



# **Social and Technological Transformation of Farming Systems: Diverging and Converging Pathways**

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## **Workshop 1.10: Practical experiences and methodological concepts from the first years of EIP-Agri implementation**

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The European Innovation Partnership (EIP) for 'Agricultural Productivity and Sustainability' was highlighted as "being indispensable to preparing European agriculture for the future" (EC Brussels, 29.2.2012 COM (2012) 79 final). EIP-Agri aims to enhance the implementation of technical, organisational and social innovations faster and more efficiently than in the past. This is important because the agricultural/food and forestry industries and their rural areas often face significant economic, environmental and social challenges. EIP-Agri is a complex policy concept that aims to connect local, regional and European innovation activities (vertical interconnections) and to bridge the innovation divide between sciences and practice (e.g. multi-actor involvement in research, EIP-focus groups). Horizontal integration is supposed to connect relevant actors, especially research institutes, farmers and regionally based organisations by forming the so called Operational Groups on a sub-national level. The implementation of the EIP-Agri concept will be jointly funded from European and national sources. The workshop called for papers presenting theoretical and practical approaches which have been developed and applied since the start of EIP-Agri in 2012/2013. Authors were invited to highlight lessons learned so far in respect to the following issues:

- Implementation of EIP-Agri through the programming processes of national and regional policy and administration for e.g. Rural Development Programmes or national agricultural/forestry and rural development schemes e.g. new funding formats enhancing innovation-driven research or more efficient methods for innovation;
- Role of specific policy/legal requirements in respect to bridging the gap between research and practice and to fostering innovation processes;
- Improvement of overall sustainability and innovative capacity of the livestock sector, arable crops and other agricultural systems;
- Collecting of innovative knowledge on specific themes effectively and efficiently;
- Practical approaches for the deployment of the vast reservoir of existing scientific and practical knowledge;
- Improvement of the flow of information and knowledge between academia and practitioners in particular on agricultural and forestry practices and innovations;
- Increasing the exchanges between European regions on innovative matters;
- Implementation of more efficient methods for innovation by e.g. private/public farm advice services, information technology, print or audio-visual media;
- Improved accessibility and long-term availability of end-user material

Furthermore, we wanted to learn more about approaches aiming to evaluate EIP-Agri. Hence, we aimed to enhance the discussion between experts addressing these topics:

- Identification of appropriate indicators and assessment concepts for innovation processes;
- Impact evaluation of projects enhancing the profitability and sustainability of animal agriculture, plant production, fisheries/aquaculture and forestry;
- Assessment of risk management practices and/or farmers' flexibility to adjust under changing framework conditions (resilience)

## **Administrative intimidation and payment reduction frustrate innovative farmers under the European Agricultural Fund for Rural Development**

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**Abstract:** This article discusses how to put in perspective what is perceived by some project grant applicants of operational group projects operating within the late Rural Development Programme 2 (RDP-2) - project grant funding in 2013-2015 - as administrative intimidation and discouragement by the Dutch national payment agency. We may learn from the conclusions in view of the operational groups under the upcoming EIP-Agri support aid and other RGP-3 grants. A guideline to this article is a phrase at the website [ec.europa.eu/agriculture/cap-funding/index](http://ec.europa.eu/agriculture/cap-funding/index): *“The European taxpayer rightly expects that these sums [- of the EU general budget for Agriculture and Rural development -] are correctly spent.”* In this article we discuss whether the EU taxpayer (and any other EU resident for that matter) should be satisfied with how the payment agency has applied the project grant payment reduction. As an example we take the results of the affirmation procedure of the grant for Knowledge exchange network projects in the Peat Colonies area, under the late RDP-2 (2013-2015), in which 62 projects were granted a maximum of €55.000. In view of what EU taxpayers rightly may expect of the agency, the procedure for the aid applications of EU funds seems to deviate from the purpose of the regulation. The image of a stimulating (though immature) regulation with a purpose-focused procedure, which resulted in remarkably effective and efficient knowledge exchange developments in the years 2007-2010, is gone. In its place is an unreliable time and resources absorbing regulation, with such administrative burden that potential project leaders are reluctant to encourage farmers to apply – even if they do not fear important payment reduction, like the former government organisations (FGOs): research institutes and extension agencies. The applied payment reductions led (of course) to additional societal unease. Moreover the project successes in terms of knowledge exchange towards innovation are not celebrated any more as they were in the early years of the RDP-2, because the focus has deviated towards the disadvantages and negative side effects. Aside from this the article reveals a reverse correlation between the projects that were allowed communication before the final decision about the payment and the applied payment reduction. FGOs seem to suffer disproportionately less from the newly implemented communication policy of the payment agency. The FGOs are nonetheless just as critical as other project leaders about how the payment agency handled the procedure. A reintroduction of the insights of the policy implementation notes of 2007 about communication could reinstall a satisfactory system from the perspective of the EU taxpayer, particularly if complemented with a sound and longer-term coordination within the payment agency. It is recommended to reinstall such a concept as a control system for the RDP-3 grant procedures. This aside, the procedure for administrative control should be improved substantially and lined up with the EU precedent judgements.

**Keywords:** Agriculture, aquaculture, framework conditions, adaptation strategies, sustainability, performance indicators, farm management

## **Introduction**

News items about incorrect uses of EU subsidies appear regularly on formal and social media. These abuses seem to proliferate despite numerous preventative measures. On the other hand the EU [and by extension national authorities] shows itself to be an increasingly unreliable partner towards grant applicants, who honestly strive to achieve the objectives of their projects and budget their affairs as effectively and efficiently as possible. This phenomenon has emerged with funding programmes for stimulating innovation in agriculture. In this article we focus in particular on an example about knowledge sharing activities and cooperation in operational groups.

In any procedure for granting projects, there are two key decision moments: the granting before the start and affirmation after the execution. The quality of the decision before the start depends largely on the competence of the consulted assessors to link the submitted project plans to their knowledge of the state of the skills in practice. This competence is determined by a combination of the individual qualities of the assessment team and the specific circumstances that frame the assessment procedure. The quality of the affirmation decision after ending the project depends on the competences of the agencies, the quality and coordination of the procedures, the distribution of responsibilities and the access to adequate juridical support.

### ***The aim of this article***

This article explores the recent incidents with unexpected negative affirmation decisions in one of the regulations under the European Agricultural Fund for Rural Development (EAFRD), and their effect on the reputation of the reliability of the government in the Netherlands. Since the national payment agencies have the habit of referring to the EU Regulations, Directives and Controls as the source of the unexpected negative decisions, a radiant network of people around the applicants, both outside and inside the government, have started to mistrust the EU grant sources for rural development.

The article discusses how to put in perspective what is perceived by some project grant applicants of operational group projects operating within the late Rural Development Programme 2 (RDP-2) project grant funding in 2013-2015, as administrative intimidation and discouragement by the Dutch national payment agency. We may learn from the conclusions in view of the operational groups under the upcoming EIP-Agri support aid and other RGP-3 grants.

A guideline to this article is a phrase at the website [ec.europa.eu/agriculture/cap-funding/index](http://ec.europa.eu/agriculture/cap-funding/index):

*“The European taxpayer rightly expects that these sums [- of the EU general budget for Agriculture and Rural development -] are correctly spent.”* In this article we discuss whether the EU taxpayer (and any other EU resident for that matter) should be satisfied with how the payment agency has applied the project grant payment reduction. As an example we take the results of the affirmation procedure of the grant for Knowledge exchange network projects in the Peat Colonies area, under the late RDP-2 (2013-2015), in which 62 projects were granted a maximum €55.000.

## **Grants and affirmations to farmers' Knowledge network groups in 2007-2013**

### ***A grant supported tender regulation for farmers' Knowledge network groups***

Under the Rural Development Programme RDP-2 (2007-2013) the Dutch government had decided that farmers' Knowledge network groups could be supported as collectives of businesses that engage in knowledge development activities outside institutes, and should therefore be framed in the knowledge dissemination chapter of the 7<sup>th</sup> Framework (EC Council Regulations N° 1857/ 2006; N° 1698/2005; and N° 1257/1999). The network group activities were perceived within this frame as a kind of public-private cooperation in knowledge dissemination for innovation, in which farmers pursue innovative knowledge development through knowledge exchange with scientists, and knowledge sharing among each other, and with experts and others.

The projects were funded with the aim of striving to find new ways of diminishing or solving problems which reduce the productivity or sustainability in agriculture. The project initiatives should come from and be developed by the farmers. This concept is similar to that for operational groups in EIP-Agri in RDP-3. Our network groups appear in fact as pioneers for the current EIP-Agri operational groups. Consistent with the conceptual formula, our network groups worked out and executed their project plans at the hand of progressive insights during the course of the project period, guided by an independent process leader. During the project period unlimited adaptations to the project plan were in principle allowed within the project budget, as long as the central project aim was still pursued.

The Knowledge exchange network projects' regulation was an innovative instrument under RDP-2. However, there was no clear internal guidance within the government about how agency workers should deal with the implications of this type of project. The payment agency needed space for adjusting the procedure while executing the administrative control, to make sure that the procedure would encourage and support innovation in agriculture and to make the administrative burden manageable. According to the policy implementation notes under RDP-2 in 2007 (made by the former agency [DR] before the national agency reorganisation in 2014), any payment reductions should only be applied after formal and informal communication with the applicant. Since a large part of the regulation rules were so called conditions, the primary purpose of the communication was to allow the applicants to correct mistakes and adjust the application for any conditions that were misinterpreted or overlooked. Thus the administrative burden was also kept manageable for both the applicants and the agency; all of course within the limits of integrity and fairness. The procedure aimed at limiting any enforced payment reductions to applicants of projects that evidently strive after the project objectives. In the information to grant applicants this policy outline about communication was continued during the RDP-2 period (2007-2013). In this way the general focus would stay on the content of the projects and not on the administration – a common problem with many EU-related grants.

### ***Shifting trends in the behaviour of the agency***

In the early years (2007-2010), the emphasis of the administrative critics was focussed on the budget of the initial project plan. Specific expenses were refused in advance if they did not fit well enough with the conditions. Due to the ongoing plan adaptations during the execution this meant that there was less money to spend during the project execution than the desired

budget. However, the advantage for the project participants was that, after the expenses were made, the affirmation of the grant payment was merely a formality.

Gradually, and (probably) directed by penalties through the biyearly EU account controls, the administrative control shifted the emphasis in the later years (2013-2015) towards payment refusal, reduction and reclaim of the expenses made, after the projects were finished. Payment refusals or reductions were initially limited to a few hundred euros, and/or faded (almost) completely away after final communication with the agency about the legitimacy of some specific expenditures. Recently however the number of projects facing payment reduction, the amount of the reduction, and the reduction percentage of the requested payment has increased.

Whether these payment reductions and refusals were rightfully imposed, is an as yet unsolved legal issue going through objection and appeals procedures, which may take until the end of 2016 (or later) to conclude. In the meantime the general atmosphere among (potential) applicants has shifted towards mistrust in both directions: agency workers spread the message that project applicants are increasingly defying the boundaries of the regulations, whereas some farmers' organisations and extension services (and even some agency workers) are now warning openly against applying for any EAFRD grant funds in future. A group of representatives of various agricultural organisations has even officially raised the unprecedented question of whether it is possible to obtain a government guarantee or a private insurance against (in their perception) the unpredictable and unreliable behaviour of the government agency.

### ***In view of RDP-3 (2014-2020)***

Overlapping the end of the RDP-2 period (since 2013) a Model Regulation for the implementation of RDP-3 has been under development in the Netherlands, based on an ex-ante evaluation. Already both the RDP-3 policy text and the Model Regulation have given rise to extensive disputes. Subsequently, decisions about opening grant funding opportunities for new projects have been delayed over and over and are for the major part not yet foreseen until after the summer of 2016. The first grant opportunity for EIP-Agri proposals of operational groups is also postponed, at least until then.

The main reasons for reticence in relation to the Model Regulation RDP-3 are:

- a. that parties do not (dare to) make use of these grant regulations because they (fear that they) cannot take the risks (notably about payment reduction) that the application for funding entails; and/or
- b. that parties expect that a grant application in the context of this regulation will lead to all sorts of complex administrative procedures during the execution – and could be followed by legal procedures afterwards.

Ad a): some organisations have explained publicly that the reason that they do not (dare to) make use of these subsidy regulations does not only have to do with the unpredictability of the subsidy payments, but also with the other financial conditions. The subsidy percentages as such are already hard to meet. On closer inspection, there are a good number of inextricable cost items excluded from the grant. On top of that, the method of calculating 'staff costs' of organisations is tight for granting in the Model Regulation RDP-3. For some relevant

parties in this field it has thus become (nearly) too complicated to construct a suitable project budget with the available sources.

Ad b): from 2013 until now, the introduction of RDP-3 has already resulted in the employment (whether or not directly paid) of policy and agency workers, accountants, administrative managers and consultants, and lawyers; even before any tender grant has opened up. Afterwards, private subsidy advisors will also claim their share of the funds. These types of surrounding employment had already increased in the context of the final years of RDP-2, for which the administrative burden had been systematically under calculated by the government. The balance with expenditure linked to achieving the actual aim of the grants, however, seems to get lopsided for RDP-3. This gets topped up with the expected increase of administrative and legal procedures related to the multitude and imbalance of EU and national rules during the project executions under the Model Regulation.

### ***International perspective***

What is happening in the recent years in the Netherlands concerning incidences of refusal, reduction and reclaim of granted funds for projects by the national payment agencies, as well as concerning the increase in administrative burden in the context of EU regulations, is not unique in the EU, although there is substantial variability between Member States because of their specific programmes, agency structures, regulations and judicial systems.

## **The context of EU funding**

### ***The concept of proper use of EU tax money***

According to the communication on EU websites, EU taxpayers have the right to expect that EU funded aid applications are properly managed. In the communication the EU states that it is important that management and checking systems are in place and that irregular payments are detected and recovered. Under the basic rules for the financial management of the Common Agricultural Policy (CAP), the European Commission is responsible for the management of the EAFRD. Based on the principle of shared management, the making of payments to beneficiaries is delegated to the Member States, who themselves work through national or regional payment agencies. Prior to making payments, these agencies must, either themselves or through delegated bodies, satisfy themselves of the eligibility of the aid applications. The exact checks to be carried out are outlined in the sectoral regulations of the CAP and vary from one sector to another. The expenditure made by the payment agencies is afterwards reimbursed by the EU Commission to the Member States; in the case of EAFRD on a quarterly basis. The reimbursements are, however, subject to subsequent corrections which the EU Commission may make under the clearance of accounts procedures (Cap-funding, 2013).

### ***Conclusion***

The EU communication states that the costs for any aid application can basically be divided into the costs for management, checking and correction, and the actual payment for the policy purpose. So at the level of 'properly done', the EU taxpayer may first of all expect that management costs and purpose directed payments are in balance. Secondly, the EU taxpayer may also expect that irregular payments are detected and recovered.

### **EU frame for regularity in aid application of EIP-Agri**

The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-Agri) provides grant support to projects under EAFRD (so called CAP ‘second pillar’; Regulation 1305/2013; 2014-2020 (3)), which show innovation in linking research knowledge with farming and forestry practices. The EU's rural development policy is worth €100 billion from 2014-2020, with each EU country receiving a financial allocation for the 7-year period. This will leverage a further €61 billion of public funding in the Member States, as well as a variable addition of private co-financing, and an unknown addition of unaccounted administration burden for applicants and advisors. There are 118 RDPs in the 28 Member States for 2014-2020. EIP-Agri serves under the national RDP and supports operational groups with funding to projects that aim at finding new ways of diminishing or solving problems which reduce productivity or sustainability. The project initiatives should come from, and be developed by, farmers or foresters.

Basically any EU grant payment should comply with the EU competition law, which nowadays is derived mostly from the Treaty on the Functioning of the European Union (TFEU or Lisbon treaty, 2007), Articles 101-109, as well as from additional EU Regulations and Directives. Next, an EU grant payment should also comply with national regulations and directives of the specific Member State. The combination of the EU Regulation and Directives and those of a specific Member State do not always add up to a consistent legal frame.<sup>1</sup> In the end, it all comes down to the issue of ‘irregular or ineligible payment’. The EU definition of ‘irregularity’ is laid down in the EU Council Regulation (EC, Euratom) No 2988/95, Article 1, cl. 2:

*‘Irregularity’ shall mean any infringement of a provision of Community law resulting from an act or omission by an economic operator, which has, or would have, the effect of prejudicing the general budget of the Communities or budgets managed by them, either by reducing or losing revenue accruing from own resources collected directly on behalf of the Communities, or by an unjustified item of expenditure.*

In effect the issue is thus shifted from the term ‘irregularity’ to the term ‘unjustified item of expenditure’; i.e. to the (in)eligibility of the expenditure in the context of the legal frame for a specific policy purpose. In this perspective there are four available options (Table 1):

**Table 1. Four options for fitting policy purposes with legal frames**

	<i>Fitting with policy purpose</i>	<i>Not fitting with policy purpose</i>
<i>Fitting with legal frame</i>	eligible	(in)eligible?
<i>Not fitting with legal frame</i>	(in)eligible?	ineligible

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<sup>1</sup>The EU competition law is also increasingly intertwined with intellectual property, such as copyright, trademarks, patents, etc. In a contribution of the author to IFSA 2014 in Berlin some confusing implications are discussed of the intertwinement of intellectual property of project authors and the funding applications of farmers’ network projects (Commandeur, 2014). In the USA it is believed that promotion of innovation through enforcement of intellectual property rights may promote as well as limit competitiveness (U.S. Department of Justice & Federal Trade Commission, 2007; Suzanne Scotchmer, 2004).



So here the issue is narrowed down further to the question of whether an expenditure is justified or not, in case the eligibility of the expenditure is disputed for not fitting (well) with either the legal frame or the policy purpose. How big an issue for dispute this may be in practice, depends on the gap between the policy purpose and its balance with the legal frame of Regulations and Directives. According to the EU communication the issue should be taken in the perspective of what the “*EU taxpayer rightly may expect*” (Cap-funding, 2013).

Somewhat confusing in this perspective is the fact that in EU Council Regulation No 1122/2009, Articles 80 & 81 the terms in use are ‘undue payments’ and ‘undue entitlements’. It leads to confusion over whether the terms ‘ineligible’, ‘unjustified’ and ‘undue’, are all supposed to mean exactly the same thing, or not.

### *Conclusion*

We understand that the EU taxpayers (and all other EU residents for that matter) have the right to expect that the aid applications of EU funds are properly managed from the perspective of the policy purpose, like EIP-Agri projects that lead to innovations in linking research knowledge with farming and forestry practices. The eligibility of an expenditure fitting only with the legal frame of Regulations and Directives should not dominate the decision on whether an expenditure is justified under the grant conditions. The decision should be dominated by the perspective of the policy purpose.

### ***Responsibility, legitimacy, fairness and consistency***

The legal texts, relevant for the EAFRD and the implementation of the national rural development programmes (RDPs) in 2014-2020 can be found through the EU website: Rural Development Legislation Index, 2014-2020. They consist of the “Common Provisions” regulation of basic rules, 4 main regulations (N° 1303/2013; N° 1305/2013; N° 1306/2013; N°1310/2013; total: 290 pp), and 4 delegated acts and implementing acts (N° 640/2014; N° 807/2014; N° 808/2014; N° 809/2014; total: 120 pp). Further on the legal texts, which are relevant for the national RDPs, are given in national Regulations, Directives, Decisions, Clarifications, etc. For most applicants this is too much to comprehend. In many EU Member States a precedent is set that the national Regulations, Directives, Decisions, Clarifications, etc., should incorporate the relevant EU Regulations. If not, the applicants do not have to be aware of them.

The relevant Regulations and Directives of the Member States can be classified into classes of rigidity. Below we give a short overview of these classes, the terms of which are sometimes hard to translate into the various European languages

- a. **Requirements:** you have to follow this rule, unless you can provide convincing evidence that it was beyond your responsibility that you have behaved otherwise;
- b. **Conditions:** you have to follow this rule, although unforeseen contingencies or evident mistakes may provide a fair excuse for having behaved otherwise (and may be corrected and adjusted if necessary or beneficiary);
- c. **Legal interpretations:** you have to follow the given interpretation of this rule, unless the interpretation contains an inconsistent restriction to the basic rule as such;

- d. **Formats:** handouts, designed as schedules, which you are required to use for providing specific information about your project, although it is not required that your background evidence is in line with these formats;
- e. **Other accounts, guidelines and clarifications:** without legal status, meant as helpful tools for understanding.

