Stairway to Excellence
Cohesion Policy and the Synergies with the Research and Innovation Funds

Example of Synergies

Innovative tools against potato blight, Jõgeva Plant Breeding Institute.

Estonia
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Executive Summary

This case study of five projects financed by National funding, Structural Funds (SF), and Framework Programme (FP)\(^1\) gives an example of how results of applied research are turned into a practical innovation which can increase revenues of potato breeders and farmers. This is also an example illustrating the spontaneous and non-linear nature of the innovation process. The knowledge has been developed within a FP project and developed through nationally funded research, and led to practical solutions while discussing problems with a potato farmer. It resulted in a SF-funded project building agrometeorological automatic weather stations for decision support on potato late blight control and irrigation management. Training and dissemination was created while the know-how from FP and following Estonian projects were used in the Estonian-Latvian INTERREG project “BALTORG_POTATO” supporting companies with improved and new potato varieties and technologies.

Type of synergies
- Downstream
- Sequential funding

S&T field targeted by the synergies
- Food, Agriculture and Fisheries

\(^{1}\) Cf diagram on p.5

The views expressed are purely those of the author and may not in any circumstances be regarded as stating an official position of the European Commission
INTRODUCTION

The case presented in the following sections is one of the examples of synergies provided by the ‘Stairway to Excellence’ project in which different sources of funding have been combined to amplify the R&I investments and their impact on the economy and wider society.

As described in the guide ‘Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness-related Union programmes’\(^2\), synergies can be achieved through:

- Sequential (or successive) funding that use funds in separate projects built on each other;
- Parallel funding that use funds in separate projects complementing each other;
- Simultaneous/cumulative funding that brings together Horizon2020 and ESIF funds in the same project aimed at achieving greater impact;
- Alternative funding that reorients FP7/Horizon 2020 projects that were positively evaluated, shortlisted, but not funded given the limited budget, towards Structural Funds impact

The combination of sources of funding is used to address two types of activities:

- Upstream activities build the appropriate capacities to perform research. They can be capacity building in physical capital (construction or improvement of research infrastructures, purchasing equipment, (including IT equipment and connections, data storage capacities), innovation infrastructures (LivingLabs, FabLabs, Design factories, etc.) and social capital (assistance for building networks, clusters and consortia).
- Downstream activities are focussed towards the market and the creation of economic value. They can be applied to research, development and demonstration activities, technology transfer and adoption; technology and innovation audits to identify potential demand for RDI results; proof-of-concept funding; pilot lines for first production; and pre-commercial procurement projects. There can also be activities to support the improvement of the innovation eco-system in a territory.

1. CONTEXT

Researchers in Estonia are used to channel different funding sources, as about 80% of R&D funding is competitive and over 60% of all public sector RD&I funding has been financed by Structural Funds. However, long-term project planning involving different funds is not common because of the competitive nature of funds – applicant cannot be sure to get “planned” funds, and one cannot plan to be a partner in a H2020 project if the idea is not ready yet in the head of future coordinator.

No special mechanisms were needed to facilitate these synergies but only the networking between researchers and between researchers and entrepreneurs, and the dissemination of research results.

Jõgeva Plant Breeding Institute (Jõgeva PBI)\(^3\) is a small Public Research Organisation (PRO) which carries out applied and basic studies and breeds new varieties of agricultural crops. Jõgeva PBI does not have a person dedicated to knowledge transfer. The direct link between the researchers and clients (farmers, food producers) is considered the best facilitator for the take-up of scientific results. Personal contacts and close collaboration between researchers and farmers create opportunities to discuss real life problems and search for working solutions.

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\(^3\) Jõgeva PBI was reorganised in July 2013 into [Estonian Crop Research Institute](http://www.cropresearch.ee)
No funding instruments were designed specifically for advertising the research results for the policy cycle 2007-2013. However, dissemination has been always an eligible cost. To facilitate the take up of the scientific results, Estonian Rural Development Plan (ERDP) for 2014–2020 includes a special measure called “Knowledge transfer and awareness”. Estonia has a system of intellectual property rights (IPR) that is well developed from a legal perspective. However, some improvement is needed, to promote the collaboration between public-private organisations and the knowledge transfer.

