session will lead to further ideas and collaborations.

We will keep monitoring the evolutions and we will offer our logistic for any follow up activities you, the actors, could need.

## 3 FUTURE PERSPECTIVES

I would like to share with the audience also some reflections related to our collaboration and projected to the coming months, as well as giving you some information about what we are doing as Tuscany Region to improve our collaboration profile within ERIAFF.

Already said about our participation to the DG AGRI Stakeholder consultation of next 20 June, we are also collaborating with the Technology Platform on Organic Farming (TP Organics), which is organizing a brunch debate in Brussels at the Tuscany office, followed by an internal TP Organics Assembly, on next 1st July 2014. They asked our support and will involve some regional experts from ERIAFF Regions. They will also invite a ERIAFF representative (probably from Catalunya) to be a speaker during the final session of the European Organic Congress in Bari (Italy) on next 10-12 September 2014.

This collaboration is very promising as organic farming is one of the top innovation priorities listed in our common priority grid. I hope this collaboration can lead us to some concrete innovative actions in the next future.

The Apulia Region is also promoting a workshop during the European Sustainable Energy Week 2014 (EUSEW 2014) to promote collaboration in the bioenergy sector. The workshop, with the title 'Bioenergy in rural areas', is taking place on 25 June at the Apulia office in Brussels and will involve some ERIAFF Regions. Another relevant initiative aligned with our innovation priorities.

The European Commission has invited ERIAFF to present some regional good practices linked with forest and bioeconomy in an Open Days event with the title 'Bioeconomy: a partnership between Agriculture and Industry', which is organized jointly by the DG Enterprises and DG Agriculture. The event is taking place on 7 October 2014 in Brussels at the Borschette Center. This gives us once again the opportunity to demonstrate our engagement before the European Institution. In this specific context, we are requested to bring some experiences or ideas about cross-border collaborations to foster biobased industries (eg. Bio-refineries) connected with the forest sector.

I call for ERIAFF members to show up with possible good ideas as the presentation can be shared between 2 ERIAFF speakers.

Finally, another event where ERIAFF partnership is called to take action is under development. It's an external seminar of the NAT Commission of the Committee of the Regions, which is scheduled in Florence (in my Region) on next 19 September 2014.

We candidated this event at the end of 2013 and now we have the final approval by the Committee of the Regions. The event is about 'The role of research and innovation in the bio-economy as a lever for increasing youth employment in the agriculture and forestry sector: success stories and future prospects' and we would like to fully involved ERIAFF Regions by launching a call for expression of interest by 3 young European farmers who could present during the seminar their experiences with bioeconomy industries. Particularly, we would like to identify those situation where bioeconomy is beneficial to farmers and to the employment rate of young people.

Even in this case, I hope to get some feedbacks and proposals by ERIAFF partners. A specific invitation will be sent in the coming days.

I would like to close my speech by highlighting some actions we are running in Tuscany and which could be beneficial to the ERIAFF partnership.

First of all, I'd like to briefly introduce the Tuscan Food Quality Center, an non for profit Association which collects the adhesion of 35 Tuscan partners from 3 different categories: Research and training; Primary production and production chain; Culture, promotion and communication.

This Center, which was constituted to facilitate the Tuscan contribution to the International EXPO' 2015 in Milan, is active in several branches, from the research (genomic, proteomic, metabolomics, nutraceutical and agronomy) to technical and practical issues dealing with:

- training for cooks specialized for collective canteens,
- certification schemes for organic and integrated agriculture, food safety and origin products,
- artistic and traditional aspects of food,
- impact assessment of traditional productions,
- multimedia tools applied to agrifood.

Furthermore, we are promoting other forms of aggregation, like the AGRISMART initiative, which is connected with space technologies and precision farming.
I take the opportunity to remind the participants that Tuscany will host the International Congress of Silviculture, which is taking place in Florence on next 26–29 November 2014.

We are also coordinating our efforts with our scientific institutions (in Tuscany we have 4 Universities, 3 National Research Centers and 2 high formation schools) by creating a scientific contact group with different kinds of expertise.

Finally, few words about our collaboration through the Operational Groups of the EIP AGRI.

We are finalizing our Operational Programme and cooperation will be an important asset in our architecture. I really hope that the work we are carrying out in our Countries and Regions can lead us to have proper and accessible tools for allowing our farmers and actors to improve their collaboration at EU level.

This will improve a lot the way we think about innovation and the way we can translate good innovative ideas into practice.

I would also suggest that our next ERIAFF Conference (in 2015) would be targeted to the connection and collaboration of existing Operational Groups, which I hope will be already set and active in the next year. Candidatures for hosting the 2015 ERIAFF Conference are open!

# 4 CONCLUSIONS

I'd like to end my contribution by recalling our commitment within ERIAFF: we have endorsed this collaborative platform for enabling our territories and farmers to improve their level of innovativeness and the way we collaborate in wide European projects and actions.

I renew here my personal commitment in promoting this approach.

I take the chance for congratulating with my collaborators, Alessandra Gemmiti, from the Regional Ministry for Agriculture, and Fabio Boscaleri, from the Tuscan Brussels Liaison office, who are fully committed within ERIAFF activities and helped me and the regional management in keeping the Network on an really operational track and who have shaped the Network exactly on what was my personal expectations.

I renew also my congratulations to the organizational staff and to all the participants, who I hope could go back home with valuable elements and ideas for further improving our commitments and the ERIAFF Network.

Thank you!

Gianni Salvadori

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