Among EU Member States the legal construction of requirements, conditions, juridical interpretations, guidelines, formats, accounts, etc., may differ substantially. In some national legal systems there is a lot of effort put into the issue of fairness and confidence (like in the Netherlands), whereas in other countries there are extensive schemes of legal interpretations and guidelines (southern Europe). In the implementation of the Lisbon treaty this topic is merely avoided, by stating that all national laws should be applied in addition to EU Regulations and Directives. However, that statement does not provide a solution for contradicting conditions and guidelines of the EU and the national governments under the EAFRD, nor does it give clear guidance on how the concepts of responsibility, legitimacy, fairness, consistency and confidence should be applied to any actual grant applications.

To complicate things further, terms referring to project 'purpose', 'aim', 'objectives' or 'goals', or to distinguish 'frames', 'programmes', and 'projects', as well as terms like 'applications', 'adaptations', 'actions' and 'activities' are poorly defined and certainly confusing in their translations into the various EU languages. Consequently it is hard for anybody, agency worker or other, in any country to decide (consistently) whether a certain EU or national Regulation Article or Directive Account is appropriately applied to the expenditures in a specific project, or not – and whether the combination of all the regulations was well applied in the procedures.

In the chain of control mechanisms EU accountancy control is applied biyearly to evaluate the work of the national agencies. Here again questions arise about how to decide (consistently) whether a certain EU or national Regulation Article or Directive Account is appropriately applied to the expenditures in a specific project, or not – and what procedure should have been applied. In addition, other questions arise, e.g. how to extend consistency towards the accountancy evaluations in other EU countries in which the national judicial systems are based on (sometimes entirely) different legal concepts.

### *Conclusion*

We understand that all applicants (as well as EU taxpayers) have the right to expect that the aid applications of EU funds are managed by well instructed payment agencies – and well trained administration workers within these agencies. Within the EU the structure of instructions is still incomplete and unbalanced, due to lack of juridical definitions (and translations) at EU and national level, to an increasing amount of confusing key terms, lack of precedent judgements, contradictions between EU and national regulations and incomparable judicial systems in the EU countries.

**Example: subsidy reduction in the context of the Knowledge exchange network projects regulation for the Peat Colonies area under the late RDP-2 (2013-2015)**

In Table 2 the first column ranks the 62 granted projects for the applied payment reduction percentage after project affirmation. The other columns reflect the quality assessment of the project plans, the involvement of former government organisations (FGOs) in the project leadership, the requested payments, the applied payment reduction, the reduction percentage and the motivation given by the agency for applying the reduction.

The projects were executed from mid-2013 (starting date varied) until (ultimately) the end of June 2015. Publicly it was communicated that the deadline for the requests for affirmation was 1 July 2015; i.e. 1 day instead of the usual 13 weeks after ending the projects. In internal and selectively applied external communications of the payment agency the deadline was later postponed to 5 August 2015; i.e. 25 [plus 1] days after the deadline for the ending.<sup>2</sup>

Affirmation decisions were supposed to take place within 13 weeks after the deadline for submission (30 September 2015), and after communication with the applicants about errors or adjustments with respect to the conditions. During the procedure the internal instructions about communications were adjusted in such way that it only took place with around 60% of the applicants (or their project leaders) before the decision. Some of the decisions were delayed, even until mid-December 2015. Payments were done ultimately right before the end of the year 2015.<sup>3</sup>

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<sup>2</sup> Oral communication RVO payment agency (June, 2016)

<sup>3</sup> Oral communication RVO payment agency (June, 2016)

**Table 2. Example: subsidy reduction in the context of the Knowledge exchange network projects regulation for the Peat Colonies area under the late RDP-2 (2013-2015)**

Ranking in reduction % <sup>1)</sup>	Project quality assessment <sup>2)</sup>	Former government organisation (FGO) <sup>3)</sup>	Requested at affirmation (Max.55.000) <sup>4)</sup>	Reduction after affirmation <sup>5)</sup>	Difference in % <sup>6)</sup>	Formal motivation <sup>7)</sup>
62 <sup>a)</sup>	6,4		€ 55.000	€ -55.000	-100,00%	No evidence of participation of the co-applicant and insufficient proof of knowledge exchange <sup>m)</sup>
61	4,8		€ 55.000	€ -49.584	-90,15%	Wages of the applicant are not eligible <sup>n)</sup>
60	4,9		€ 55.000	€ -49.523	-90,04%	Wages of the applicant are not eligible <sup>n)</sup>
59	6,1		€ 36.897	€ -28.433	-77,06%	Costs made between the application and the granting are not eligible under EU legislation <sup>o)</sup>
58	4,9		€ 39.696	€ -19.058	-48,01%	Costs made between the application and the granting are not eligible under EU legislation <sup>o)</sup>
57	n.a.		€ 6.920	€ -2.147	-31,03%	Allowances to trainees are not eligible <sup>p)</sup>
56	4,7		€ 55.000	€ -11.045	-20,08%	Wages of the applicant are not eligible <sup>n)</sup>
55 <sup>b)</sup>	4,9		€ 55.000	€ -10.732	-19,51%	Agency interpretation of final report: activities were not executed (during the project period) <sup>m)</sup>
54	5,2		€ 55.000	€ -10.160	-18,47%	Wages of the applicant are not eligible <sup>n)</sup>
53	4,9		€ 55.000	€ -4.945	-8,99%	Wages of the applicant are not eligible <sup>n)</sup>
52	5,2		€ 43.800	€ -1.314	-3,00%	Insufficient evidence provided at affirmation <sup>q)</sup>
51	5,3		€ 55.000	€ -1.392	-2,53%	EU publication conditions (logo) not respected <sup>r)</sup>
50	4,8		€ 42.609	€ -639	-1,50%	Compensations to the applicant are not eligible <sup>m)</sup>
49	5,4		€ 55.000	€ -569	-1,03%	EU publication conditions (logo) not respected <sup>r)</sup>

48	4,0	1	€ 55.000	€ -257	-0,47%	Insufficient evidence provided at affirmation <sup>q)</sup>
47	4,8		€ 47.583	€ -168	-0,35%	VAT in business transactions are not eligible <sup>s)</sup>
46 <sup>c)</sup>	5,9		€ 55.000	€ -173	-0,31%	Application included unrelated costs <sup>s)</sup>
45	6,3	1	€ 51.764	€ -146	-0,28%	Application included not eligible bank costs <sup>q)</sup>
44 <sup>d)</sup>	6,7		€ 55.000	€ -130	-0,24%	VAT in business transactions are not eligible <sup>s)</sup>
43	4,9		€ 54.996	€ -34	-0,06%	Insufficient evidence provided at affirmation <sup>q)</sup>
42	5,5	1	€ 54.902	€ -4	-0,01%	VAT in business transactions are not eligible <sup>s)</sup>
<b>41-03</b>	<b>5,6</b>	<b>19</b>	<b>€ 48.357</b>	<b>€ 0</b>		<b>Average of 39 projects</b>
02	4,9		€ 0	€ 0		Not applied for affirmation
01	6,4		€ 41.214	€ +13.726	+33,30%	Compensation for over-investments by others <sup>t)</sup>
<b>FGO</b>		<b>22</b>	<b>€ 1.114.953</b>	<b>€ -407</b>	<b>-0,47%</b>	<b>Research institutes and Extension agencies</b>
<b>non-FGO</b>		<b>38</b>	<b>€ 1.810.138</b>	<b>€-245.046</b>	<b>-13,54%</b>	<b>Other project leaders (exclusive N° 01 - 02)</b>
<b>Totals</b>		<b>60</b>	<b>€ 2.925.091</b>	<b>€-245.453</b>	<b>-8,39%</b>	<b>all (exclusive N° 01 - 02)</b>
<b>Average</b>	<b>5,5</b>	<b>60</b>	<b>€ 48.572</b>	<b>€ -4.091</b>	<b>-9,16%</b>	<b>all (exclusive N° 01 - 02)</b>

- 1) The total number of objection appeals is unknown; the following appeals are confirmed:
- a) Objection to 62: The explanatory memorandum indicated, that others (including farmers) should participate, not necessarily the co-applicant; agency workers were present at knowledge exchange; decision is not based on proper administrative control
  - b) Objection to 55: Misinterpretation of final report; also: minor mistakes were made to conditional rules in an annex and an invoice, applicant expects permission to make corrections; decision is not based on proper administrative control
  - c) Objection to 46: Obvious mistake was made in an invoice, applicant expects permission to correct.
  - d) Objection to 44: Misinterpretation of the rule by the agency: individuals cannot be incorporated in the corporation tax administration system
- 2) Project quality assessment: reflecting expert assessments of a combination of project plan quality criteria; in this assessment the notes ranged from 4,0 (lowest quality) to 6,8 (highest quality).
- 3) FGO: "former government organisation", involved a.o. as project leader (Research institute or Extension agency)
- 4) After the affirmation application, the requested payment was only 3,4% less than the granted amount.
- 5) According to the policy implementation notes under RDP-2 in 2007, payment reductions should only be applied after communication with the applicant, and permitting the applicant to make justifiable corrections. Although it is unknown with whom exactly, it is confirmed that formal and informal communication has taken place with about 60% of the applicants before

decision making. These included all FGOs. However, similar communications have e.g. not taken place with any of the applicants mentioned, who submitted objection appeals.

- 6) In terms of effectiveness it may be discussed to what extent the agency should put in efforts to reduce “non-eligible” payments if the administrative control costs exceed the estimated payment reduction.
- 7) The majority of the given formal motives are related to so called conditional rules. This means that both under national and EU legislation the applicants should have been allowed to explain their intentions and make justifiable corrections after the application for affirmation. Moreover, misunderstandings about these conditions should have been prevented, by clear communication beforehand about the details of the Regulation during the granting and execution period. Some general comments on the specific formal motives:
  - m) Such conclusions should be based on proper administrative control of actual facts; not on personal interpretations of text fragments by agency workers
  - n) Mistakes like these should already have been detected in the budget during the granting procedure
  - o) The applied rule is not based on any clear EU legislation
  - p) According to the policy implementation notes under RDP-2 in 2007 allowances to student trainees are contributions to education, and not a salary to an “employee” of the applicant.
  - q) Unclear why evidence was not allowed to be added afterwards
  - r) Except for editing books, EU publication rules are insufficiently clear for many circumstances, e.g. in cases of co-productions outside the project, or with social media involved (e.g. Facebook and Twitter). Besides, the rule is a condition – unclear why the applicant was not allowed to correct the publication.
  - s) Concerns condition - unclear why corrections or adjustments were not allowed
  - t) The comment seems to refer to a misunderstanding about the requested amount

### ***Ranking in reduction percentage (Table 2 -1)***

Of the 62 projects, 39 received the requested payment (N°03-41). One (N° 02) did not apply for payment (was not executed) and one (N° 01) was granted more than requested. The payment of the other 21 projects (N°42-62) were reduced in comparison to the requested payment.

### ***Notes on ranking for project plan quality (Table 2 -2)***

The project plans were granted in early 2013 after a quality assessment by a group of experts, using a given set of criteria. The overall assessment ranged from 6.9 (highest) to 4.0 (lowest) quality, with an overall average of 5.5. The project plans that faced payment reduction after affirmation were assessed slightly, though not significantly, lower (average 5.3; range 4.0-6.7) than the ones that did not face payment reduction (average 5.6; range 4.2-6.9). It seems therefore that payment reductions are not influenced by the quality assessments of the project plans.

### ***Communication and FGOs (Table 2 -3)***

Communication is usually done with the contact person, i.e. the project leader. In the affirmation procedure of 2015 formal (written) communication about misunderstandings and (possible) payment reductions have taken place with about 60% of the applicants before decision making. In addition informal communications have taken place with the project leaders involved. It is unclear with which specific applicants formal or informal communication have taken place. However, due to the procedure, project leaders of organisations leading

many projects were better informed, because what was communicated about one project, they could extend to others. Consequently, the large FGOs were better informed than other project leaders. Note: these communications have e.g. not taken place with any of the four applicants (or their project leader), who are now known to have submitted objection appeals.

It is not known what policy decision founded the agency's decision to reduce the allowance of communication before the payment decision. According to the agency the decision to allow communication was not made randomly, but based on a criteria called "completeness of the application". The definition of this criteria is rather obscure, but was related to the notice at first glance of the agency worker of occasion, as to whether any information was missing. The applicants who were allowed communication with the payment agency in that period before the payment decision could get up to 25 days more than others to finish their application. They were convinced that the communication had a positive effect on the decision about the payment, although the administrative burden frustrated them.

There has been no general evaluation of the perception of the administrative burden by the applicants. However, in several informal contacts for this article all contact persons (including all contact persons of FGOs) complained about the disproportionality and excessiveness of the administrative burden throughout the project execution period.

#### ***Request at affirmation (Table 2 -4)***

The average difference between the originally granted payment and the requested payment at affirmation is -3.4% (excluding the project ranked as N° 02). Table 2 does not specify these data, because that is beyond the focus of this article. One project should be mentioned here, however, (N° 01) because the maximum payment was originally granted, but the requested payment was (probably by mistake) nearly € 14.000 less. This mistake was corrected by the agency in the affirmation procedure, although a reduction of € 60 was subtracted.

#### ***Reduction at affirmation (Table 2 -5)***

In view of the previously evoked policy information that the payment agency had planned to allow all applicants to correct and adapt their application before making negative decisions – within the limits of integrity, it is remarkable that communication was reduced to 60% and in 21 cases a payment reduction was imposed by the agency, varying from € 4 to all € 55.000. With these 21 cases, 11 applicants were faced with a reduction of less than € 1.500. Those are about the costs for an uncomplicated administrative control in such a procedure. So in these cases the costs for payment reduction outweigh the benefits for the EU.

There seems a reverse correlation between the projects that were allowed communication before the final decision about the payment and the applied payment reduction. FGOs seem to suffer disproportionately less from payment reductions in the newly implemented communication policy of the payment agency. Of in total over € 1.11 million of requested payments for the 22 FGO projects only € 407 (0.47%) was reduced, whereas of in total over € 1.81 million of requested payments for 38 non-FGO projects (excluding N° 01-02) nearly € 0.25 Million (13.54%) was reduced.

This difference between FGO and non-FGO involvement is significant. However, there is no indication that the quality or the success of the project execution, the problem theme, the competences of the project leader, the composition of the network, or personal matters, have caused the phenomenon. The suggestion is that FGO project leaders were better informed

and had more opportunities to adjust their payment applications than others. Nonetheless, FGO project leaders seem as frustrated as other project leaders about how the payment agency handled the procedure.

### ***Reduction percentage (Table 2 -6)***

The funding of the Knowledge exchange network projects is tight for the applicants. Applicants are not allowed to cover wages or unpaid hours. Even other costs, e.g. travel, supplies, bank costs, etc., may often not be granted. Eligible costs are only accepted if they are made by others – and are covered for 80% to the applicants, whereas benefits should be accessible to everyone. Applicants already feel this is a substantial discouragement to apply. If in addition the payment is reduced after affirmation (even by a small amount), the discouraging effect to future applications may be much more than the amount of reduction. The incidences of important payment reductions – putting to one side the motives of the payment agency - seem to have a devastating effect on the expectancy of future applications of, in particular, the farmers that are known to take responsible initiatives for their sector.

### ***Formal motivations for payment reduction (Table 2 -7)***

The criteria for the success of Knowledge exchange network projects are (Wielinga et al., 2008):

1. The relevance and urgency of the problem or theme, for agriculture;
2. The passion of the participants to exchange knowledge exchange with respect to the problem;
3. The competence of the project leader to guide the knowledge development process;
4. The focussed efforts to produce and the production of knowledge exchange products.

In view of these criteria it is remarkable that the agency's motivations for payment reductions seem far more related to (accidental) administrative errors than to any of the project success criteria – maybe with the exception of the project ranked N° 62 (100% reduction); that particular motivation seems outside the trend among the others.

All payment reductions seem to be motivated by issues that could have been solved through communication, either through clarification, explanation or correction of the final report, the financial report and related documents, or through a voluntary reduction of the requested payment by the applicant. The represented motives do not indicate the presence of any intentional misuse of the grant in any project.

The majority of the given formal motives are related to so called conditional rules – and often those conditional rules that are unclear. This confirms that both under national and EU legislation the applicants should have been allowed to explain and make justifiable corrections after the application for affirmation. Moreover, misunderstandings about these conditions could have been prevented by clear communication about the details of the Regulation during the granting and execution period. In the text below Table 2 some additional comments on the motives are given.

### ***Conclusion from the example***

In view of what EU taxpayers have the right to expect of the agency, the procedure for the aid applications of EU funds seems to have deviated from the purpose of the regulation. The image of a stimulating (though immature) regulation with a purpose-focused procedure, which resulted in remarkably effective and efficient knowledge exchange developments in the years



2007-2010, is gone. Instead we have an unreliable time and resources absorbing regulation, with such an administrative burden that potential project leaders are reluctant to encourage farmers to apply – even if they do not fear important payment reduction, like the former government organisations (FGOs): research institutes and extension agencies. The applied payment reductions led, of course, to additional societal unease. Moreover, the project successes in terms of knowledge exchange towards innovation are not celebrated any more as they were in the early years of the RDP-2, because the focus has deviated towards the disadvantages and negative side effects.

### **Administrative control**

Two kinds of incidents may occur at the level of (unintended) irregularities: both the beneficiaries and the payment agency can be responsible for it. In EU funded projects payment refusal, reduction or reclaim can even be demanded by the European Commission (EC), if an (unintended) irregularity has taken place at the level of the national or other authorities, without the responsibility or even the knowledge of the beneficiary. Legal instruments for the national agency to reduce the risks of reclaim by the EC are very limited. Therefore risk avoiding behaviour of the national payment agency towards the beneficiaries is common (Brink van den, 2012).

### ***What is proper administrative control?***

The frequency and type of incidents that happen depends largely on the control system of the payment agency, but may be biased by the EU control system that is applied to the agencies. In EC implementation act 809/2014, Section 2 the provision for checks of payments are outlined. In Article 48 the conduct of administrative checks are specified. In this context, the administrative check reports serve as evidence for payment refusal, reduction or reclaim in case irregularities have occurred. Confusion may occur, however, in the interpretation of the terms ‘control’, ‘check’, or ‘audit’: are they similar? In addition the English term ‘administrative control’ or ‘office/ desk control’ is confusing too, especially after translation in other languages: does that mean that only documented reports and texts should be taken into account, or should the control include a check of the actual situation? EC Commission Regulation N° 809/2013 is unclear about that. However, important decisions are found in precedent judgements, for example:

In EC Curia Decision Judgement Case T305/00 (2003) the following precedent is found on the matter, which has since been applied to other control reports of administrative checks:

*“In order to assess the evidential value of a document, it is necessary to determine whether the information it contains is credible, to take into account the origin of the document and the circumstances in which it was drawn up, and to consider whether it seems, on the basis of its content, sensible and reliable (see Joined Cases [...]).”*

From this precedent it can be concluded that the administrative control should be related to the actual (onsite) situation and be sensible and reliable. The EU Court of Justice gives the national court explicitly the space to assess whether the principles of legal certainty and protection of legitimate expectations are rightly applied in view of the Community law. In face of payment reduction, refusal, or reclaim the assessment should be balanced with regard to the conduct of both the beneficiaries and the relevant governing bodies (Brink van den, 2012).

### Conclusion

Proper administrative control should cover the following elements:

- a) It should be done by a competent person in view of the content;
- b) Conclusions should be supported by facts of the onsite situation that may serve as evidence;
- c) Conclusions should be sensible, reliable and likely in view of the actual, onsite situation.

### **Application of administrative control to the example of this article**

The underlying EU 'soft law' procedures are often not easily revealed to the grant applicants. This makes it hard for beneficiaries to provide evidence if a mistake is made by the payment agency (Dam van, 2013). The agency in this example (RVO) has a historical, pre-reorganisational habit of providing the information about procedures, though only after request. Lately it sometimes arrives with an extensive delay of up to several months.

The administrative control of the affirmation application in the example were done by the agency at the hand of a list of 17 questions. An adjusted translation of these questions is given in Table 3.