2. IMPLEMENTATION

Figure 1 maps the project chronologically, the research activities of the organisation and the type of funding. It aims to give a picture of relations between projects revealing planned or unplanned dependencies (synergies) between projects and their source of funding.

Figure 1. Chronology of the main projects involved in synergies

Added value / complementarities created by the synergies
Research results used for creating innovative tools, innovative tool used in real business in organic farming. The researchers of Jõgeva PBI gathered know-how in the FP project where one of the results of expertise exchange was the creation of innovative pathogen analysing tools. Expertise of the researchers was developed through the nationally funded research. The idea of innovative solution emerged while researchers discussed concrete problems with a potato farmer. The result was the SF project - to build agro-meteorological automatic weather stations for decision support of potato late blight control and irrigation management. Another synergy – training and dissemination - was created while the know-how from FP and following Estonian (national funding) projects were used in the Estonian-Latvian INTERREG project “BALTORG POTATO”, supporting companies with improved and new potato varieties and technologies.

Mechanisms facilitating the synergies
Estonia has no specific policies or other mechanisms to facilitate synergies (no fast track submission, evaluation of proposals submitted under SF calls that aim at complementing FP projects, no alignment of call deadlines, the eligibility, evaluation criteria etc.)

Main problems encountered in implementing the synergies
Respondent did not identify any difficulty.
Suggestions to improve the synergies
There is no need to improve synergies artificially, as it may turn out to be counterproductive – processes would be longer because some ESIF funds would be frozen for unknown period and less funding would be available for free competition. The best way to promote synergies is to remove contradictions in different regulations.

Main motivations in implementing the synergies
Researchers in Estonia must use different funding sources to be able to carry out research activities, as approximately 80% of R&D funding is competitive and more than 60% of all public sector RD&I funding has been financed by Structural Funds. Participation in the FP project offered opportunities to improve scientific excellence via international cooperation and building up innovation capacity of the organisation. The respondent emphasised also the satisfaction of offering innovative solutions for the businesses, as one of main motivators for knowledge transfer projects.

Facilitating mechanisms for the take up of the scientific results
Jõgeva PBI is a small PRO and does not have a person dedicated to knowledge transfer. Only big universities have Knowledge Transfer Offices such as Tallinn University of Technology which has an Innovation and business centre (Mektory). University of Tartu hosts the Technology Transfer Unit of the Office of Research and Development, and Tallinn University the Knowledge Transfer Centre of the Research Administration Office. Existing IPR regulations need improvement to promote the collaboration between public-private organisations and the knowledge transfer.

Impact on the regional / national economy
These projects offered very tangible (and in the end financial) results for all potato growers and breeders.

Figure 2 below aims to position projects according to the activities they cover; from upstream (infrastructures, equipment, research activities) to downstream related activities (innovation, knowledge transfer, access to market).
Figure 2: DIAGRAM of the complementarities of the funds in the knowledge triangle/ flow

**Nationally Funded Project 1:** Breeding and maintenance breeding of potatoes and related studies on agro-technology and seed. Production, 2003-2008

**Nationally Funded Project 2:** Phenotypic and genotypic characterisation of Estonian populations of *Phytophthora infestans*; epidemiology of potato late blight, 2005-2008

**FP5 Project 1:** EUCABLIGHT: Potato Late Blight Network For Europe, 2003-2006

**SF Project 1:** Implementation of site specific monitoring system for decision support on late blight control and irrigation management in potatoes, 2011-2013

**SF Project 2:** BALTORGPOTATO: Baltic Organic Potato for the World Markets, 2011-2013

**Research**
(Research Infrastructures, facilities, Research activity etc.)

**Training**
(Continuous professional training, PhD fellowships)

**Innovation**
(Knowledge dissemination, knowledge transfer events, funding of the KTOs etc.)
3. RELATED PROJECTS

**Name of the FP project:** EUCABLIGHT Potato Late Blight Network For Europe, FPS.
- FP funding scheme: CON - Coordination of research actions
- Budget: Total cost - €1,126,883
- Time frame of the FP funded project: 01.02.2003 to 31.01.2006
- Main objectives and type of costs covered: This project incorporates the majority of late-blight research programmes from across Europe. Existing expertise exchange, with the aim of standardising methods and creating universal databases of new and existing information on:
  a) characterisation of *P. infestans* populations
  b) the characterisation of foliage and tuber resistance of potato germplasm. This knowledge was consolidated to plan future strategies for the sustainable control of disease.