**Table 3. Checklist of the administrative control of the affirmation applications in the Knowledge exchange network projects in the Peat Colonies area, under the late RDP-2 (2013-2015)**

	Description <sup>4</sup>	Y/N
1	Is the signature correct and sufficient?	
2	Has the project started within three months after the granting date?	
3	Has the project ended ultimately on 1 July 2015?	
4	Is the application for payment affirmation submitted within 13 weeks + 25 working days after ending the activities, but NO LATER THAN August 5, 2015? (1 July + 25 working days)?	
5	Is the term report (required after each year) received?	
6	Is the final report satisfactory?	
7	Has the applicant executed the project according to the project plan and (if applicable) the adaptations approved by the agency?	
8	Is the payment overview satisfactory and are all expenses made AND payed?	
9	Are all payments supported by invoices and evidenced documentation of payments?	
10	Is the applicant able to receive payments in the government administration system?	
11	Is there a motive for physical control on site, after the desk control and (if applicable) the risk analysis?	
12	If applied: are there any results from the physical control on site which could influence this request for affirmation payment?	
13	Are there any manifest errors?	
14	Are there any circumventing devices applied?	
15	Has the applicant deliberately provided incorrect or incomplete information?	

<sup>4</sup> Adjusted translation in English by the author of this article

16	Has the applicant deliberately provided incorrect or incomplete information this calendar year, or before, in any request for a grant, a payment in advance, or an affirmation payment, concerning this or any other regulation within the same RDP context?	
17	Are there any ineligible expenses presented in this request?	

The most revealing aspect of the question list is not the questions that are posed, but the fact that the three key questions for proper administrative control (mentioned above) are not specifically posed. According to an informant of the agency these key questions are neither posed nor specified in any other control guidance. Agency workers are instructed to try and draw conclusions from their own interpretations. Only if necessary, in cases of doubt about the conclusion they are about to draw, may they then make contact with the applicant – preferably in a formal letter.<sup>5</sup>

This instruction seems a deviation from the legal principle of the ‘benefit of the doubt’. It means that based on an administrative control an agency worker can only choose from two conclusions: ‘benefit of the doubt’ or ‘doubt’. In cases of doubt the most obvious action is communication by telephone or e-mail. In cases of persisting ‘doubt’ further facts checking procedures may be performed, e.g. by a special inspection agency, before the conclusive decision is made about the payment reduction, refusal or reclaim.

Here is an example of part of the affirmation checklist together with the motivation of the agency worker on the occasion, after which this applicant was faced with an important payment reduction:<sup>6</sup>

11	Is there a motive for physical control on site, after the desk control and (if applicable) the risk analysis?	YES
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*Motivation: Eligibility of an invoice unclear, and of the expenses for an event. The issue is sent to the national inspection agency for control onsite.*

12	If applied: are there any results from the physical control on site which could influence this request for affirmation payment?	NO
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*Motivation: The national inspection agency concluded that all is correct. Substantiating information is added. Based on the substantiating information I deducted some ineligible costs.*

This example indicates rather obviously, that this agency worker was both poorly trained – and checked afterwards. Obviously this person did not know how to evaluate the information: neither the questions in the checklist, nor the substantiating comments of the inspection agency:

- The answer “NO” to N° 12 contradicts the subsequent decision to reduce the payment;
- Substantiating information supporting that all is correct does not support a counter decision;

<sup>5</sup> Oral communication RVO payment agency (June, 2016)

<sup>6</sup> Adjusted translation in English by the author of this article

- Conclusions about ineligible costs require evidence from proper administrative control.

The motivation seems to indicate that the agency worker is trying too hard to reduce payments. The behaviour raises questions as to what extent the fierce biyearly EU account controls have created an atmosphere of pressure.

The example seems illustrative for the control methods that were used by the payment agency for this Regulation: with all four decisions objected to there are issues about the (mis) interpretation of conditional rules and reports. In addition, the majority of the other motives for payment reduction are also about the interpretation of (conditional) rules, which had not been clear or about which the communication had been inadequate at an earlier stage.

### **Discussion**

In 2007 policy implementation notes were made by the former payment agency [DR] under RDP-2, about how to make this regulation really stimulating and avoid unsupportive payment reductions. Apparently these notes are out of use since the national agency reorganisation, completed in 2014. Besides, few or none of the current workers in the payment agency have experiences that go back to the origin of this regulation. The evaluation system that is currently in use is perceived as intimidating and discouraging by the (potential) applicants and project leaders for several reasons: restriction of eligible costs; administrative burden; and risk of payment reduction.

In the official interim evaluations of this regulation various assessment experts have proposed that, in order to reduce the procedures, they should be linked to the granted projects as 'steering experts' during the execution. Project leaders have proposed instead, to avoid this increase of hierarchy, the organisation of a mutual evaluation system of project successes, using intervision techniques (Blokland et al., 2013; Bartels BV, 2009). Although the implications of neither of these propositions has so far been discussed seriously, the incorporation of both in the legal control system could be interesting and challenging.

A reintroduction of the insights from the policy implementation notes of 2007 about communication could reintroduce a satisfactory system, from the perspective of the EU taxpayer in particular, if complemented with a sound and longer-term coordination within the payment agency. It is recommended to reintroduce such concept as a control system for the RDP-3 grant procedures. In addition, the procedure for administrative control should be improved substantially and lined up with the EU precedent judgements.

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## **Q Methodology, a useful tool to foster multi-actor innovation networks performance**

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**Abstract:** We address in this paper the opportunities of Q Methodology for empirical agricultural innovation studies. In the systems perspective on innovation, multi-actor innovation networks are seen as a key strategy for successful innovation. Given the several types of actors involved, the scientific and policy literature points at the need for 'innovation brokers' to build capacity for collective innovation and prevent innovation network failures. This paper aims at introducing Q Methodology as a fitting and promising tool to assist these systemic facilitators to probe more deeply into the mechanisms of social learning and collective cognition. Q Methodology is a mixed method that provides quantitative structure to individuals' opinions via factor analysis, based on a clear methodological structure and process. It has gained popularity in a range of 'messy' studies to analyse and typify the diversity of worldviews on complex and socially contested issues. Increasingly considered as a well-established method to address rural research questions, its use in agricultural innovation studies is still missing. After providing practical information about the conduct of Q methodological research, we reflect on the usefulness of Q Methodology in fostering multi-actor innovation network performance.

**Keywords:** Q Methodology, mixed method, stakeholder analysis, agricultural innovation system, innovation broker, multi-actor innovation network

### **Introduction**

Q Methodology has a rich, if little known, history. In 1935 the psychologist and physicist William Stephenson - a doctoral student of Charles Spearman - published a letter in *Nature* (Stephenson, 1935); the letter announced that he had reconceptualised correlation analysis in such a way that in place of correlating tests in relation to random variables expressing traits, he had developed a method to correlate whole aspects of persons. What Stephenson introduced as an objective study of human subjectivity would grow into the scientific method Q Methodology (hereafter referred to as Q). Considerably developed and codified by the political scientist Steven Brown (1980), Q has been used in a wide range of study applications seeking to uncover and analyse similarities and differences in the subjective viewpoints of individuals (McKeown, 1990).

In the eight decades since it was first proposed by Stephenson, Q has spawned both an increasing community of active practitioners, and recurrent severe critiques (e.g. Burt & Stephenson, 1939; Cattell, 1951; Kampen & Tamás, 2014), which the Q community in turn considers as repeated substantial misunderstandings of its mathematical and practical aspects (Brown et al., 2015). However, the last 15 years have witnessed a further increase in published Q studies - and a decline in published criticisms -: 92 publications per year in the years 2001-2013 compared with 35 in the years 1991-2000 (Brown et al., 2015). According to Donner (2001), Q is particularly well-suited for topics where it is necessary to recognise

social complexity and, consequently, has slowly gained popularity in a range of 'messy' environmental issues (e.g. Addams & Proops, 2000; Cuppen et al., 2010; Curry et al., 2013; Hermans et al., 2012; Visser et al., 2007, 2011).

Regarding farming research, Previte et al. (2007) advocate that Q, were it to become better known, could be successfully applied to address rural research questions, while Fairweather and Klonsky (2009) argue that Q is "*the only well-established method that rests on what farmers state is their approach to managing a farm rather than on methods that rely on researcher assessments of farming styles*".

Q methodology is useful when one wishes to characterise how different groups of people think about a particular issue in a systemic way. It can be used to explore perspectives on any issue area where there is subjective disagreement, making it particularly useful for studying controversy - and there is a lot of controversy with regard to food and farming. A well-delivered Q study reveals the key viewpoints extant among a group of participants and allows those viewpoints to be understood holistically yet with a high level of qualitative detail.

We had the opportunity to personally ascertain the soundness of the method through its application in four contrasting cases. Three of these cases involved unsustainable and conflicting uses of natural resources: (1) cereal fallows in arid Tunisia (Visser et al., 2011); (2) marginal farmland with high nature value (turloughs) in West Ireland (Visser et al., 2007); and (3) endemic medicinal and aromatic plants with high economic value in the High Moroccan Atlas (Louah, 2010). Our fourth Q study aimed at understanding barriers to the development of modern agroforestry in South Belgium (Louah et al., in press) - agroforestry being increasingly promoted by scientists as a sound environmentally friendly farming innovation for European productive areas (Palma et al., 2007).

The idea of using Q methodology arose as we were looking for a way of scientifically integrating the human ecology (practices, worldviews, values) of food and farming issues. In our opinion and experience, whereas with food and farming issues the human ecology is quintessential for understanding, more often than not it is ignored or silenced. As natural scientists we were ill equipped to explicitly take on board the human factor and societal concerns, and especially suspicious of researcher bias when it comes to studying phenomena that are hard or impossible to measure and thus quantify, or at least break down into measurable bits and bites. Compared with purely qualitative methods - with, in our sense, often unclear interpretation processes - Q is very appealing because it involves a more rigorous analytical framework minimising researchers' bias (Brown, 1980), as well as very well defined and transparent steps - see the next point for overview of Q basic steps and assets. Therefore, Q opened doors toward transdisciplinary research and thus to successfully understand, in various contexts, systemic barriers to sustainable management or innovation and how to overcome these barriers. Q was also the gateway to other, complementary, methodologies for investigating human ecology.

Today we focus our research on food system redesign, and more especially on the development of agroecological innovation. Research in system redesign views innovation not



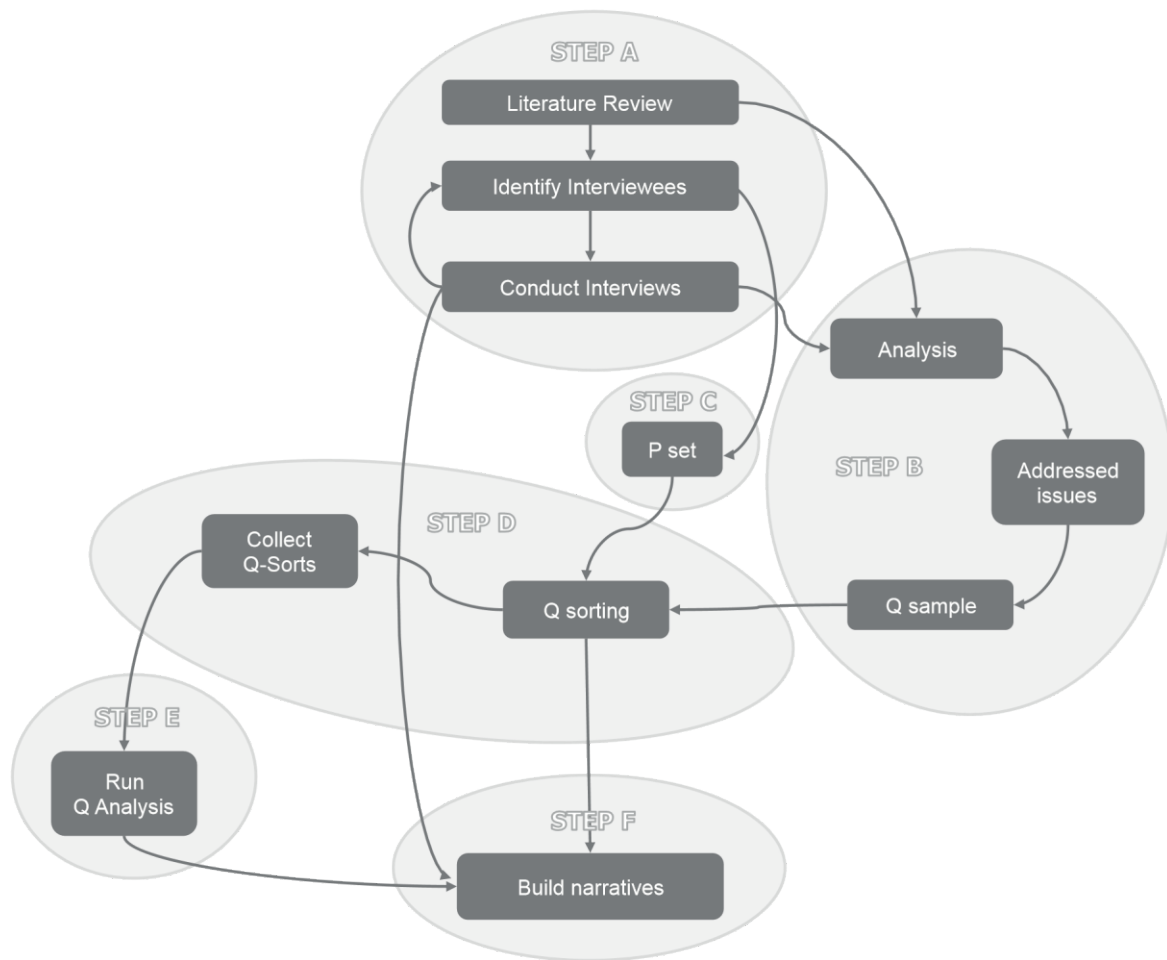
just as an end product of science and technology to be transferred to end-users but as a process of sociotechnical nature. It is important to acknowledge that, *in fine*, food system redesign happens through stakeholder action, whether accompanied or not by (formal) research. Examples abound of farmers who redesigned their farms over the course of a decade or longer without any formal help by state-funded research. However, even though their output/input efficiency, productive potential and socio-economic viability have been scientifically demonstrated, and even though some small scale experiments and initiatives hold promise for upscaling, food system redesign for stronger sustainability does not break through. Reasons can be summarised with the concepts of (systemic) lock-in and path dependency (Geels, 2002; Geels & Schot, 2007; Vanloqueren & Baret, 2009).

The recent reports of Dedeurwaerdere (2014) and of the Standing Committee on Agricultural Research (EU SCAR, 2012) are very explicit on the need to reorganise (agricultural) research following a more comprehensive perspective on the nature of innovation (in farming). Today, the involvement of innovation brokers within multi-actor innovation networks emerges as a key strategy to foster food system redesign (Klerkx et al., 2012; Louah et al., 2015). **We suggest that Q methodology holds promise to support innovation brokers in the definition of collective or concerted action, and thus to enhance innovation networks' performance.**

Before making our case on Q opportunities for empirical agricultural innovation studies, we describe the basic steps of the method while highlighting its key strengths and some common methodological pitfalls. To underline the practical use of the methodology we illustrate these steps with our case study on barriers hampering agroforestry development in Wallonia (South Belgium).

### **How to do Q**

The Q approach is an original mixed method that provides quantitative structure to individuals' opinions via factor analysis, thus allowing an in-depth understanding of the topic at stake. Practically speaking, the research process entails six well-defined steps summarised in Figure 1 and further described below (Brown, 1980; McKeown & Thomas, 1988; Watts & Stenner, 2012).



**Figure 1. Flow chart of the six-steps Q methodological research process**

***(A) Development of the concourse***

Essentially, Q requires the researcher to pay attention to the discourse under investigation; that is, the views held by the stakeholders. Q study begins with the development of a collection of items, typically statements, within that discourse. This collection of items is called the ‘concourse’. Not to be confused with the concept of discourse, concourse is used in Q for the collection of opinion statements about the topic that captures the range of issues and worldviews at stake relative to that topic (Van Exel & de Graaf, 2005). In practice, the concourse can be elicited from various sources: interviews, focus groups, participant observation, text from grey or scientific literature, websites and other media (McKeown & Thomas, 1988). Opinion statements are collected verbatim from these sources - oral ones should be audio-tape-recorded -, until it appears that ‘saturation point’ has been reached.

Context on agroforestry (AF) was set through 50 individual open-ended interviews with three local sources of opinion: (1) farmers; (2) researchers; and (3) decision makers from different levels of Walloon institutional and associative bodies related to agriculture and/or forestry. Each stakeholder was contacted by phone to get a first appointment, and presented the approach as being part of a European research about agricultural innovation. We never mentioned “agroforestry” or “trees” on the phone to avoid influencing the stakeholder before the interview. The few refusals to a first interview were due to a planning problem. Of the 53 stakeholders contacted, only three have not been interviewed. Table 1, shown in illustration of step C, displays the number of interviews conducted per interviewee type.

### **(B) Q sample selection**

Once the concourse is captured, it needs to be reduced down to a manageable size. It is indeed difficult and time consuming for respondents to evaluate a too large number of statements (Brown, 1980). The task becomes one of selection, organisation and analysis, so as to draw the Q sample, i.e. a subset of typically 20 to 60 opinion statements. An opinion statement is understood to be a kind of stimulus that triggers respondents search for meaning (Glynos et al., 2009). It is important to note that the selected statements come verbatim from the sources, with no influence of the researcher’s own reference frame.

The Q sample is not undertaken haphazardly. As the selected statements are the essence of the subjectivity that will later emerge from their sorting by the respondents (cf step D) (Brown, 1986), particular care is needed to ensure that the sample is representative of both the array of expressed opinions and of as many sub-issues within the topic as possible. In other words, the Q sample has to be compiled in a way to get to the *quintessence* (Barry & Proops, 1999) of worldviews and issues at hand, so that the respondents can truly express their views (Brown, 1986).

Usually a design principle is used in order to ensure that all aspects of the topic of interest have been covered, and to ensure that the sample does not favour one aspect over another – avoiding the potential incorporation of a bias into the final Q sample. This artificial categorisation of statements has to be considered as a mere way for the observer to organise in order to facilitate the selection of statements for the Q sample. In doing so, he has to ensure that the sample is balanced, i.e. that one respondent has an equal opportunity to react positively and negatively to statements in at least one of the main categories. Therefore, within one category, both statements reflecting positive and negative assertion, and thus disagreement among the concourse, have to be selected (Stephenson, 1953). Pilot-testing is also often used in order to obtain a final ‘well-structured’ Q sample, i.e. ensuring optimum balance, appropriateness, applicability, intelligibility and comprehensiveness - notably one statement should consist of just one idea on which to (dis)agree.

It is important to realise that although the Q researcher may choose to identify a particular statement with a specific category, this a-priori ‘labelling’ and the selected statement in itself makes little difference to the subsequent data processing. While it comprises the raw materials of the study, the Q sample indeed possesses no specific meaning prior to the sorting process by the respondents (Watts & Stenner, 2005). As Brown (1980) pointed out:

“ultimately, this artificiality is replaced by categories that are operant, i.e. that represent functional as opposed to merely logical distinctions”. Therefore as long as a Q sample is representative of the concourse, the sampled statements may differ with no impact on Q results (Eden et al., 2005). This key feature is a gauge of researchers’ bias minimisation and is further discussed in step D.

*A list of 228 statements faithfully quoted from the 50 interviewees have been extracted. A balanced Q sample has been built through the categorisation of the concourse into three issues: (1) Agriculture status and trends; (2) AF ecology and practices; and (3) Barriers to AF. Pilot-testing allowed us to obtain a final well-structured Q sample of 42 statements. Table 2 and 3 shown in illustration of step D display a selection of the final Q sample.*

**(C) Q sorters selection (p set)**

Once the Q sample is drawn, it is submitted to respondents or ‘Q sorters’ for the ‘Q sorting’ task (cf step D). The Q sorters constitute the p set - usually 12 to 40 people - and are purposely sampled as ‘people that have something to say in relation to the topic’ (Watts & Stenner, 2012). Besides, the p set also has to emphasise diversity (Watts & Stenner, 2012). Indeed, while the statement selection focuses on being representative of the concourse, the selection of respondents seeks to represent the breadth of existing opinion around the topic rather than being somehow representative of the population as a whole. Depending on the question of interest, the p set might include for example policy makers, specialists in a particular field, people living in a certain area or affected by a particular issue.

*The p set of our Q study on AF consisted of a structured sample of 20 respondents (cf Table 1) expected to have a clear and distinct viewpoint regarding the topic. All the 20 stakeholders who were asked to carry out the Q sorting agreed to do so. Only four Q sorters hadn’t been interviewed before since we argue that the interpretation step needs to rely both on interviews and Q sorting to increase in rigour.*

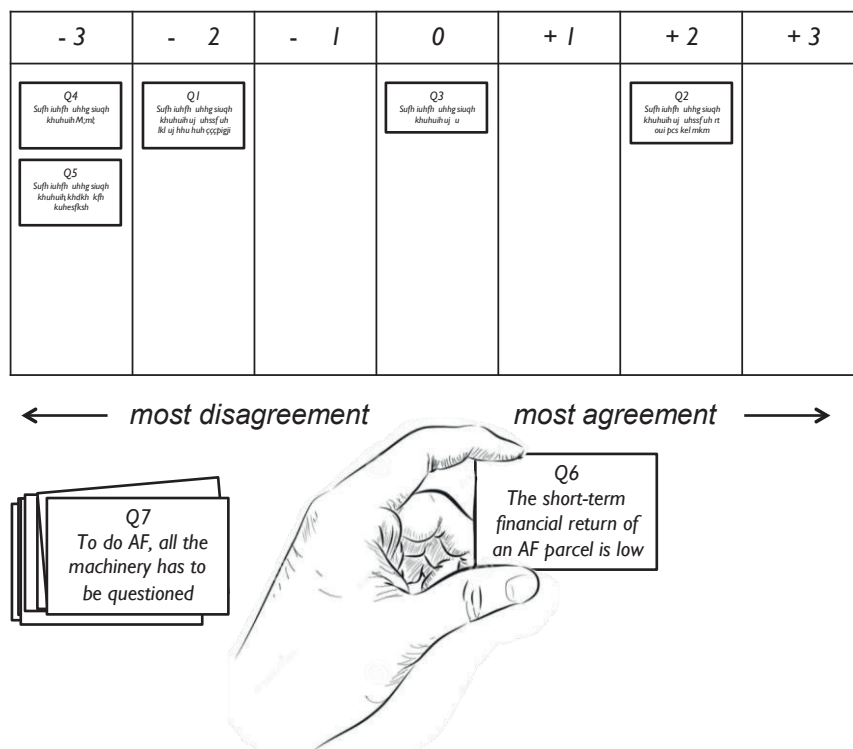
**Table 1. AF Q study: distribution of interviews and Q sorts among interviewee types**

	Farmers	Researchers	Decision makers	Total
Interview only	30	2	2	34
Q sort only	2	1	1	4
Interview and Q sort	10	1	5	16
Total interviews	40	3	7	50
Total Q sorts	12	2	6	20

**(D) Q sort generation through Q sorting**

Once generated, the Q sample is submitted to the appreciation of the p set through the ‘Q sorting’. Before proceeding, the right material needs to be prepared. Q statements have to be organised by the predefined categories, given a unique numbering code and written on individual printed cards. They will be sorted with the help of a laminated A1 paper sheet on

which a grid is drawn with column headings that correspond to all possible ratings. For example, in each of our Q studies we chose seven possible rankings and thus columns from left to right were respectively headed as follows: I could not disagree more (-3); I strongly disagree (-2); I disagree (-1); I don't know (0); I agree (+1); I strongly agree (+2); I could not agree more (+3). But depending on the research questions other scales for ranking can be developed. This homemade device allows conducting of the Q sorting, which consists of asking one Q sorter to physically place each card on the grid according to the extent to which he agrees or disagrees with the statement it displays. It is through this sorting that each Q sorter gives subjective meaning to the statements. As illustrated in Figure 2, the grid allows for statement ranking in relation to the ranking of the other statements, rather than evaluating them individually. This relative ranking is assumed to decrease the risk of arbitrary or biased sorting, for example under influence of the respondent's mood at the time of sorting, and thus enhance the repeatability of the sort (Raadgever et al., 2008).



**Figure 2. Illustration of a Q sorting process**

The Q sorting is assisted. Thanks to the grid, the researcher can help enhance the internal coherence of the ranking. It goes without saying that caution must be employed to ensure that contradicting statements don't receive similar scores. But to illuminate the more fine-grained Q sorter worldview, the researcher also needs to assist the Q sorter when it comes to nuancing between two close scores. All along the process, the researcher has to carefully collect, and record qualitative data about how the participant has interpreted the statements in their Q sort and what implications those statements have in the context of their overall viewpoint. These comments are major data as they will later aid the interpretation of the viewpoints captured by each of the extracted factors (cf step F). Once all the statements are placed on the Q grid, and the participant is satisfied with it, this becomes the 'Q sort', i.e. the collection of scores of the Q sorter of all statements; it reflects the respondent's perspective

on the topic at hand. The researcher can now record the array of attributed scores on a sheet of paper.

We insist on the fact that it is the holistic pattern of the Q sort that matters, not the statements themselves. In a single person's Q sort, the scores attributed to statements represent interactions that have taken place from within a common frame of reference: the perspective of the Q sorter. Each score is implicated in all the other scores, each at least implicitly having been compared with all the others, none being independent of the others. The meaning we strive to find via Q thus does not reside in the statements themselves, but rather in the pattern of their Q sort (Brown, 1993).

*The 22 Q sorters were asked to place each one of the 42 cards in the grid. No particular statistical distribution was employed and every comment made during the process has been noted and recorded. Each Q sorting lasted on average about 2 hours and happened in a positive atmosphere. In general, Q sorters were reluctant initially but grew more confident and took pleasure in the exercise as Q sorting progressed. Table 2 and 3 display a selection of significant statements respectively causing dissensus and consensus among the three idealised views emerging from our Q study on AF – ie a transformative viewpoint (TV), a politically correctness viewpoint (PC) and a viewpoint maintaining the status quo (SQ) (see illustration of step F). While dissensus statements could be found in each category, almost no consensus statements were found in the categories related to AF – ie AF ecology & practices and AF.*

**Table 3. AF Q study: a selection of distinguishing statements, with their respective category, label and scores attributed by each of the three extracted idealised views.**

Cat.	Q statements	Scores		
		TV	SQ	PC
Agric. status & trends	Q15 Our soils are not being depleted at all	-3	0	1
	Q27 Nature provides valuable assets to agriculture but these have been woefully neglected	3	1	0
	Q31 We are not fools, experiences such as AF ought to be carried out by others	-2	-1	2
	Q28 We would not be able to farm without chemical fertilisers	-2	0	2
AF ecology & practices	Q34 AF allows us to regenerate soils by enriching them in carbon and in nitrogen	3	1	0
	Q41 AF would be more appropriate for land that is less productive than ours	-2	-2	2
	Q37 Intercropping several plant species results in a higher overall productivity compared to pure stands.	3	1	0
	Q35 Tree shade during haying causes delays in drying	0	1	2
	Q6 The short-term financial return of an AF parcel is low	2	1	1

Barriers to AF development	Q12 <i>Making an income from hardwood in AF is not possible</i>	-2	-2	0
	Q14 <i>Increases in agricultural productivity thanks to AF must be quite obvious before throwing yourself into it.</i>	0	0	2
	Q2 <i>Farmers are afraid at working with trees while foresters are afraid at working in a farming environment</i>	2	0	1

**Table 4. AF Q study: a selection of consensus statements, with their respective category, label and scores attributed by each of the three extracted idealised views.**

Cat.	Q statements	Scores		
		TV	SQ	PC
Agric. status & trends	Q30 <i>It would be better to take away all the subsidies and to ensure fair pricing</i>	2	1	2
	Q25 <i>Farmers are bound by the subsidies</i>	2	0	2
	Q19 <i>In Wallonia there is not much in terms of information support for farmers</i>	-1	-1	-1
	Q21 <i>The major change can't be implemented only by the elected officials, all the different actors in civil society need to contribute</i>	2	2	2
Barriers	Q11 <i>You must be the owner of the field to do AF</i>	2	1	2

#### **(E) Statistical analysis of Q sorts**

It is at this stage that the researcher analyses the Q sorts thanks to a sophisticated statistical procedure and with the assistance of modern computing technology. The analyses of Q sorts involve correlation, factor analysis, and the calculation of factor scores (Brown, 1980; Stephenson, 1953). This step is a purely technical and objective procedure, and therefore sometimes referred to as the scientific base of Q (Van Exel & de Graaf, 2005). Yet, as we will see hereafter, parts of this factor analysis process are qualitative.

Prior to analysis, a data matrix is built with the Q sorts as variables (columns) and all Q statements as objects (rows). Typically for Q, the correlation of variables thus generates a correlation matrix that reflects the relationship of each Q sort configuration with every other Q sort configuration - and not the relationship of each statement with every other statement. The initial correlation matrix is then subjected to factor analysis in order to produce a set of factors onto which the respondents load effectively on the basis of the Q sorts they have created. Indeed respondents are clustered on the basis of the degree of similarity between their Q sorts, thus respondents that load onto the same factor will have created very similar Q sorts or 'sorting patterns' (Watts & Stenner, 2005).

Clustered variables (Q sorts) suggest a shared view among a group of people. Q factor analysis allows the revealing of these shared views in the form of idealised sorting patterns of the Q statements, and shows which Q sorts are correlated with these few idealised views (Brown, 1980, 1993). The endpoint statistical analysis is reached when each of the significant factors is represented by its own best-estimate Q sort or idealised statement patterns that will undergo the next step of interpretation.

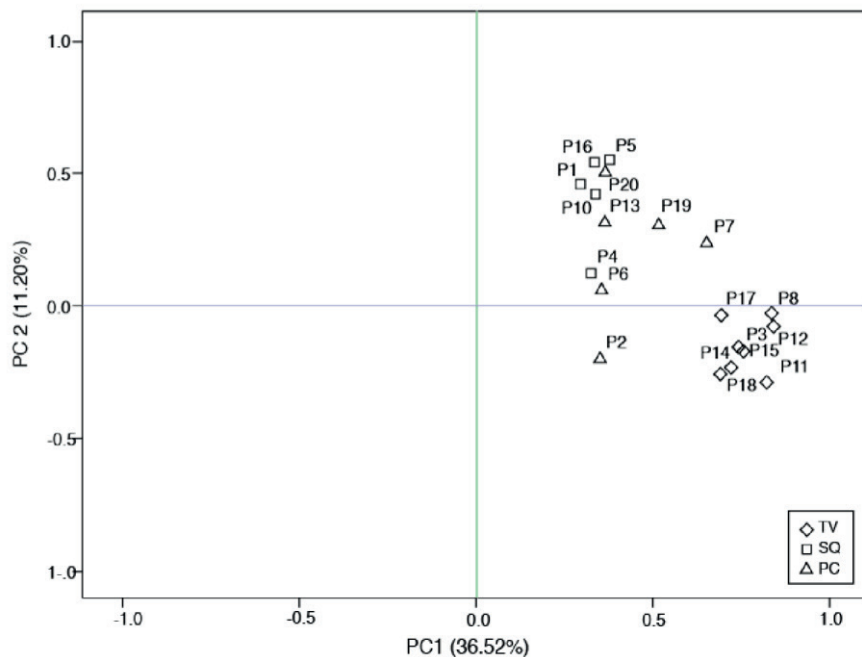
Today, several Q methodological packages ease these statistical analyses - e.g. PCQ (Stricklin & Almeida, 2001) and PQ Method (Schmolck & Atkinson, 2013) - by automatically generating the initial correlation matrix and making processes of factor extraction, rotation and estimation very straightforward. Rotation just consists of changing the reference points of the geometric coordinate frame in order to enhance the interpretability of the extracted factors (McKeown & Thomas, 1988). Despite the computer automation, the researcher has to make some decisions as the analysis proceeds, starting with the selection of the factor analysis and factor rotation methods. Two factor extraction methods and two factor rotation methods are most widely used by Q researchers, namely and respectively: Centroid and Principal components; and Hand rotation and Varimax rotation. There exists a lively and old debate within the Q community about the use and abuse of either of these methods (see Brown et al., 2015; Kramer & de Hegedus, 2003). Suffice to summarise here that Centroid extraction is the method of choice of leading Q methodologists based on philosophical considerations related to their preference for Hand rotation (Brown, 1980; Brown et al., 2015; Stephenson, 1953).



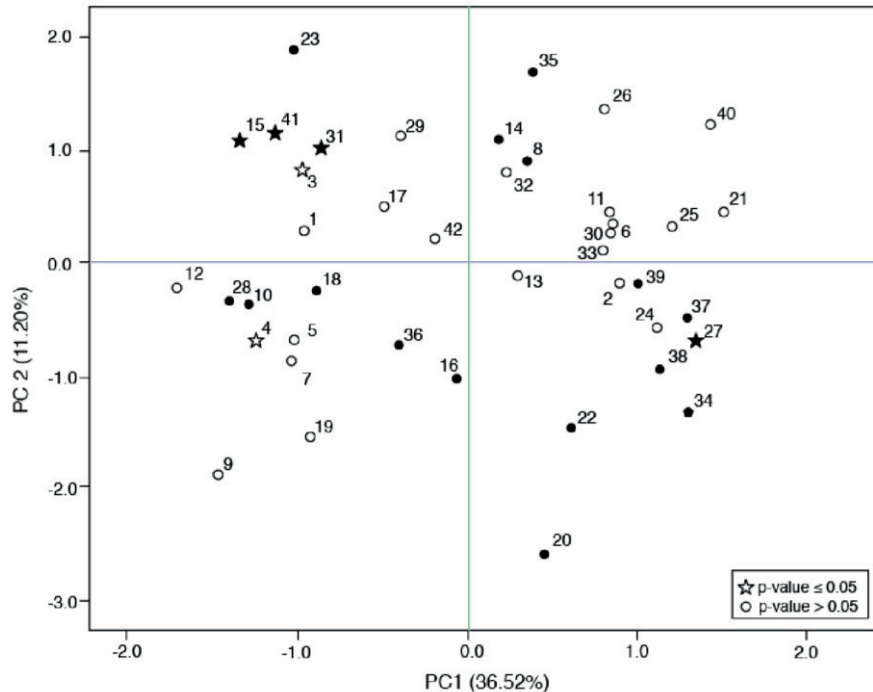
The final substep is to decide which factors should be selected for interpretation – usually from two to four. A standard requirement is to select only those factors with an eigenvalue in excess of 1.0, as factors going below this minimum explain less of the overall study variance than would any single Q sort. A second standard requirement is that an interpretable Q factor must ordinarily have at least two Q sorts that load significantly upon it alone (Watts & Stenner, 2012). Such significantly loading Q sorts are representative of the factor as they exemplify the shared item pattern or configuration that is characteristic of that factor. The retained idealised factors – usually from two to four – are hereafter referred to as Q Factors.

*As many Q researchers, we opted for the simplicity and reliability of PCA and Varimax procedures. Q analysis outputs found to be very satisfying, since these procedures are both consonant with our aims of using Q, namely to reveal the range of viewpoints on AF that were favoured by the p set. As stated by Brown (1980, 238), there is ultimately no substitute for careful consideration in the context of a particular study. Yet now that we are fully aware of the debate on statistical considerations, we are likely to use the method of Centroid extraction and Hand rotation procedures in our future Q study.*

*The PCA and Varimax procedures yielded four significant factors referred to as PC1, PC2, PC3 and PC4. PC1 carried the greatest proportion of the total variation (36.52%), while PC2, PC3 and PC4 carried respectively 11.20, 8.78 and 8.12%. The loadings of the original variables (Q sorts) on PC1 and PC2 (Figure 3) show that the conversation on AF broke down into three distinct idealised Q sorts. The loading of the statement scores on PC2 as a function of PC1 shows the spread of the statements on the main correlation axes (Figure 4).*



**Figure 3. AF Q study: loading plot of the PCA on all statements (PC1, PC2). Q sorts are grouped based on the discourse they belong to, ie TV, SQ or PC.**



**Figure 4. AF Q study: Score plot of the PCA on PC1 and PC2 for all Q statements. Statements are grouped into two categories according to the significance of difference between the discourses. Statements used for the interpretation of the discourses are shaded**

**(F) Interpretation of Q outputs**

The interpretative task consists of summarising the narratives respectively depicting the idealised worldviews of the topic as being expressed by the distinctive Q Factors. The construction of each narrative demands the researcher to sequentially develop an explanation that fits the data associated with the positioning and overall configuration of the statements in the idealised Q sort, supplemented by discussions and comments recorded while constructing the concourse and during Q sorting. This ‘abductive’ reasoning (Watts & Stenner, 2005) is not so amenable to providing a set of substeps to follow in a simple logical order. There are no clear guidelines here. The researcher works slowly to a conclusion that is defensible (Fairweather & Rinne, 2012). The abductive process of Q Factors’ interpretation is firstly based on four basic tables, and associated graphics, generated by Q statistical analysis (for more details see (Brown, 1993; McKeown & Thomas, 1988; Stephenson, 1953; Watts & Stenner, 2012). These four types of table respectively display:

**Q Factor scores (or factor loadings)**

The table of ‘Factor scores’ is the most important output: it displays a listing of the Q Factors’ scores that are used to determine which sorts are represented by which Q Factor, i.e. load significantly on it. Q Factors can therefore be seen as typologies since they group people of similar views. This table - and its associated plot (illustrated in Figure 3) - allows visualising that all the Q sorters can be identified as reduced number types via data reduction. However, it does not explain these types. The other output tables must be examined to describe the emergent distinctive idealised Q sorts and to label these.

### **Representative sorts for each Q Factor**

The Q sorts of respondents loading significantly on a particular Q Factor are used to create one idealised Q sort, also known as ‘representative sort’ of that Factor. The ‘z-score’ represents the idealised position of each statement in one idealised sorting grid (Brown, 1980; McKeown & Thomas, 1988). This second type of table, generated for each Q Factor, displays a list of the Q sample statements rank-ordered according to their z-scores in order to create the representative sort of each Q Factor. Usually relatively clear and distinctive viewpoints are already beginning to emerge from these respective statements’ rankings. Whilst the most extreme z-scores are the most useful for interpreting the Q Factor, it is a mistake to assume that ‘everything happens’ at the extreme positions of the distribution - see the remark below on interpretive failures.

### **Distinguishing statements**

The tables of distinguishing statements, also generated for each Q Factor, display the statements that distinguish each Factor from the other Q Factors – at a significance level of 0.05 (Watts & Stenner, 2012). The lower the significance level, the more the statement distinguishes the associated Factor from the others with a lower probability that this difference is due to chance. This additional information allows gaining insights into each idealised view on the issue at stake. It thus may also contribute to the labelling of the distinctive Q Factors or views.

### **Consensus statements**

The table of consensus statements, generated for all the Q Factors, displays the statements that do not distinguish between any of the Q Factors (Brown, 1980). In other words it displays the existing agreement across the different views on the issue. Focusing on agreement among the concourse topic can be of particular interest to start a dialogue related to commonality, a key idea in organisational change (Ramlo, 2015) and thus, as we will discuss later, of particular interest for innovation networks. The consensus among Q Factors also reveals important insights into Q sorters’ views and narratives’ labelling.

Distinguishing and consensus statements can also be visualised on the ‘score plot’ (illustrated by Figure 4). Hence, the positions of the statements (Figure 4) can also be interpreted along with the positions of the Q sorts (Figure 3) with regard to the same axes.

*The resulting plots from our Q analysis on AF showed that PC1 stands for the common agreement among stakeholders (since all Q sorts have a positive score on it). PC2 stands for disagreement opposing more strongly groups TV and SQ, PC3 for disagreement opposing more strongly groups TV and PC, and finally PC4 stands for a general disagreement between all stakeholders.*

Although several substeps of the analysis include calculating statistical significance - which is highly quantitative - it must be highlighted that the interpreting and naming of the Q Factors falls into a more typical qualitative framework.

*The three extracted narratives on AF in Wallonia have been constructed on stakeholders' interviews (step A), Q statistical analysis' outputs (step F) and Q sorters' comments (step D). While it was not our initial intention, the resulting narratives were linked to distinctive expressions of 'good farming', and thus supporting different farming styles. These three views on 'how to farm' are summed up below:*

**Factor TV**, i.e. the 'transformational viewpoint' discourse, resembles stakeholders (1) in their desire to redesign agricultural practices through capitalisation on ecological processes in order to improve sustainability; (2) clearly supporting AF development in Wallonia considering its environmental assets and the quality of the landscape as the main advantages; and (3) arguing that innovations are and should be undertaken by farmers themselves in order to be tailored and adapted in a site-specific way to highly variable and diverse farm conditions.

**Factor SQ**, i.e. the discourse maintaining the 'status quo', resembles stakeholders considering (1) farming practices as benign for the environment; (2) AF to be inappropriate in Wallonia; and (3) farmers as end-users of innovative technological packages developed by specialised industrial and scientific institutions.