**Name of the nationally funded project 1:** Breeding and maintenance breeding of potatoes and related studies on agrotechology and seed production
- National funding scheme: Ministry of Agriculture, State Budget
- Budget: €317,321
- Time frame of the project: 01.01.2003 to 31.12.2008
- Main objectives: The main goals of potato breeding have been high-yielding table and industrial varieties which are medium to medium late, have resistance to diseases, pests and mechanical damages and have high quality.

**Name of the nationally funded project 2:** Phenotypic and genotypic characterisation of Estonian populations of *Phytophthora infestans; epidemiology of potato late blight.*
- National funding scheme: Estonian Science Foundation Grant, State Budget, Ministry of Education and Research
- Budget: €46,358
- Time frame of the project: 01.01.2005 to 31.12.2008
- Main objectives: The aims of studies are obtaining of new theoretical information on establishment and evolution of local populations of *P. infestans* and improvement of late blight forecasting and control. Genotypic characterisation of late blight isolates (isozymes, genetic fingerprinting, mtDNA haplotypes) enables more exact and reliable detection of diversities between isolates and populations than that is possible by means of phenotypic character.

**Name of the SF project:** Implementation of site specific monitoring system for decision support on late blight control and irrigation management in potatoes.
- SF funding scheme: EAFRD
- Budget: €119,019
- Time frame of the SF funded project: 01.03.2011 to 30.11.2013
- Main objectives: Automatic observatories to develop protection of potato blight; researching the need for moistening in potato cultivation.

**Name of the regionally funded SF project:** BALTORGPOTATO Baltic Organic Potato for the World Markets
- Regional funding scheme: INTERREG, ERDF
- Budget: €354,576
- Time frame of the funded project: 01.07.2011 to 30.06.2013
Main objectives: To increase economic competitiveness of stakeholders involved in organic potato food production chain, thus promoting sustainability and competitiveness of the Programme area.
4. ANNEX – DETAILS OF THE RELATED PROJECTS

FP FUNDING PROJECT

Name of the FP5 project: EUCLABLIGHT Potato Late Blight Network for Europe
          http://www.eucalight.org/EucaBlight.asp
Project reference: QLK5-CT-2002-00971
Beneficiary: Jõgeva Plant Breeding Institute (associated partner) 4
Type of institution: PRO
Budget Total cost: €1,126,883 (EU contribution – €1,101,683)
FP funding instrument:
• Funding scheme: CON - Coordination of research actions
• Subprogram: 1.1.1.-5. - Key action Sustainable Agriculture, Fisheries and Forestry
• Call for proposal: 'Quality of life and management of living resources’ 1998 to 2002
Time frame of the project: 01.02.2003 to 31.01.2006

Main project objectives:
• Incorporate the majority of late-blight research programmes from across Europe
• Existing expertise will be exchanged, with the aim of standardising methods and creating
  universal databases of new and existing information
• Brain gain
• Training
• Knowledge transfer
• Gaining scientific reputation
• International collaboration

Specific goals (expected output):
Exchange of existing expertise, with the aim of standardising methods and creating universal
databases of new and existing information on:
  a. characterisation of P. infestans populations;
  b. the characterisation of foliage and tuber resistance of potato germplasm. This knowledge
    will be consolidated to plan future strategies for the sustainable control of disease.

Collaborative work within the project: 24 partners from Europe and associated partners.
Participants in collaborative work:
1. Scottish Crop Research Institute (SCRI), United Kingdom
2. Institut National de la Recherche Agronomique (INRA), France
3. Plant Research International B.V. (PRI), Netherlands
4. Service Régional de la Protection des Végétaux Nord Pas-de-Calais (SRPV), France
5. Association des Créateurs de Variétés Nouvelles de pomme de Terre (ACVNPT), France
6. Irish Agriculture and Food Development Authority (Teagasc), Ireland
7. Wageningen University (WU), Netherlands
8. Applied Plant Research (PPO), Netherlands
9. Sarvari Research Trust United Kingdom
10. Agri-Food and Biosciences Institute (AFBI), United Kingdom
11. Plant Breeding & Acclimatization Institute (IHAR), Poland

4 All together 24 partners
Main Results

- Pathogen analysing tools (Pathogen Graphic Analysis tool, Pathogen Genotype Analysis tool, Pathogen Virulence Analysis tool)