**Factor PC**, i.e. the political correctness discourse, resembles stakeholders (1) assuming that small adaptations are needed to improve agriculture's sustainability but without challenging the validity of the current modern system model in itself; (2) considering AF as a viable option but only if its agronomic feasibility and economic profitability are scientifically proven in Walloon context; and (3) agreeing with SQ with the top down technology transfer approach.

We close this section by pointing out the risk of serious interpretative failure relative to the representative sort tables. As stated above, a concentration on too few statements in the array, typically on the ones with extreme z-scores, hinders the capturing of the holistic nature of the interpreted viewpoint at hand. A typical mistake is to assume that a statement ranked 'zero' displays indifference or neutrality and to consider this statement as of little importance. However the zero attributed by a particular Factor may become very informative when consideration is given to the ranking of the same statement by the other Q Factors. Statement rankings in this supposedly 'neutral' area of the configuration thus shouldn't be disregarded, otherwise one may fail to capture the subtleties of the viewpoint being expressed.

*For example, Factor SQ attributed a zero score to Q28 - 'We would not be able to farm without chemical fertilisers' - while Factors TV and SQ respectively attributed -2 and +2 to the statement. Q28 was found to be one of the distinguishing statements, and qualitative data gathered from stakeholders clustering with SQ showed that the zero ranking doesn't reflect a neutral position but a nuanced one.*

### **Opportunities for Q methodology to foster agricultural innovation**

In the systems perspective on innovation, multi-actor innovation networks (hereafter referred to as MAIN) are seen as a key strategy to foster robust transitions leading to a redesign of farming systems - see Pittaway (2004) broad review on networking and innovation. Such multi-actor configurations show many operational differences (Klerkx et al., 2012) but they all somehow facilitate and undertake a collective process around identified agricultural innovation challenges and opportunities, at different levels in agricultural innovation systems (AIS) – e.g. village, country, sector or value chain. MAIN generally do not emerge autonomously, and their deliberative setup implies that connections between members need to be forged and their interactions need to be coordinated (Röling & Jiggins, 1998). Accordingly AIS scholars, actors positioning themselves as a systemic intermediary and systemic facilitator, therefore play a significant role (Leeuwis & Aarts, 2011). A so-called ‘innovation broker’ is considered as a member of an actors network who is focused neither on the generation nor the implementation of innovations, but on enabling other actors to innovate (Winch & Courtney, 2007). Innovation brokers aim at enabling this co-evolution of innovation by facilitating linkages among different actors who were previously not connected for various reasons - such as cognitive distance, high transaction costs and information asymmetry (Klerkx & Aarts, 2013). Hence, while the innovation potential precisely builds on this very rich social fabric, innovation brokering means raising the challenge of improving communication between actors with different cultural and cognitive frames as well as different stakes and interests (Kilelu et al., 2013; Nooteboom, 2000).

Innovation brokers thus must develop the skills required effectively to facilitate reflexive human interaction so that it yields desirable outcomes, i.e. social learning and concerted action (Röling, 2002). According to Röling (2002) this implies an understanding of collective human behaviour that goes beyond the emergent property of individuals pursuing maximum utility. It implies understanding how people make sense of the world and socially construct it. As we showed in the previous section, Q methodology is a convenient and sound tool for advancing such understanding.

### **Q Methodology as an appropriate research tool for innovation brokers**

While to our knowledge Q has never been used as such, we suggest that it holds great potential for allowing innovation brokers to probe more deeply into the mechanisms of social learning and collective cognition<sup>1</sup> within a particular MAIN.

More concretely, a Q study on a particular MAIN and regarding a specific topic would allow an innovation broker to get deep insight into (1) the range of actors’ worldviews on the topic, (2) the prevalent variations in the topic’s discourse, and (3) the way these variations logically relate to each other. Thanks to Q, the innovation broker could identify patterns of discourse that characterise the narratives (Q factors) of collective actors about the topic. Such a deep understanding of stakeholders’ worldviews provides relevant informative supports to foster a range of MAIN key enablers such as conflict resolution, negotiated agreement, shared learning, convergence of goals and concerted action. This means that Q findings could assist innovation brokers at effectively developing a common understanding and agreement space

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<sup>1</sup> Cognition it has to be understood has ‘the process of knowing’, as defined in the Santiago theory of cognition (Maturana & Varela, 1992). The theory considers cognition as a broad concept that involves perception, emotion and action (Capra, 1996).

both in the definition of common objectives and their respective prioritisation, and in the negotiation of the issues raised. Creating/increasing this common space stimulates changes among actors and finally leads to successful innovation (Klerkx et al., 2013).

Q applications can be of four types depending on the particular objective at hand. These are:

- diagnostics, *e.g. to identify what the collective actors define as a valuable innovation;*
- analysis of a thematic issue, *e.g. modern agroforestry or market access;*
- design of action, *e.g. for the design of common on-farm experimental plots;*
- monitoring of action, *e.g. to assess the set up of these on-farm experimental plots.*

### **Q methodological strengths for innovation brokers**

From a methodological standpoint, Q offers several strengths regarding innovation brokers' functions. These strengths are:

- the examination of subjectivity within an objective framework, based on a clear structure and process, which can bring clarity to the typical complex and socially contested topics at stake and therefore enhance communication and negotiation within the MAIN;
- the emphasise on the active and engaging role of actors along the data gathering process, which stimulates their reflection upon their beliefs, thoughts, perceptions and state of mind; this holds the potential benefit of increasing actors' awareness and understanding of the topics – i.e. action research –, enhancing change management and other sensitive organisational issues;
- the 'bottom up' or 'self-interpretative' nature of the emergent shared viewpoints, since Q Factors directly results from the 'undeconstructed' Q sample and Q sorts formulated by actors; this allows avoidance of the risky bias of innovation brokers' assumptions about the way understandings are structured;
- the focus on actors' shared viewpoints whilst considering their individual viewpoints; this allows integration of the personal and the social viewpoints in a coherent manner (Watts, 2009).
- the equal consideration of all voices and viewpoints in the Q analysis process, which is particularly useful to elicit marginalised and 'silenced' viewpoints within a MAIN.
- and finally, the discovering of both expressible and 'hardly' expressible' (and thus hardly discoverable) aspects underlying actors' worldviews.  
*Emotional dimensions are often illustrative examples of hardly expressible aspects, i.e. that have significant influence on innovation processes (Schön, 1983; Van Dam, 2009) - e.g. emotional commitment, a key aspect of leadership for innovation -, but still often*

*missing from the analysis of innovation success and failure stories - see Anderson et al. (2014) for review on innovation analysis.*

The 'unsayable' nature of these aspects can either come from the fact that they are, at first sight, considered as having no influence on actors' worldviews/behaviours regarding the topic at stake, or either because they are deeply anchored in individuals sub-consciousness. Q is a convenient way to bring hardly discoverable aspects to light while other methods based on open-ended interviews would struggle to do so; let's remember that Q has been developed by a psychologist!

All these valuable and original assets can, however, only be effective through the meticulous and properly sampling of the statements about the topic at stake (Paige & Morin, 2016): people can 'tell a story' only if they have the appropriate statements with which to tell it. First and foremost, the Q analysis thus has to be conducted in a study context whose objectives must be clearly defined.

### **Q methodological limitations for innovation brokers and recommendation**

In terms of limitations, Q has been criticised for lacking generalisability (Van Exel & de Graaf, 2005). However, Q does not claim to provide findings that can be extrapolated across a population, "*the results are the distinct subjectivities about a topic that are operant, not the percentage of individuals (...) that adheres to any of them*" (Van Exel & de Graaf, 2005, p.3). Besides, Q study findings have been shown to be reliable and stable over time (Brown, 1980; Stephenson, 1953) but, crucially, only in the shared viewpoints expressed, rather than in the individual Q sort arrays. This leaves Q sorters free to change their minds whilst expecting the emergent manifold of shared viewpoints to show a degree of consistency over time (Fairweather & Rinne, 2012; Watts, 2005).

The real limitation of Q to assist innovation brokers rather lies in its inability to address actors' relationships, and thus not to capturing the dynamics and the actors 'agency' within a network. Yet balancing relationships within a MAIN also constitutes a key enabler of its performance - see Klerkx & Aarts (2013) for further details. We close this paper by suggesting a more holistic methodological framework allowing us to overcome this limitation: the combination of Q methodology with Social Network Analysis<sup>2</sup> - SNA (Kolleck, 2013). While to our knowledge Q has never been combined with SNA, their complementarity would enable innovation brokers to embrace together the deep understanding of actors' worldviews and relationships, and therefore to better take up challenges, dilemmas and paradoxes disabling the interactive innovation process (Klerkx & Aarts, 2013; Pittaway et al., 2004).

### **Conclusion**

We addressed the opportunities of Q Methodology for empirical agricultural innovation system studies. This led us to consider the potential role of Q in analysing and supporting innovation processes within multi-actor innovation networks. We argued that Q is a fitting and promising tool to assist innovation brokers with building capacity for collective innovation and preventing

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<sup>2</sup> *Social network analysis allows mapping of institutional linkages, visualising relationships between actors, and assessing the position of actors within the network – in terms of centrality, number of ties, strength of ties – (Spielman et al., 2011).*

innovation network failures. However, Q remains limited to provide actors' worldviews without addressing the relationships between these actors. To overcome this limitation, we conclude that Q Methodology may be even more valuable when combined with Social Network Analysis. This refreshing and holistic approach holds the potential to support innovation brokers to arrive at shared visions, well-established linkages and information flows amongst different actors, conducive incentives that enhance well-developed human capital, and hence innovation network performance. Our sense is that this novel methodological framework is a path worth exploring in (agricultural) innovation network studies.

### **Acknowledgements**

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## How to design and develop inclusive knowledge and innovation agricultural networks: lessons from the case of the Portuguese Cluster of small fruits

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**Abstract:** The idea underpinning EIP-AGRI of linking producers and users of knowledge and promoting their interaction around problem-solving is well grounded on the evidence provided by the ‘innovation systems’ and related literature. Evidence gaps that matter to the implementation of the EIP-AGRI activities comprise the lack of knowledge regarding the best-fitted network configuration for different farming systems and farming styles, and the nature and effectiveness of a facilitator function and role to bridge communication between researchers and farmers. This paper contributes to the filling of the evidence gap regarding the networks’ configuration best-fitted for different farming systems and farming styles and providing insights into the facilitator relevance and its desirable profile, building on the evidence collected for a concrete network: the Portuguese Cluster of small fruits (CSF). The small fruit sector is a novel sector in Portugal that in recent years has attracted a large number of new investors, in particular newly-established, small-scale, inexperienced producers. A social network analysis (SNA) approach has been used to depict the different actor’s positions and interactions in the network focusing on the knowledge flows involved in the creation and exchange of knowledge. The insights provided by the CSF analysis emphasise that agglomeration economies based networks, which are very important in some agricultural sectors (e.g. fruit, wine) and in countries or regions where small-scale farming is significant, can in fact be the basis for knowledge and innovation networks in the sense wanted by the EIP-AGRI, since inclusiveness and facilitation functions are properly accounted for.

**Keywords:** Agriculture, knowledge and innovation networks, agricultural knowledge and innovation systems, clusters, EIP-AGRI

### Introduction

Innovation has been placed at the heart of the Europe 2020 strategy for growth and jobs (CEC, 2013). The European Innovation Partnerships (EIPs) are an innovative tool launched recently by the European Union (EU) to tackle major societal challenges that look for solutions by building on the networking and interaction between actors from the research chain and the innovation players. The EIP on agricultural sustainability and productivity (EIP-AGRI) is one of the five EIP launched by the EU. The EIP-AGRI (EU SCAR, 2013) relies on the innovation systems theoretical approach (Lundval, 1992; Cooke et al., 1997; Audretsch, 1998; Asheim, 1999) that envisages innovation as a part, as well as the result of, interactive learning processes involving multiple actors. Within this approach, multi-actors knowledge networks are the basis for innovation processes taking place at the territorial level. EIP-AGRI activities focus on enhancing the network of producers and users of knowledge, which includes farmers, researchers, advisors, businesses and other individual and collective actors whose interaction generates “*new insights and ideas, and mobilises existing tacit knowledge into focused solutions*” (EU SCAR, 2013 p.25). Hall (2009) endorses the importance of incremental

innovation focused on problem solving or the constant minor adjustments and improvements that farmers make to succeed.

The link between networking behaviour of firms from all economic sectors, including the primary sector, and their innovative performance has been established in the literature (e.g. Pittaway et al., 2004; Ritter & Gemünden, 2003; Nieuwenhuis, 2002). In addition, the research on 'innovation systems' highlights the importance of partner diversity to the innovative capacity of the networks. Research on the agricultural innovation systems also emphasises the critical role of actors' heterogeneity (Wood et al., 2014; Eastwood et al., 2012; Oreszczyn et al., 2010), and defines innovation as an outcome of open-ended interactions among various actors combining knowledge from many different sources (Wood et al., 2014; Klerkx et al., 2010; Conroy, 2008; Klerkx & Leeuwis, 2008).

The idea underpinning EIP-AGRI of linking producers and users of knowledge and promoting their interaction around problem-solving is therefore well grounded on the evidence provided by the 'innovation systems' and related literature. Evidence gaps that matter to the implementation of the EIP-AGRI activities comprise the lack of knowledge regarding the best-fitted network configuration for different farming systems and farming styles, and the nature and effectiveness of a facilitator function and role to bridge communication between researchers and farmers.

The FP7 EU project PRO AKIS encompassed among their goals exploring and identifying the possibilities, conditions and requirements of agricultural and rural innovation networks that constitute examples for the EIP-AGRI. A set of four case studies for in-depth analysis was selected across different European countries. This paper focus on the Portuguese Cluster of small fruits (CSF), one of the networks selected by the PRO AKIS project, given that it offered useful insights on how to design and develop knowledge and innovation networks able to cope with inclusiveness challenges.

The paper contributes to fill the evidence gap regarding the network configuration best-fitted for different farming systems and farming styles and provide insights on the facilitator relevance and its desirable profile.

The paper has two interrelated goals: (1) to present the configuration of the Portuguese CFS, by describing its structure, content and dynamics as a learning and innovation network; and (2) to discuss how the originality of this network regarding its inclusiveness might be kept in its future development in spite of the tensions evidenced towards the segregation of different groups of farmers.

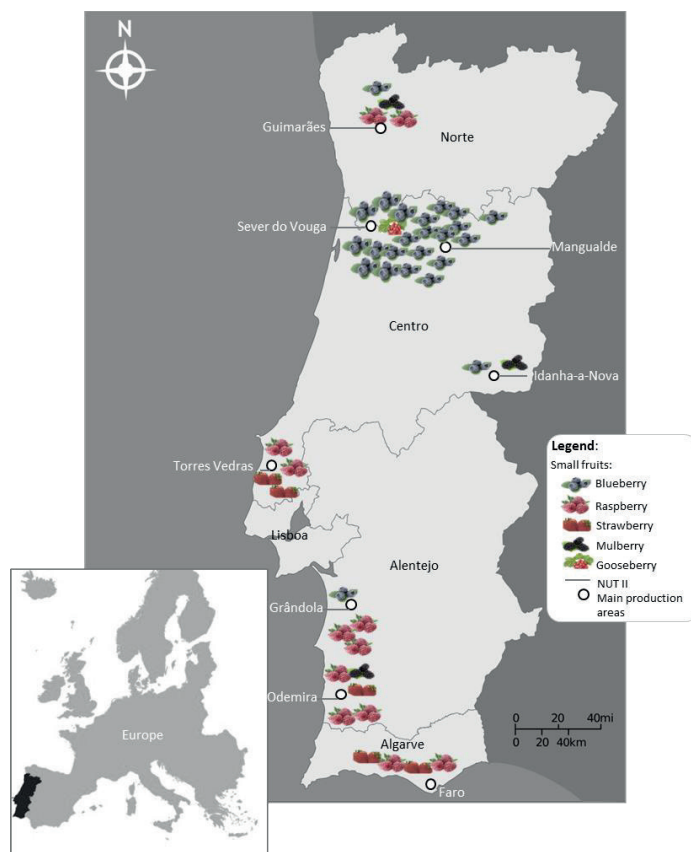
The paper is organised as follow: the next section presents the case study. Subsequent sections describe the methods and procedures applied in data collection; present and discuss the results; and finally offer some concluding remarks.

## **The case study**

The introduction and expansion of the small fruit sector in Portugal is quite recent. It was launched in the nineties but its main expansion occurred in recent years, with the sector growing from a few hectares in 2009 to 1,150 hectares in 2015. Its recent explosion is largely due to the investment by new farmers; supported by EU funding to help young farmers settle into their production chain. Unemployment, and the lack of opportunities in other areas that have resulted from the economic crisis in southern European countries, have attracted

hundreds of young farmers (under forty years of age), often searching for a new life-style. They are mostly highly educated individuals but with little or no experience in the farming sector. Unsurprisingly, the small fruit sector is currently characterised by a huge demand for knowledge and information and by a strong dynamic to organise and deliver its supply.

The sector is concentrated in two sub-regions: southern and central-northern Portugal. Figure 1 shows the geographical location of the sector, as well its differentiation regarding the type of berry specialisation profile.



**Figure 1. Main areas of production of small fruits in Portugal** (Source: *Madureira et al., 2014*)

Both sub-regions offer favourable agro-climatic conditions for berry growth and differentiation at European level due to better taste, colour and ripening time. Together, they constitute the national small fruit commodity chain which has international markets as its main destination. However, the two sub-regions present distinctive characteristics regarding the sector organisation, the profile of their producers, and the accumulated expertise and ability to mobilise knowledge and to innovate. The southern area is characterised by larger and specialised exploitations, including farm-based organisations producing in association with a multinational company. The central-north is dominated by small farms, by the mono-production of blueberries and by the sector novelty experience in the area. Hence the former's position as a supplier of knowledge and skills while the latter is viewed as being highly in need of both.

The Portuguese Cluster of small fruits (CSF) was launched in 2013, resorting to public funding to agglomeration economies (creation of sectoral clusters). It was led by a sectoral



association, which is the main network facilitator along with other three partners. It is a multipurpose network focused on the berry sector organisation at national level. Its major concern is to ensure the sector's competitiveness and sustainability. Knowledge and innovation are key factors to achieving these goals, given the huge knowledge and information gaps in the sector caused by its novelty and lack of tradition along with the entry into the sector of hundreds of small and inexperienced producers.

The CSF is therefore mainly a knowledge and innovation multi-actor network with a singular configuration: it tries to benefit from the know-how and expertise of experienced pioneer producers, while transferring the same to the less or completely inexperienced producers in the central-northern sub-region. The former producers, which are mostly located in the southern sub-region of the country, have already well-established informal and transnational knowledge exchange networks. Hence, the study of the CSF offers an opportunity to understand the role of clusters as a tool for clustering knowledge generation and diffusion beyond a localised level (Porter, 2000; Marshall, 1920). In addition, this network presents the opportunity to understand how extra-cluster knowledge exchange and learning can determine the success of intra-cluster flows (Guilianni & Bell, 2005).

The CSF is a horizontal nationwide network; its coordination structure comprises the main facilitators of knowledge sharing and diffusion processes. It is composed of both experienced and inexperienced producers and a diversified set of other actors, such as: private agricultural advice companies; independent consultants; several FBOs (cooperatives, farmers' groups and associations); and up and downstream industry firms, among others. Table 1 illustrates the diversity of actors within the Portuguese berry sector.

Due to it being an export commodity (its domestic consumption is recent and still residual), berry production needs to be concentrated to attain export scale. This situation generated a dynamic for an agglomeration economy, although it also entailed in the central-northern sub-region an increasingly large number of small and fragmented organisations (such as producer groups, farm-based small firms and other business models in general) that are also offering technical advice to their members and/or selling advisory services to other producers. Hence, this network offers a good example for EPI-AGRI, given that it has been created to overcome the sector challenges regarding its productivity and sustainability (which underpin its competitiveness within the global markets), and to address simultaneously the risks faced by the sector competitiveness due to the massive entrance of the small-scale and inexperienced producers.

**Table 1. Major actors and their roles in the small fruit sector**

<b>Actors</b>	<b>Description of their role in small fruit sector</b>
Independent producers	Production
Private companies Micro SME	Berry production, harvest and/or trade
	Storage, processing and transformation
	Advisory services (technical support, accounting, marketing, certification) supply
Producer groups	Advisory services supply for application to PRODER incentives, direct payment, project installation
Cooperatives	Berry production, harvest and trade
	Knowledge transfer (creation, storage, conversion and sharing)

	Supply of advisory services (technical support, accounting, marketing, certification) Berry harvest and trade
Farmer associations	Support and sectoral promotion
Sectoral associations	Promotion and support of knowledge creation and exchange Support and sectoral promotion Internationalisation and innovation promotion
R&D public institutions	Knowledge creation, storage, conversion and sharing
R&D private institutions	Knowledge creation, conversion and sharing
Local governments	Supporting and encouraging enterprising farmers (land banks, business incubators, licensing new projects), territorial marketing
Public regional advisory agencies	Providing support to project installation management and technical advice Knowledge transfer (creation, storage, conversion and sharing)

(Source: *Madureira et al., 2014*)

### Methods and data collection

The methodological approach adopted for data collection encompassed three phases:

- in the first phase (aimed at understanding and mapping the actors of the Portuguese small fruit sector), an exploratory study was carried out that included a number of different steps, from the collection and systematisation of the latest news and events taking place in the sector, to the direct observation and participation of the research team in some of those events (e.g. meetings of producer groups, the Blueberry National Fair and sectoral workshops related to production and harvesting techniques);
- during the second phase the team of researchers participated in meetings involving the facilitators of the CSF. These meetings allowed for the collecting of information on the CSF foundation, previous informal networks and ties, understanding the facilitator's role and to identifying and mapping all the actors involved in the network;
- in the third phase an exploratory-descriptive approach was chosen to gather information about the structure, content and dynamics of the network. For this phase, two different interview guides were constructed and applied through questionnaires: one for the participants and the other for the facilitators. This script was also applied using a matrix to record relationships and interactions between actors and the flow of knowledge/information, whether in the process of creating, sharing or storing knowledge. These interviews took place on site, lasted on average 60 minutes and were set up by prior contact via email and telephone so that respondents were aware of the objectives of the study and the type of information to be collected. The sample selection distinguished the actors involved according to the criterion 'role in the network' and contemplated the following groups: 'facilitators'; 'suppliers of knowledge'; and 'knowledge demanders'. The sample selection was random and resulted in: three interviews with 'facilitators', nine interviews with 'suppliers of knowledge' and 24 interviews with small farmers ('knowledge demanders').

To carry out the analysis of the social network, supporting the flow of information in the process of creating, sharing and storing knowledge, Social Network Analysis (SNA) methodology was adopted (for a more detailed description see Hanneman & Riddle, 2005 or Wasserman &

Faust, 1994). SNA is based on mapping and characterising the relationships that are established as a result of the interactions between different actors and/or groups of actors. The analysis of the interactions between the actors allows us to look into: (1) interaction patterns within the network; and (2) knowledge flows (central actors, direction and intensity). The specific software for SNA, the Ucinet (version 6), working directly with another program, the NetDraw, was used with the purpose of drawing the graphs of the networks under study. The main purpose of adopting the SNA methodology was to obtain well-founded insights regarding key actors and the intra-network and external interactions that explain some of the relevant processes of knowledge creation, sharing and storage, taking place in the network.

## Results

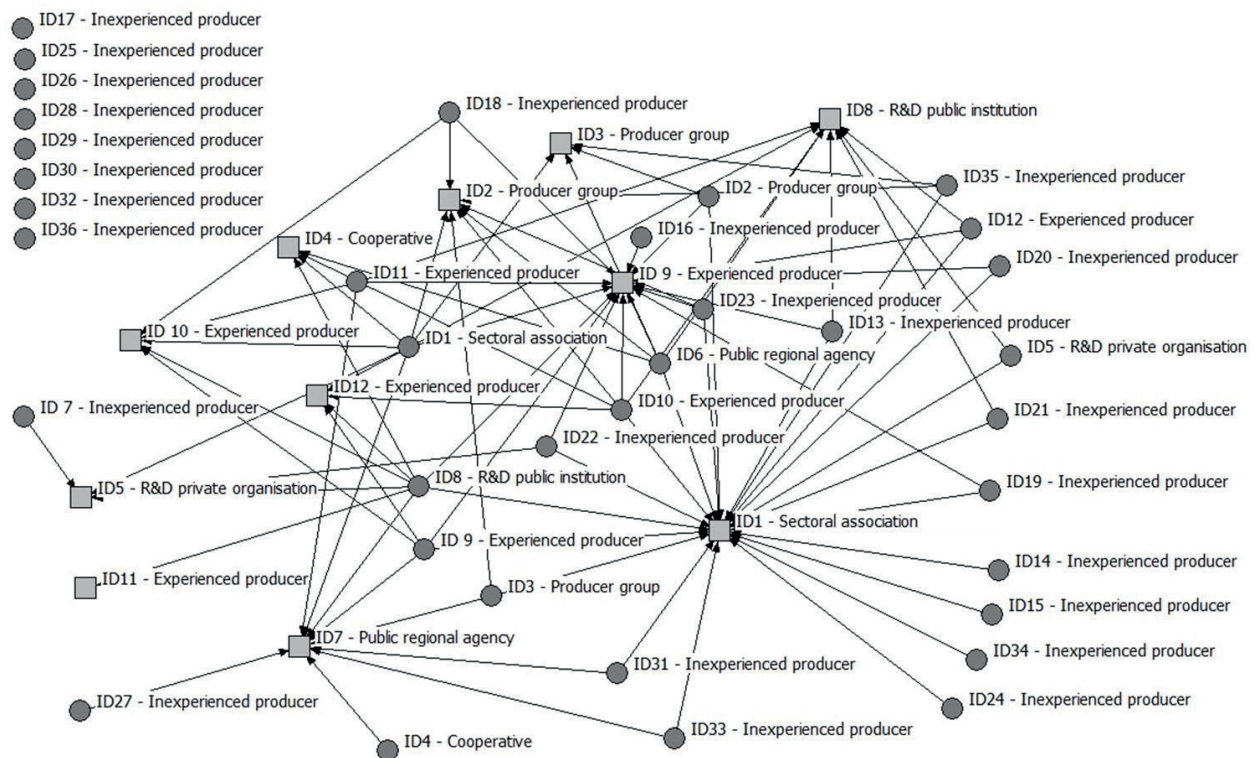
### *Actors, roles, interactions and the network configuration*

The CSF players can be grouped into four major categories:

- there is a core group of four organisations that coordinates the network and includes their key facilitators;
- a second group of members is a larger and more diverse one, encompassing independent producers, producer groups, small and medium firms of producers and others, cooperatives, farmer associations, private advisors, project developers and up and downstream firms, (among others) which are directly or indirectly responsible for the knowledge, expertise and information supply. This group also includes regional agencies of the Ministry of Agriculture and, to a lesser extent, researchers and universities. The experienced pioneer producers (independent or members of profit and non-profit producer groups) stand out within this supply-side group. Our rough estimates suggest there are around 15 people/organisations. The latter are vital to CSF insofar as they are the main knowledge and expertise suppliers, while being simultaneously innovation-led producers, ergo fundamental to encourage innovation processes within the network;
- the third category of actors comprises the inexperienced producers. This is the largest group, with hundreds of producers, although not all of them participate in CSF activities. Among this group there are some active knowledge searchers but the majority are apparently passive recipients of information.
- the local governments and local development associations of central-northern region constitute the fourth group of actors in the SFC network. They act mainly as enablers and supporters, promoting the settlement of new producers and acting as lobbyists in favour of the sector.

Figure 2 represents the interactions among the interviewed actors of the CSF network, based on the SNA methodology for data gathering and mapping. In Figure 2, the actors are identified according to their level of experience and type of activity and described as follows: experienced and inexperienced producers, producer groups (both profit and non-profit), cooperatives, the public regional agency of the Ministry of Agriculture and the three members of the core coordination group of the CSF that are relevant for the knowledge flows within this network i.e. the small fruit sectoral association, the R&D private and non-profit organisation, and the R&D public institution. The grey circles are the network nodes (the interviewed actors) and the grey squares represent the actors they preferred to be linked with. The grey lines

represent the ties, with the direction (arrows) indicating to whom the actors direct their main interactions.

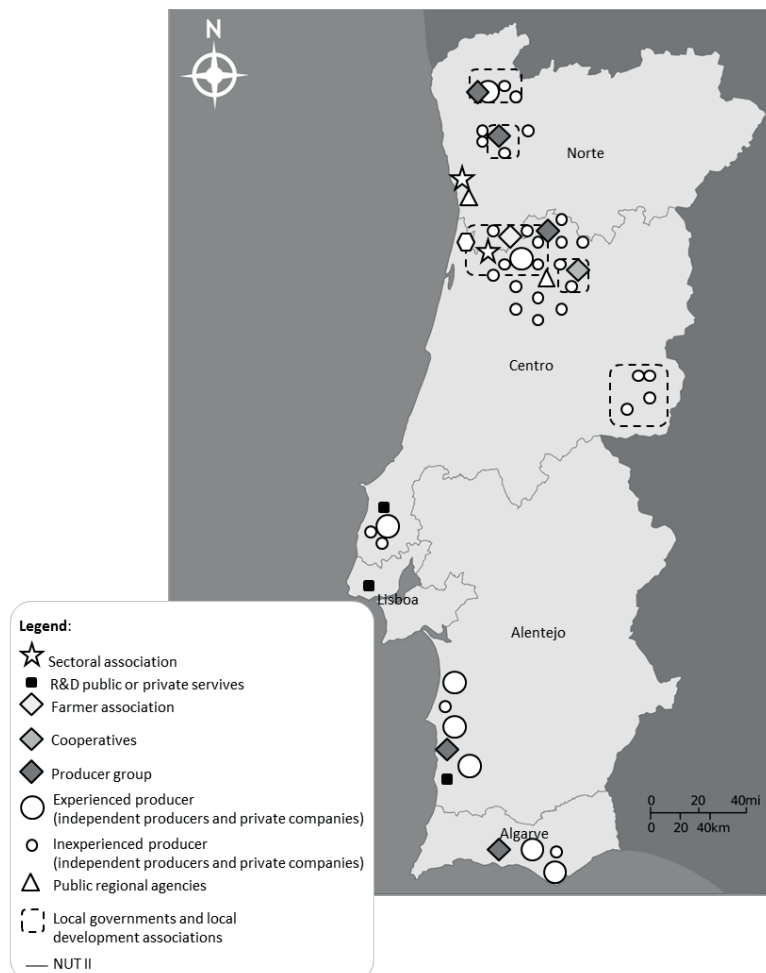


**Figure 2. Interactions among the SFC network interviewed actors. (Source: Madureira et al., 2014)**

The analysis of the sociogram depicted by Figure 2 illustrates four important features defining the configuration of the CSF network. Firstly, the dichotomous relationship between experienced and inexperienced producers, in which the later are clearly the demanders for knowledge, expertise and information, and the former play the role of active supply-side exchangers. Secondly, the polarisation of the network around two central actors - the sectoral association (ID1) coordinating the CSF located in the central-northern sub-region and the ID9, a medium independent producer located in the southern sub-region - reflecting the geographical fragmentation of the network. Thirdly, the importance of the sectoral association (ID1), producer groups (e.g. ID2, ID3 and ID4) and the regional public advisory agency (ID7) (all located in the central-northern sub-region) as facilitators, intermediating the interaction between inexperienced producers and the researchers and the experienced producers, as well as overcoming the geographical fragmentation. Fourthly, although the CSF appears to be an inclusive network, bringing on board the small inexperienced and mostly new-established producers, the sociogram suggests there are probably a relevant number of isolated inexperienced producers (IDs 17, 25, 26, 28, 29, 30, 32 and 36). These producers' isolation is probably due to lack of time (in view of their status as part-time farmers) and/or their passive attitude towards seeking knowledge and expertise.

The spatial fragmentation of the network is illustrated by Figure 3. Another challenge faced by the network, in addition to the geographical distance between suppliers and demanders of

knowledge, is that there is a cognitive distance between experienced and inexperienced producers: the former have knowledge needs on a superior scale in comparison with the latter. Less or inexperienced producers are mostly small-scale farmers, looking for basic knowledge and expertise related to topics such as orchard planting, berry farming practices and cultivation and harvesting techniques. Their main motivation is to be successful in the planting and maintenance of the orchards, ensuring the quality standards required by the buyers or FBO assemblers they are linked to.



**Figure 3. Spatial configuration of the SFC network’s actors.** (Source: *Madureira et al., 2014*)

Geographical distances and asymmetries in the knowledge needs and demands of the two groups of producers create imbalances that threaten its cohesion and sustainability. The triangular configuration of the coordinating structure of the network, including the sectoral association, two R&D institutions, and a partner association focused on the international promotion of the sector, appear to have been a wise governance model, being able to tackle the tensions caused by the imbalances just mentioned. Pre-existing relationships and ties between producers, advisors and researchers (established during the pioneering period when the berries were introduced into Portugal in the nineties), created a number of strong informal, personal and interrelated networks, which appear to be the critical cement for the network governance cohesion. The importance of ‘persons’ rather than ‘roles’ is acknowledged as a key aspect for the success of communication within the farmers’ networks (Wood et al., 2014).

The network facilitators have a significant role in mobilising experienced producers, for whom inter-personal liaisons appear to be essential, to ensure their participation. In fact, producers are motivated to participate in the network by their concern with safeguarding the (good) reputation Portuguese berries enjoy in the export market destinations. The inexperienced farmers are mobilised to participate by the intermediate facilitators, whose job is made easier by the former's acute needs for knowledge and skills to plant, cultivate and harvest the berries.

The learning activities promoted by the CSF (mainly directed at the inexperienced and newly established producers) include thematic workshops, open days, fairs, and technical visits to 'best orchards', involving experienced pioneer producers as trainees, tend to be very much valued by the former group of producers. This confirms that learning from/with 'peers' who communicate knowledge and information on a common ground, built on empirical experience, facilitates the overcoming of the cognitive distances (Nooteboom, 2000), and enhances innovative behaviour by mimicking the innovation-led producers from the southern sub-region.

Interaction among small-scale producers, enhanced by the CSF activities, creates huge networking opportunities, also involving other actors (e.g. advisors or researchers) that often lead to informal collaborative innovation processes driven by the goal of solving practical problems. Collective learning processes among small-scale producers enhanced by the network are very important for the creation (accumulation and storing) of knowledge about local responses regarding varieties of berries and farming practices (e.g. irrigation, plant protection). Available scientific and synthetic knowledge relates to very distant contexts, such as central-northern Europe or the US and Canada. On the other hand, networking enhances inter-personal relationships and social learning processes that are often the result of informal sub-networks led by the small-scale producers. These informal sub-networks offer an effective platform for the co-creation, conversion and sharing of knowledge and information oriented towards problem-solving. In addition, they provide actual opportunities for resource sharing, and consequently cost reduction, especially as product transportation and other logistic operations are concerned. Simultaneously, they are a way of creating agglomeration economies through informal cooperation and product assembling (i.e., examples of marketing and value chain innovation). The case study also illustrates how a problem-solving approach enhances the farmers' networking and innovative behaviour with a broader scope, comprising the marketing and organisational innovation. Hence it offers some insights on the research gap highlighted by Viaggi and Cuming (2012) - that there is lack of evidence on the connection between the commercialisation networks (very relevant in sectors such as fruit production) and innovation - by showing that marketing and value chain innovation can be induced by knowledge and learning networking.

The CSF illustrates how social interaction becomes a powerful tool capable of enhancing systemic innovation (Knickel et al., 2009) - that is mostly incremental in its nature - and resorting to processes of imitation and informal collective learning experiences to solve practical problems, within which farmers act as knowledge co-creators and exchangers. Nonetheless, different innovation patterns can be identified, namely when comparing experienced innovative producers with others that are small-scale and inexperienced. To a large extent, the former rely on incremental innovation processes, products and marketing. In their innovation processes, they combine scientific, synthetic and tacit knowledge (cf. Asheim & Coenen, 2006), aiming at continuously improving their production practices (e.g. irrigation and fertiliser dosing and timing) and adjusting their products to market demand. In the case of mature producers, collaborative innovation processes take place in their own networks,

involving other experienced producers (national and abroad), buyers and researchers who are largely outside the CSF. However, their innovation outcomes are used intra-network by some of the small-scale and inexperienced producers through imitation/adaptation of innovation processes, facilitated by the CSF, for instance by the technical visits promoted by the network.

### ***Common goals, tensions and dynamic of the network***

In spite of the divergence in the participant producer expectations towards the CSF there is compatibility of objectives in the network. There is clearly a dichotomy in the participants' expectations: on one side, experienced pioneer producers expect their participation will help safeguard Portuguese berries' brand reputation; and, on the other side, inexperienced farmers hope to get knowledge, expertise and information that will help them meet producers' and buyers' quality challenges. Hence, despite different expectations for joining the network, the underlying goals of these two types of producers are actually convergent. In addition, individual goals and the collective objective of the network of guaranteeing the competitiveness and sustainability of the berry sector are compatible. Therefore, while there are different expectations and goals among individual actors, these appear to concur to the network overall goal, thus giving it social cohesion. However, there are a significant number of small-scale producers (as suggested by Figure 2) who chose not to participate in the network and who, on account of their lack of knowledge and experience and the fact that they work alone, may endanger the collective goal, particularly as regards the sector's sustainability, for they may adopt less adequate varieties and/or incorrect farming or selling practices.

On the other hand, some experienced producers joined the network with feelings of distrust and chose to keep themselves on the side lines. While the attitudes and behaviour of the latter do not compromise the network overall goal, their full participation could boost its outcomes, namely as far as filling in the learning needs of inexperienced farmers is concerned.

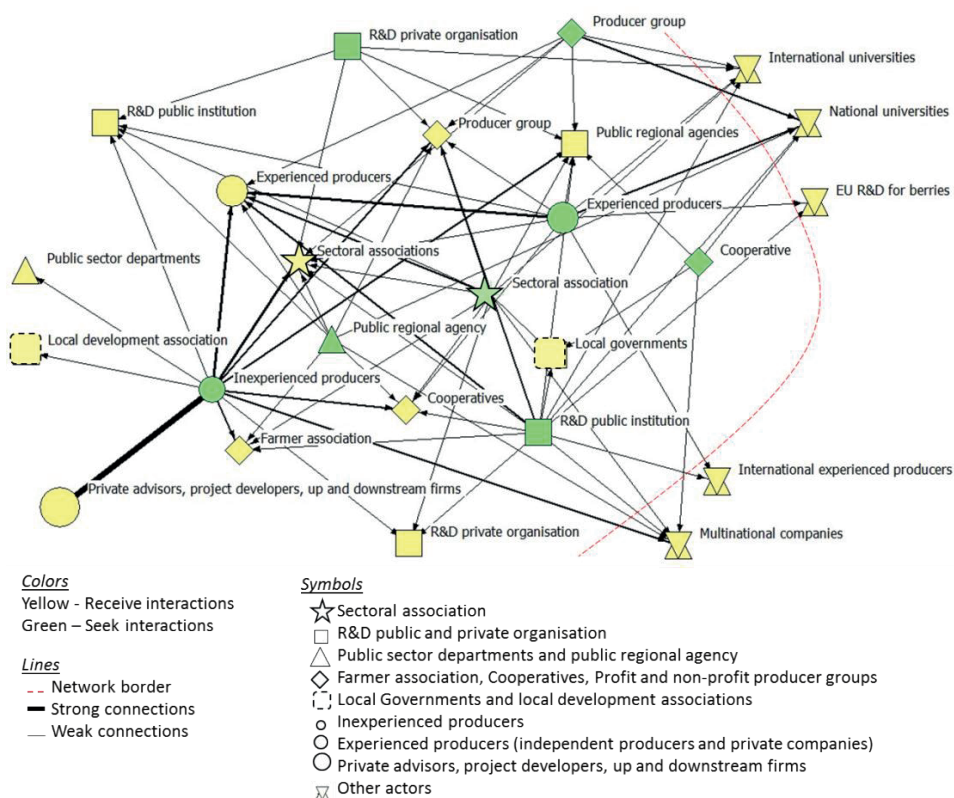
CSF presents experienced producers an insufficient offer and is still not able to attract a relevant number of small, inexperienced producers, especially those with less time and/or interest in knowledge demand processes. These tensions are a threat to the network cohesion and suggest that inclusiveness is still a challenge not completely resolved. However, the major threat relates to the transition from the cluster to the operational groups to be created in the frame of EIP-AGRI funded by the Portuguese RDP, similar to what is happening in the other member states.