- International conferences, workshops and lectures.
  - 19 October 2005, Management meeting, Location: Tallin, Estonia
  - 19 October 2005-23 October 2005, EU.NET.ICP, Location: Tallin, Estonia

ISI publications:

- Lehtinen, A., Hannukkala, A. 2004. Oospores of Phytophthora infestans in soil provide an important new source of primary inoculum in Finland. Agricultural and Food Science 13, 4: 399-410
NATIONAL FUNDING: PROJECT 1

Name of the project: Breeding and maintenance breeding of potatoes and related studies on agrotechnology and seed production.


Beneficiary: Jõgeva Plant Breeding Institute

Type of institution: PRO

Budget: €317,321

National instrument: State budget, Ministry of Agriculture


Time frame of the project: 01.01.2003 to 31.12.2008

Main project objectives
The main goals of potato breeding have been high-yielding table and industrial varieties which are medium to medium late, have resistance to diseases, pests and mechanical damages and have high quality.

Specific goals (expected output)
Varietal agrotechnology study: testing of varieties in different climatic and soil conditions, comparison of varieties included into Estonian Variety List to find out their suitability for cultivation in Estonia, selection of varieties and new breeds suitable for cultivation in organic conditions.

S&T field of the project: Food, Agriculture and Fisheries

Collaborative work within the project
Collaborative projects (No 159, and No 393) of estimation of glycoalkaloid (GA) content in potato tubers in collaboration with Central Laboratory of Health Protection was carried out in the years 1999–2003 and 2004.

Main Results
- **Patents**: a new potato variety Reet. Reet is a nematode and wart resistant variety of medium maturity. It has regular shaped tubers (shallow eyes, short-oval); no darkening and crumbliness occurs, suitable for salad, chips and mechanical peeling. As it is relatively resistant to potato foliage and tuber blight, it is suitable for organic farming.
- More suitable varieties for organic farming have been selected in field trials: Maret, Agrie dzeltenie, Impala, Folva, Anti, Ando, Juku, Sarme and Reet. Most of them are Jõgeva PBI varieties.
- International exchange of know-how: Cooperation with
  - Boreal Plant Breeding Ltd (Finland),
  - MTT Agrifood Research (Finland),
  - Cornell University (USA),
- Participation/ organisation of international conferences, workshops and lectures.
  - 8th International Congress of Plant Pathology
• Crop Protection Conference for the Baltic Sea Region
• Ninth Workshop of an European network for development of an integrated control strategy of potato late blight


**National funding: Project 2**

**Name of the project:** Phenotypic and genotypic characterisation of Estonian populations of *Phytophthora infestans*; epidemiology of potato late blight.


**Project reference:** ETF6098

**Beneficiary:** Jõgeva Plant Breeding Institute

**Type of institution:** PRO

**Budget:** €46,358

**National instrument:** State budget, Estonian Science Foundation Grant

**Funding scheme:** ETF

**Time frame of the project:** 01.01.2005 to 31.12.2008

**Main project objectives**

The aims of studies are obtaining of new theoretical information on establishment and evolution of local populations of *P. infestans* and improvement of late blight forecasting and control. Genotypic characterisation of late blight isolates (isozymes, genetic fingerprinting, mtDNA haplotypes) enables more exact and reliable detection of diversities between isolates and populations than that is possible by means of phenotypic character

**Specific goals (expected output)**

Detailed characterization of resistance of potato varieties cultivated in Estonia (resistance genes, length of the latent period, lesion growth rate, production of conides and oospores) is important by means of better understanding of late blight epidemiology and implementation of integrated control measures.

**S&T field of the project:** Food, Agriculture and Fisheries

**Main Results**

- Relations and inheritance of qualitative and quantitative traits of yield, disease resistance and quality in breeding of field crops for sustainable agriculture.
- Participation/ organisation of international conferences, workshops and lectures.