The EIP-AGRI is being implemented through a variety of public funded actions aimed at creating networks involving researchers, farmers, and other actors, focused on creating solutions to challenges related to agricultural sustainability and productivity adjusted to the diversity of farming systems and farm styles across Europe. The operational groups (OGs) are the operational framework at the member states level to join the research and innovation actors driven by the solving of concrete problems. The OGs are funded by the rural development programme (RDP) of each country which defines: 1) priorities with respect to the nature of the problems (goals and contents of the OG); 2) the OG structure (e.g. number and type of actors to be involved); and 3) the amounts and the typology of actions to be eligible for public funding.

The lessons learned from the study of the CSF appear to be quite valuable when it comes to guiding the requirements related to the OG configuration, namely to avoid its geographical fragmentation. This is likely to happen due to the segmentation of the producers according to

the two sub-regions: central-northern and southern. The network segregation by sub-regions and groups of producers i.e. experienced pioneers and inexperienced/newly-established, will cause the loss of its original inclusiveness feature. This feature has been shown to be particularly important given that it allows the linking of these two groups of heterogeneous producers by resorting to the knowledge and expertise of the experienced pioneer producers. These are shown to be able to convert analytical and synthetic knowledge (scientific and technical) into empirical tacit knowledge, relying on their informal knowledge networks with Portuguese and international researchers and with other innovation-led producers (illustrated by Figure 4). Their facilitation role is obvious. They bridge the communication between research and inexperienced producers looking for local-specific empirical knowledge. They are actually the knowledge and innovation brokers. The ‘formal’ facilitators in the network are equally important, given they bring on board the experienced and pioneer producers. Meanwhile, some of the newly-established producers can take over that role, but time is needed for that, so the current configuration of the cluster is critical to boost the sector in the central-northern sub-region.

Figure 4 is a sociogram representing the CSF network drawn by aggregating the actors according to their characteristics, which allows for visualising the network border and the extra-cluster actors and interactions with the intra-cluster ones.



**Figure 4. SFC network interactions according to the categories of actors. (Source: Madureira et al., 2014)**

Figure 4 makes clear the importance of facilitators, both the ones that enable the communication bridge (the experienced producers and some advisors and more empirical researchers) and the ones that bring people together, building on their networking ability. Yet, to sustain this inclusive network model, which relies to a large extent on the ‘good will’ of many



actors (namely the experienced pioneer producers), investment is needed into the knowledge and innovation infrastructure enabling it to deliver the converted local-specific knowledge also needed by the latter group of producers.

### **Concluding remarks**

The study of the Portuguese CSF offers interesting insights into how to design and develop inclusive knowledge and innovation agricultural networks. It contributes to research gaps with respect to the configuration and the facilitation role of this type of network to enhance the farmers' innovative behaviour. The lessons learned are also relevant at the policy recommendations level, in particular concerning the operationalisation of the EIP-AGRI regional and local actions to be funded by the national RDP in cases, such as the Portuguese one, where the knowledge and advisory infrastructure is poor and fragmented (Knierim et al, 2015; Madureira et al., 2014) and where there might emerge the temptation to use temporary funding of networks to fill structural holes. It also appears to be useful in contexts where the farmers' knowledge demand is high, for instance due to the presence of a substantial number of new-entrants in the sector and/or the investment in novel sectors, a situation that will tend to happen across Europe due to the dynamic in the consumer preferences, markets and climate change.

The lessons learned can be summarised as follows:

- The CSF illustrates that the facilitator function is important and that it may assume different configurations: a) the bridging communication facilitators who broker analytical and synthetic knowledge delivered by researchers; and b) the facilitators that enable the bridge between different actors.
- Pioneers, best farmers or innovation-led farmers appear to be good bridging communication facilitators, in particular when networks are unbalanced with respect to the knowledge needs and demands, such as in the case of networks addressing the needs and demands of newly-established, novel sectors, small-scale and other farmers' populations, or groups with limitations to access and to mobilise directly the scientific and technical knowledge.
- The inclusiveness can be a critical feature of knowledge and innovation networks focused on productivity and sustainability gains, such as the case of the OG designed under the EIP-AGRI framework, because when there is a segregation between farmers with more access to scientific and technical knowledge and ones with less, the goals of EIP-AGRI will be only be attained to a limited degree.
- Inclusiveness can be achieved by knowledge and innovation networks in spite of geographical and cognitive distances, when farmers share common goals such as the competitiveness of the sector, showing that national clusters might make sense and be helpful to enhance sectoral competitiveness built on farmers' innovation, which is boosted by networking based on multi-actor networks.
- Imbalances and tensions within knowledge and innovation networks caused by geographical and cognitive distances between key actors might be surmounted with wise governance structures, namely through the inclusion of best/pioneer farmers and ensuring the representativeness of the different types of actors: sectoral associations, advisory services and researchers.

The insights provided by the CSF analysis emphasise that agglomeration economies based networks, which are very important in some agricultural sectors (e.g. fruit, wine), and in countries or regions where small-scale farming is significant, can in fact be the basis for knowledge and innovation networks in the sense wanted by the EIP-AGRI, since inclusiveness and facilitation functions are accounted for properly.

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## First experiences in implementation and evaluation of the EIP approach in two federal states of Germany

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**Abstract:** The implementation of the EIP-AGRI differs between the several federal states of Germany. This paper provides an overview of the current state of implementation of the EIP approach in Germany. The authors are involved in the implementation of the EIP-AGRI in two federal states in different ways: in Hesse the Institute for Rural Development Research (IfLS) is commissioned as the 'innovation support service' and in Baden-Württemberg as the evaluator of the EIP-AGRI approach. The paper presents the state of the implementation of the EIP-AGRI approach in Germany and compares the requirements and regulations of EIP-AGRI funding in the context of the two federal states' Rural Development Programme of Hesse and Baden-Württemberg. The third part of the paper focuses on the assessment concept for the evaluation of the EIP-AGRI in Baden-Württemberg.

**Keywords:** Innovation, assessment concepts, evaluation, operational group, innovation support service, implementation, RDP, EIP-AGRI, network

### Introduction and Outline

#### ***EIP-AGRI***

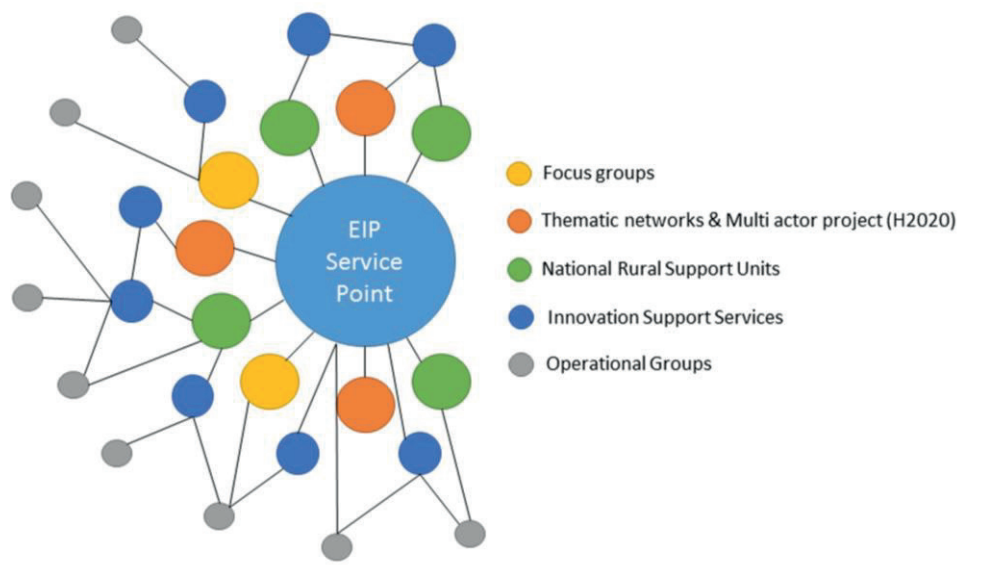
In the context of the Europe 2020 Strategy, European Innovation Partnerships (EIP) were established to foster research and innovation in the EU. The EIPs in general are challenge-driven and should create societal benefits and improvement. Overall, five EIPs have been created in different sectors: active and healthy ageing; water; raw materials; smart cities and communities; and agriculture. Each EIP has specific aims. EIP 'Agricultural Productivity and Sustainability' (EIP-AGRI) tries to connect between research and farming practice (EIP Service Point, 2015). The EIP-AGRI was launched under the European Agricultural Fund for Rural Development (EAFRD). The aim is to accelerate innovations – defined as the introduction of inventions into the market – and to connect research and practice. This was done through Article 35 (cooperation) of Regulation (EU) No 1305/2013, which offers the possibility in the EAFRD to promote so-called Operational Groups (OG) and the implementation of innovative projects. The EIP-AGRI is implemented in the rural development programmes (RDP) of the Member States, in Germany at the level of the federal states.

Furthermore, the EIP-AGRI is organised in a network of a range of actors that supports the approach in various ways (see Figure 1). At the European level, the EIP-AGRI Service Point improves communication and cooperation between innovation actors through sharing knowledge, tackling challenges and connecting people. Among the tools, the so-called Focus Groups are to be mentioned. Groups of 20 researchers, farmers, advisors and other stakeholders work together and share knowledge and experiences to boost innovation. They are intended to function as an inspiration for Operational Groups (EIP Service Point, 2015).

A more research-oriented approach is the EU Framework Programme for Research and Innovation – Horizon 2020. It also has a connection to the EIP-AGRI network. Thematic

networks and multi-actor projects are to support multinational innovation projects. The results of the projects are shared through the EIP-AGRI network (EIP Service Point, 2015).

At the national level, the Member States' rural support units also facilitate the communication and exchange between the various actors and participate in the EU activities. For example, the German National Rural Support Unit offers an online platform and a project database, as well as visits to connect the EIP actors in different federal states (Rocha, 2015). Finally, some Member States and regions have provided structures such as the 'innovation support services' to assist the Operational Groups in different ways (see below).



**Figure 1. Schematic illustration of the EIP-AGRI network** (Source: based on Krause & Freese (2013); modified and translated by authors)

### **Outline of the paper**

The results presented in this paper are based on practical experience with the implementation of the EIP-AGRI in the different federal states. The authors are part of the EIP network and have a good insight into the implementation process in Germany.

Special emphasis will be placed on Hesse and Baden-Württemberg. The Institute for Rural Development Research is involved in the implementation of the EIP-AGRI in Hesse as the 'innovation support service' and in Baden-Württemberg as the evaluator for the RDP.

The paper is divided into three parts. First, the authors illustrate the status quo of the implementation in the German federal states. The paper then provides an overview of the Operational Groups funded in Hesse and tries to assess the given innovation potential. The third part of the paper focuses on the assessment concept for the evaluation of the EIP-AGRI in Baden-Württemberg. The authors describe the planned evaluation process with special emphasis on the implementation and support of transdisciplinary approaches, the enhancement of innovation clusters and the cooperation between the various stakeholders.

### **Implementation of the EIP-AGRI approach in German federal states**

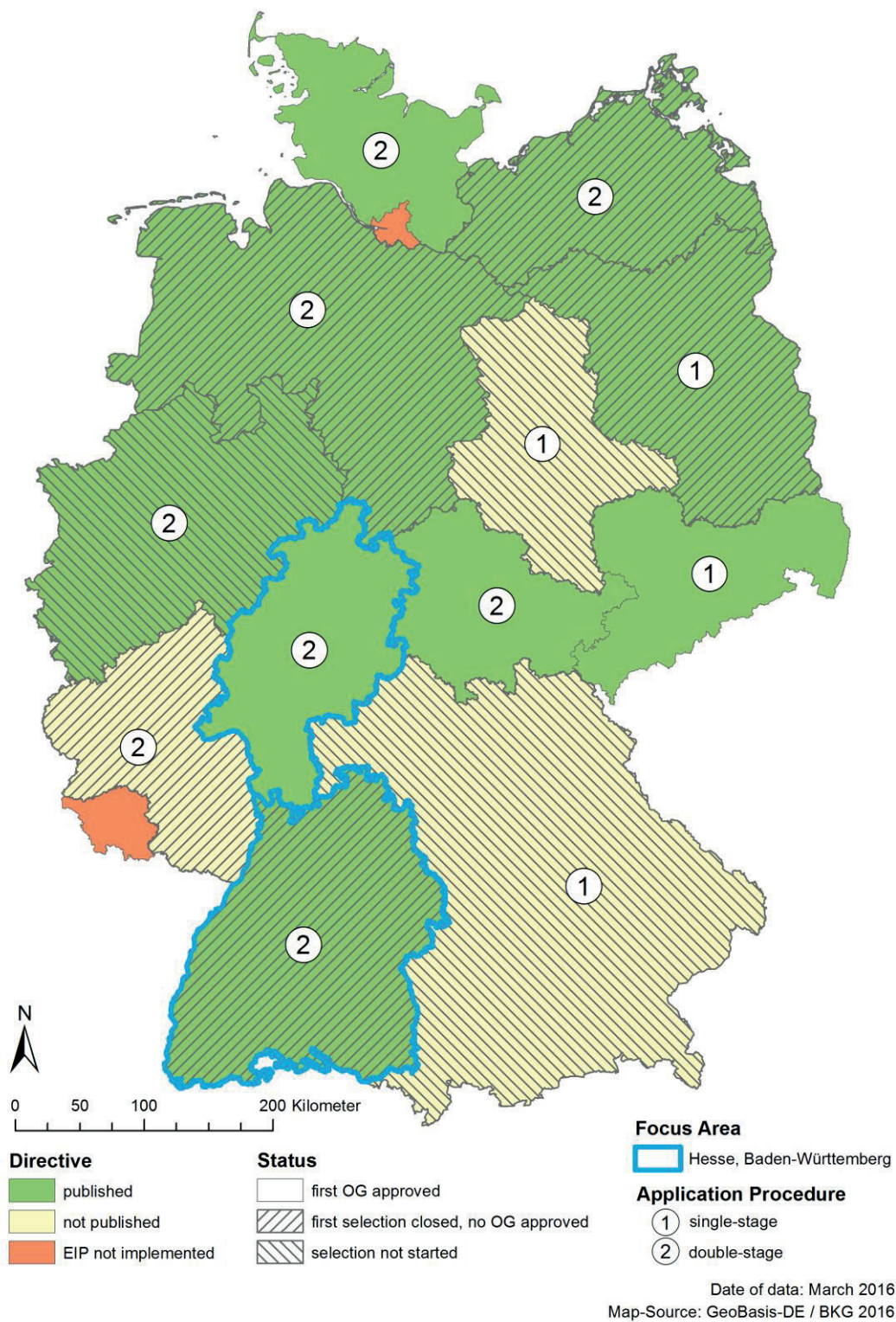
In Germany, the EIP-AGRI is implemented by twelve federal states (except Saarland and Hamburg) through the rural development programmes (RDP). In the following sections the

authors provide an overview of the implementation's status quo in the federal states and focus on the funding conditions and implementation in Hesse and Baden-Württemberg. Finally, the work of the Hessian 'innovation support service' is introduced.

### ***Status quo of EIP-AGRI implementation***

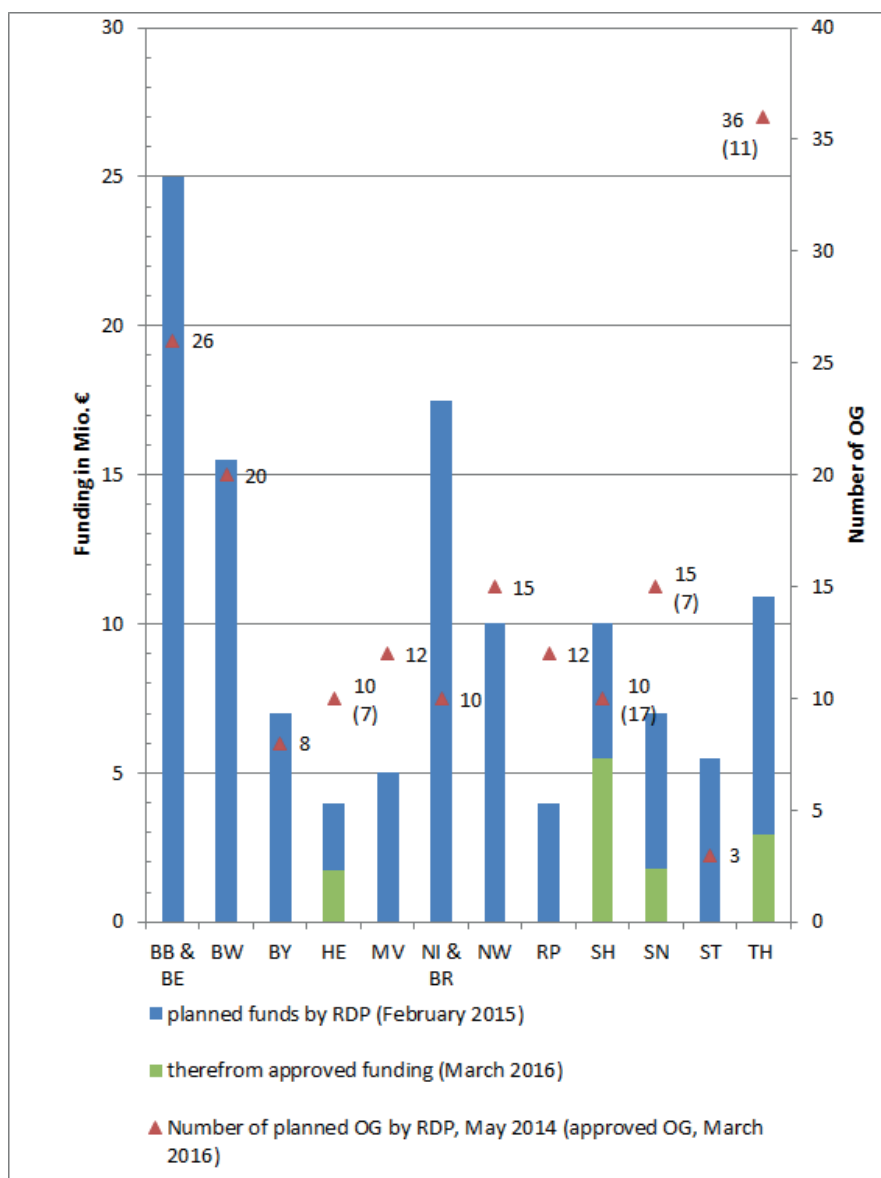
The implementation of the EIP-AGRI in the twelve federal states proceeds differently. Nine federal states had already published their directives by March 2016 (see also Figure 2). It is expected that all federal states will adopt their directives until the end of 2016. The main differences between the directives are crystallised in the support rates: on the one hand between the rates for the running costs and the innovation projects; on the other hand, nearly all directives classify the support rates based on Annex I related to the Treaty on European Union and the Treaty on the Functioning of the European Union (Official Journal C 326, 26/10/2012).

The process of project selection is also different, as shown in Figure 2. Eight federal states provide a two-stage selection process. Four federal states use a one-stage selection. In the single-stage procedure, the Operational Groups submit a complete formal application. Two-stage selection process means that the Operational Group has to submit a so-called action plan and a cooperation treaty as a draft at the first stage. If the action plan is approved and the Operational Group is chosen, at the second stage the chosen Operational Groups are invited to submit a formal application. Finally, the financial appointments between the federal states are also different (see Figure 3).



**Figure 2. Differences in implementation and status of EIP-AGRI in Germany**  
(Source: own illustration based upon a request of LfULG 2016)





**Figure 3. Financial allocation for EIP-AGRI in Germany – planning and actual status quo** (Sources: Rocha (2015), LfULG (2016), own request 2016) (Abbreviations: BB & BE = Brandenburg & Berlin, BW = Baden-Württemberg, BY = Bavaria, HE = Hesse, MV = Mecklenburg Western Pomerania, NI & BR = Lower Saxony & Bremen, NW = Northrhine-Westphalia, RP = Rhineland-Palatinate, SH = Schleswig-Holstein, SN = Saxony, ST = Saxony-Anhalt, TH = Thuringia)

Altogether the federal states have foreseen 119 million Euro funding for the EIP-AGRI and 177 Operational Groups. So on average each federal state has planned ten million Euro and nearly 15 Operational Groups to become approved. Looking at the federal states the average subsidies vary between four million Euro (Hesse and Rhineland-Palatinate) and 25 million Euro (Brandenburg & Berlin). As Figure 1 shows, four federal states have already approved the first Operational Groups. These states have already approved between 25% and 55% of the planned funding for Measure 16.1 (EIP-AGRI). Currently, some federal states are considering increasing the initially planned funds.