**ISI publications:**

SF FUNDED PROJECT 1

Project title: Implementation of site specific monitoring system for decision support on late blight control and irrigation management in potatoes (title on the etis.ee web site)

Alternative title: Applied research about using automatic observatories that are measuring the field-based meteo-data on developing protection system of potato blight. (title on the maainfo.ee web site)


Beneficiary: TÜ Talukartul

Type of institution: Private association (potato farms)

Budget:
- Total Investment: €119,019
- EU contribution: €85,694
- Other contributors: n/a

SF/ESIF funding instrument: EAFRD

Time frame of the project: 01.03.2011 to 30.11.2013

Main project objectives: Establishment of network of agro-meteorological automatic weather stations for decision support of late blight control and irrigation management of potatoes.

Specific goals (expected output)
- Different decision support systems for prognosis of optimal timing of fungicide applications to control potato late blight are compared and adjusted for Estonia’s conditions.
- Monitoring the availability of soil moisture during the growing period, calculating the deficiency of soil moisture needed for potato plants, and calculating the amount of artificial irrigation.

Collaborative work within the project
Jõgeva Plant Breeding Institute transferred the knowledge acquired from previous FP and national projects, and tailored the solutions to the requirements of the TÜ Talukartul.

Main Results
Guides, programmes and web site in Estonian and observation network consisting of 13 observatories have been established.

Monitoring has shown very big variations in precipitation and also the types of fungicides had to be applied to control of potato late blight in different areas of Estonia. As a result of the project, regular monitoring of soil humidity enables to make better decisions for late blight control and irrigation.

SF FUNDED PROJECT 2 - Regional project

Project title: Baltic Organic Potato for the World Markets BALTORG POTATO

Web link: http://www.baltorgpotato.com/
http://www.estlat.eu/supported-projects/?project=47
Beneficiary: Jõgeva Plant Breeding Institute
Institution: PRO
Budget:
  Total Investment: €354,576
  EU contribution: €254,488
  (the part of Jõgeva PBI €29,969)
SF/ESIF funding instrument: INTERREG III, ERDF
Time frame of the project: 01.07.2011 to 30.06.2013

Main project objectives:
To increase economic competitiveness of stakeholders involved in organic potato food production chain, thus promoting sustainability and competitiveness of the Programme area.

Specific goals (expected output)
- To increase capacity of Baltic Organic Potato Network in order to provide support to organic potato growers, breeders and processors, and training the key staff of network:
  - assessment of external markets,
  - elaboration of joint strategy and action plan,
  - elaboration of tools (training programs and methodology) to be used for capacity building of companies involved,
  - acquisition of equipment to provide assistance to companies and for research.
- To increase capacity of companies involved in organic potato food production chain in order to enable them to produce and process organic potato in quality and quantity satisfying demands of customers:
  - provision of training,
  - experience exchange activities within and outside Program’s area,
  - testing of potato growers and assisting them in preparation for certification,
  - supporting companies with improved and new potato varieties and technologies,
  - negotiations with Estonia’s public authorities, in order to ensure EU subsidies for companies growing organic potato.
- To promote and ensure visibility and recognition of organic potato food products, their producers, and region in EU and in the world:
  - elaboration of the web site, updating information,
  - provision of information about organic potato food products and stakeholders on web sites of partners,
  - participation in international business and research fairs,
  - elaboration and dissemination of marketing materials,
  - publications in international business magazines,
  - broadcasting in radio and TV.
- To consolidate regional stakeholders involved directly or indirectly in organic potato food production chain and in network, thus creating preconditions for new joint research initiatives and development of new organic potato products and technologies, demanded at the world.
  - involving in network new participants, representing business and research environment and having competencies in organic food and potato production, processing and research,
  - strengthening collaboration of stakeholders, especially companies and research institutions,
  - consultations with companies in elaboration of joint strategy and action plan,
  - providing and exchanging of information about knowledge and experiences of stakeholders involved,
  - dissemination of “collaboration success stories”, thus raising awareness and wish of potential stakeholders to collaborate.

Collaborative work within the project
• Potato Growers and Producers Association (Latvia)
• Association of Latvian Organic Agriculture (Latvia)
• Aloja Starkelsen, Ltd. (Latvia)
• Estonian Biodynamic Association (Estonia)
• State Priekuli Plant Breeding Institute (Latvia)
• Jõgeva Plant Breeding Institute (Estonia)
• Institute of Economics of Latvian Academy of Science (Latvia)

Main Results
• Strategy and action plan for organic starch production
• Report. Joint testing of Latvian, Estonian and foreign potato varieties

S&T FP Research areas
Food, Agriculture and Fisheries