So far, nine federal states have already called on actors from the sectors of agriculture, forestry, food economy, horticulture and viticulture to submit their innovative ideas. Four federal states have already finished the first turn (see above). Forty-eight Operational Groups have been approved. The first funding results indicate that this new instrument is well-accepted by the actors.

Hesse was one of the federal states to finish the first term and approve the first Operational Groups. For the first selection stage, Hesse used an additional informal process. Interested groups were asked to submit an expression of interest ahead of the kick-off event and present their idea during the event to find partners and additional ideas. Afterwards all interested groups received an offer for consulting services by the ministry, granting authority and the 'innovation support service'. These advisory services have been approved and are also offered in the second term.

Three federal states have already finished the first stage. For example, in Baden-Württemberg twelve Operational Groups were chosen out of 31 applicants. At the next stage, the chosen groups have to submit more detailed information about their project. Apart from Hesse, Baden-Württemberg promoted four specific topics and needs, which should be covered by the applicants. Hesse has focus themes in the regulation and the interested groups must demonstrate a connection to the needs of Hesse and a contribution to the EFRD priorities.

In conclusion, most federal states are at some point of the implementation process of EIP-AGRI and have communicated the funding conditions. The arrangements are nearly the same in the federal states. Nevertheless, it becomes apparent that there are many questions arising during the implementation process. The federal states try to face open questions by different working groups of the ministries, the granting authorities and the innovation support services.

### **Operational Groups**

In this section the authors provide an overview of the seven Operational Groups in Hesse, their approaches to fostering innovation processes and the degree of novelty (routine<sup>1</sup>, improvement<sup>2</sup> or radical<sup>3</sup> innovation; Hartschen et al., 2015) of the planned innovation.

In Baden-Württemberg the Operational Groups are not yet officially established and approved.

The thematic scope in Hesse is manifold, from boosting regional feedstuff, sustainable utilisation of 'senior laying hens', a sustainable productivity in the wheat sector, horticulture, and the control of plant diseases. With the first call, Hesse funds seven Operational Groups with nearly two million Euros.

The Operational Group 'Aromatic Mint' focuses on cultivating and improving the quality of mint varieties with special aromas and additives in Hesse. Traditionally, Germany is among the most important locations for producing and processing medicinal and spice plants in Europe. In particular, medium-sized manufacturers who produce spices, aromas, food supplements, and herbal medicines hold a leading position at the international level. The expected output of the Operational Group are recommendations for the cultivation of mint varieties appropriate

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<sup>1</sup> Routine innovation offers an additional benefit of a product, optimizing existing properties or reducing production costs.

<sup>2</sup> Innovation by improvement: substantial improvement. Some properties are improved by 30%,

<sup>3</sup> Radical-innovation: new and high economic solutions. Are a paradigm shift and a permanent demarcation to competitors.

for the regional market of Hesse and Germany (IDL 2016a). The degree of novelty has to be assessed at the level of introducing new products which are suitable for the climatic conditions into a regional market. The level of novelty lies in the range of improvements. The established mint varieties could boost Germany's and especially Hesse's position in this market and could provide a competitive advantage in the medium term.

Strengthening the Hessian agricultural production with declared local feeding stuff is at the centre of interest of the Operational Group 'Value-added Chain of Domestic Soya in Hesse'. There is a need to increase the usage of declared domestic animal feed. The consumer demand for animal-based food which is produced using domestic animal feed is rising. Livestock farms react to this demand and increase their efforts to use domestic animal feed. Furthermore, the requirements of society in regard to an environment- and climate-friendly, multifunctional agriculture, as well as the interests of Hessian farmers, support the approach to increasing the production of declared domestic animal feed. The production of soya in Hesse is also becoming economically attractive due to climate change and breeding progress. The aim of the project is to eliminate deficits along the value-added chain of domestic soya "from the harvest to the feeding trough" (IDL 2016b). Other federal states have established conversion lines or other levels of the value-added chain. The product could be a process innovation because the value-added chain can be improved in the project and it builds new possibilities to continue the whole chain in Hesse. If solutions are collectively developed within the project, the innovation is also to be seen as a management innovation. However, at this early stage of the project it is not possible to assess the level of innovation.

The Operational Group 'Organic Hen' started from an ethical and economic point of view. The present situation i.e. that organically raised hens – after their laying period – are only used as an industrial property, is not satisfactory. Throughout their whole life period the laying hens are raised with a high level of dedication using high-quality organic feed. Although these conditions are reflected in high-quality eggs and meat, there are no processing structures which could take the high meat quality into account. The regional sale as classic soup hens (boilers) is not very attractive and other marketing options are rare. Furthermore, the market prices for soup hens are too low and do not allow for the quality of the product. Within the project's scope innovative product lines should be discovered which satisfy the expectations of modern cooking behaviour alongside the highest quality standards. The objectives of the project are to contribute to a new awareness of the high meat quality of organically raised laying hens and to also stimulate the demand for them when their laying period is over (IDL 2016c). The particularity of this Operational Group is that the members are actors along the value-added chain, mainly farmers. Additionally, associated partners from scientific institutions are included in the project. The members created a cooperative for the lead partnership able to work together beyond the funding period. This innovation project is a classical product innovation by improvement of the use.

The aim of the Operational Group 'Establishment of a More Sustainable and Environment-friendly Wheat Value-Added Chain' is to reduce soil fertilisation by nitrogen. The objective of the project is to establish an ecologically sustainable certified system of an adapted use of nitrogen along the value-added chain of baking wheat in the Wetterau model region (IDL 2016d). The innovation level is mostly routine innovation because the additional benefit has to be seen in the improvement of the environmental impact and the economic benefit in saving fertiliser.

The root disease caused by the fungus *Rhizoctonia solani* is a fundamental problem in the production of plant material for potato growing because for a successful cultivation healthy plant material is of very high importance. The Operational Group 'Development of Professional Practice and Optimisation of the Logistics Chain to Control the Pathogen' focuses on transferring research findings into practice, testing and improving them for the application in the field (IDL 2016e). This process innovation can also be regarded as an improvement in the realisation of competitive advantage.

Two Operational Groups are dealing with horticulture. One of them tries to solve the problem of 'yellow wilt' on lamb's lettuce (IDL 2016f). Until now it has not been possible to identify the reason for the disease's occurrence or to find scientific solutions. If the Operational Group can develop mitigation strategies, the innovation level can be considered as an improvement.

The second horticulture group, 'Innovation in Decision-making Support for Irrigation of Outdoor Vegetables', optimises and expands a support system for irrigation. The degree of novelty for this service innovation is located between improvement and routine or basic innovation.

In summary, most of the Operational Groups develop process innovations. Most groups are expected to reach the innovation degree of an improvement. The Operational Groups address issues at different levels. Some address specific problems and solutions relevant for a small geographical scope (Hesse or parts of it), but most Operational Groups address questions which are relevant beyond the Hessian borders and can be used by farmers in other regions.

### ***Innovation support service in Hesse***

The innovation support services are established in different ways. Five federal states have found internal solutions and five federal states have tendered the innovation support services. Hesse decided on the external solution and in 2014 assigned the Institute for Rural Development Research in Frankfurt/Main for the whole Measure 16. The tasks are financed under technical assistance and not as part of the Measure.

The task of the innovation support service in Hesse is to support the managing authority for the Hessian RDP in implementing Measure 16 (including 16.1, 16.4, 16.5, 16.7). For this purpose, the service provider cooperates with the responsible ministry, granting authority and the institutionalised agricultural extension services, the 'Landesbetrieb Landwirtschaft Hessen'. Furthermore, the innovation support service creates input for information and publicity, e.g. developing and designing leaflets, publishing articles and hosting events to inform and activate stakeholders.

The innovation support service is the first contact point for interested stakeholders and connects the different actors during the application and realisation phase. The intensity of consultation is high and the support service tries to harmonise the ideas of the stakeholders and the expectations of the EIP-AGRI.

### **Evaluation approach of EIP-AGRI in Baden-Württemberg**

The implementation of the ongoing evaluation process in Baden-Württemberg is just starting and the methods and milestones have not yet been finally agreed. Up to now the range of topics and main evaluation questions have been discussed among the evaluator and the responsible administration for EIP-AGRI.

In the following section, general considerations of the focal issues of the evaluation of EIP-AGRI will be discussed. After this, potential evaluation methods and a first evaluation scheme for Baden-Württemberg will be presented.

### ***General considerations***

Fundamental considerations are necessary regarding the evaluation of innovations and innovation processes. For the funded innovations themselves their degree of novelty (routine, improvement or basic innovation) and their range of change are of special interest (Hartschen et al., 2015). Related questions are: was it possible to realise incremental innovations of established products or processes?; was it also possible to trigger even radical innovations, which involve entirely new applications and processes? Furthermore, it should be of interest to determine if appropriate projects include a whole innovation process from the initiation phase up to the launch or if they focus on individual phases of the innovation process. As a result, this case raises the question of whether funded projects are capable of shortening or accelerating innovation cycles.

Another aspect is the degree of transdisciplinarity of the funded approaches. Here the question is who pointed at the problem to be solved or the task and who cooperates for its solution. Ideally, socio-economic and scientific issues are merged and a research subject is developed in such a manner as to have a high connectivity to practical and scientific methods and approaches (Jahn, 2008). Finally, it is of interest whether through funded actions permanent cooperation between agriculture, industrial companies and science can be encouraged and possible innovation clusters on individual projects established.

The main question in evaluating EIP-AGRI is, to which extent innovation, cooperation and building the knowledge base in rural areas were supported by the funding programme (Commission of the European Communities, 2014b). To answer this question the implementation of the funding programme, the selection of projects and their results and effects have to be examined in more detail as part of the evaluation. In terms of implementation, the programmed funding objects, funding conditions and procedures are of particular interest. The main issue is whether the existing regulation is suitable to trigger innovations like the ones described above. In addition, the selection procedure and criteria guiding the decision-making on funding projects are of great importance and need to be considered as well.

The results and impacts of the projects can mostly be examined only after their completion. In addition to the type and quality of the implemented innovation itself, the question should be central to what extent the competitiveness of farms can be increased. Another question is whether progress toward sustainability has been achieved.

### ***Objects, methods and instruments of investigation***

The European Commission provides evaluation questions for orientation purposes such as: to what extent was the Programme for the Development of Rural Areas able to promote collaboration and improve the knowledge base in rural areas (Commission of the European Communities, 2014b)? To answer such questions a range of evaluation methods are needed including quantitative and qualitative approaches to measuring the output, outcome and impacts of the funded EIP projects and OGs. The EC suggests the use of a mix of methods including desk research, focus groups, interviews, case studies, network analysis and workshops (European Commission, 2015). Furthermore, other studies on the assessment of agricultural knowledge and innovation systems present innovative approaches, methods and

tools to assess specific factors influencing the development of innovation in rural areas (Cristiano & Proietti, 2014; World Bank, 2008; OECD, 2012).

Baden-Württemberg is currently developing the methodological framework for answering the questions raised based on the following considerations: as an essential analytic dimension, the implementation of the EIP-AGRI approaches in the rural development programme of Baden-Württemberg needs to be investigated; the selection of innovative approaches / projects and Operational Groups is of special interest; and finally, the results and effects of the funded projects need to be examined.

### ***Implementation in MEPL III***

The implementation of the EIP-AGRI approach is put into practice through the Rural Development Program (MEPL III) as well as through guidelines for the funding of appropriate projects. The objects of support, funding conditions and handling procedures for Operational Groups and overall objectives for funded innovation projects are defined there. Document analysis and surveys are intended as primary research methods. The rural development programme and the implementation of policy guidelines will be examined by document analysis. Surveys will be conducted with the managing authority, granting and paying agent as well as with beneficiaries. Regarding the examination, the focus is especially on the question of whether the funded projects are capable of coping with the problems and identified needs presented and analysed in the RDP. It also has to be asked whether the stated rules of action allow the Operational Groups to act in accordance with their needs.

### ***Selection of innovative approaches***

The selection process and the selection criteria for projects play a central role in promoting EIP-AGRI projects. The main question is whether the 'right' projects are funded. With regard to the selection process, whether there are only a limited amount of calls, or periodical calls, to select applicants is also of interest.

Methodically, an analysis of the selection criteria and a comparison of the selection process with the EIP objectives should be made by the evaluator. In addition to the investigation of the selection process and rating system the proposals of funded and rejected projects are also to be assessed. A document analysis of funding data, project lists and in particular the action plans submitted should be undertaken. Individual aspects can be investigated in greater depth in the context of case studies on funded projects during the ex-post evaluation.

Essential criteria for the evaluation are e.g. the innovative nature and type of innovation of the funded projects, the composition of Operational Groups and in particular the potential contribution of the project to the EIP objectives.

### ***Results and Impact***

In order to assess the effectiveness of the funded projects, it is important to look at their outcomes and effects. Depending on the objective, different issues are the focus of interest. The question of to what extent progress towards sustainability has been achieved and whether the competitiveness of farms could be increased is of general interest.

For the investigation of the results and effects, particular document analyses (interim and final report) and case studies come into consideration. In addition, Operational Groups should

complete some kind of self-assessment/-evaluation of their activities and performance, which should be examined and rated by an external evaluator.

The following aspects are the focus of the investigations: how useful are the results achieved in the projects (recommendations, products, processes, technologies)?; with regard to the commercial launch, the dissemination of the results achieved (e.g. number of users) is of special interest.

Regarding the work of the Operational Groups, special benefit aspects of cooperation should be of particular interest, but quantitative criteria such as duration of cooperation and frequency of meetings and distribution of tasks will also be examined. However, the latter also serve as an indicator of the intensity of cooperation.

In terms of contributions to the implementation of rural development programmes, a comparison of the pursued and achieved goals should be made. It is also important to examine achieved results and effects with regard to the priorities of the RDP and how they have been accomplished with the measure examined (innovation, competitiveness, climate, biodiversity, etc.).

### **Conclusions and Outlook**

The different status quo of implementing the EIP-AGRI in the German federal states is a challenge in terms of coordination and handling important questions related to the implementation. On the other hand, some federal states can learn from the 'early birds' which can be considered to be a positive effect. Operational Groups are not yet approved and established in every federal state in Germany.

Another big challenge is to integrate the need for the compliance with regulations, questions on liability and legal entities, failure rate and financial sanctions with innovation and cooperation in mind, as well as the possibility of failure. Moreover, the reduced funding for projects and products which are not classified in Annex I of the Treaty on European Union and the Treaty on the Functioning of the European Union is less constructive for the EIP-AGRI approach.

However, EIP-AGRI is a new instrument for all Member States as well as the European Commission, so all actors need to become acquainted with this new flexible and creative approach. EIP-AGRI is an opportunity which should be used and further developed.

Due to the experiences of the authors the use of the EIP network cannot be assessed yet, but it seems that the output of other innovation funding instruments such as Horizon 2020 multi-actor projects and thematic networks as well as the outcome of the Focus Groups are increasingly used by the actors. It remains an open question as to how far the funded projects fulfil the expectations. At what level of innovation are the funded projects located? What kind of innovations can be expected? What types of innovations are pushed? These are questions that will be answered in the course of or at the end of the funding period. In addition, it will be of interest to see to what extent the funded cooperation in Operational Groups could also achieve effects in terms of building regional or national 'innovation clusters', which could form the basis of more innovative processes and activities in future.

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## **Methodologies for evaluation of sustainable agricultural public policies within the European context. A review.**

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**Abstract:** In Europe, many governments have already defined and implemented public policies for sustainable agriculture, at several scales and in different territories. Nowadays, decision makers count on pre-defined and already tested evaluation methodologies for the policies they design, but indicators that are brought to the table for the evaluation tasks are mainly focused on one aspect of the sustainability. Many of these methodologies are mainly defined for a single objective, which is usually the environmental one. Thus, not all the tackled points are assessed, such as participation or socioeconomic issues. When it comes to defining public policies and their evaluation systems from a holistic or multidisciplinary perspective, several main goals need to be addressed. Indeed, from an agroecological approach, policies must be engaged in environmental issues as well as on social and economic matters. Moreover, there is not yet a specific evaluation set for systemic public policies for sustainable agriculture. This article aims to identify the current evaluation methodologies for public policies related to sustainable agriculture in Europe. Based on the review of several authors' publications, it presents an analysis of the existing and proposed methodologies so as to highlight their potential and deficiencies for their translation into public policies defined from a multidimensional approach. This analysis, together with a reflexion on the nature of the indicators to be integrated in such methodologies, will include participation, ex-ante or ex-post evaluation approaches as well as whether a multidisciplinary sustainability evaluation is included. It suggests a basis for defining evaluation methodologies well adapted to public policies related to sustainable agriculture that tackle simultaneously its three dimensions: social, economic and environmental.

**Keywords:** Public policies, evaluation, policies impact, agroecology, indicators

### **Introduction**

The concept of sustainable agriculture has gained momentum in the European social discourse due to the successive ecological, economic and social crises in the rural context, and also thanks to the agroecological movement. With more or less impact, this discourse has been integrated by the political European stratum. During the last decades, many public policies have been designed so as to foster the ecologization of agrarian practices, as a means of reaching alternative ways of production which are thought to be sustainable from the three dimensions of agroecology: social, economic and environmental.

It seems quite logical that, to achieve these objectives, the European institutions are transformed and that they implement new ways of acting, designing and assessing. This means accepting the need to develop a true political agroecology, as has been highlighted by some authors (González de Molina, 2103; Garrido Peña, 2012). The way in which this new paradigm is built has to integrate the complexity of the agrarian transformation through the

increase in stakeholders' participation, in this particular case linked to a sustainable agrarian production. As Ostrom (1965) affirms, the evolution of institutions towards collective action needs to create an interdependent framework in between participants in such a way that each individual is collectively affected and obliged to act together with others to reach the expected objectives.

The theoretical frame in which this way of acting is inserted is the Political Ecology. It is defined as a discipline, which focuses on the design and production of actions, institutions and norms that tend towards achieving sustainability (Garrido Peña, 1996). It is also strongly linked to Ecological Economy. But we are not going to go into either of these disciplines in depth here because they have been described and compared in an interesting publication by Martinez Alier (2004). This author demonstrates, for instance, how the economical ecology launches a debate between the "weakness" and "strength" concepts of sustainability.

The task of designing multi-target actions and performing a multi-dimensional productive transformation is not an easy one. Many examples show how the implementation of some agroenvironmental policies are not generating the expected effects. Whether this is because they haven't been designed properly or because they haven't been assessed on time with the adequate holistic methodologies that allow us to tell what the real effect of these actions is on the agrarian system sustainability on which they are acting.

Today, there is a wide range of methodologies on offer to assess public policies in terms of fulfilment (budget, deadlines, procedures, quantitative objectives, etc.) that have been developed by the different national agencies for assessment that exist in almost every country in Europe. This kind of assessment could be called "structural" assessment. However, these methodologies still have only a partial approach (only environmental, only economic, etc) when assessing impacts for agrarian sustainability. Different models of production are fostered as a consequence of political actions. For a more accurate measure of the sustainability of such systems, it is important that the evaluation methodology, as Ostrom proposed, tackles the whole complexity and that it includes the three above mentioned dimensions.

This article aims at providing a bibliography revision of the different methodologies employed for assessing some European policies related to sustainable systems. In this revision we try to identify if these policies have been designed with awareness of and the aim of involving stakeholders so as to include them in the results. We also want to identify the complexity with which the impact is being assessed, i.e. if the three dimensions of sustainability (economic, ecological and social) are being measured. This information will provide a global vision of what the methodologies lack from a holistic perspective, as well as showing up some examples that could become guidelines for the improvement of future assessment tools. The study will be based around sustainable agriculture and organic farming.

Tools for evaluation must reflect the quality of inter-connections between the public organisations and outside (Subirats, 2005). A public policy is a collective answer, channelled by an institution to a problem that has been considered to be relevant for the population or community concerned (Subirats, 2016). The need to integrate these mechanisms for evaluation with the design of public policies has been mentioned many times, but very little has been done in practice because of the complexity of such a task.

Systems for assessment are complex because (Moreno, 2007): they have to be characterised from several perspectives (different actors); the principle of *emergence* (the whole is more than the sum of its parts) prevails because several actions are getting added to each other; there is no clear cause-effect link; some self-organisation processes have to be added to the institutional actions; there is a *reflexive nature* (that steps down individuals) and directed behaviours (that encourage individuals). These factors oblige us to always take into consideration an implacable uncertainty.

A good example of a complex evaluation can be found in the work done for assessing the policies for the management of natural resources in which there is a recurrent conflict of interest between different social groups (Martínez Alier, 2004; Subirats, 2005). In these cases conflicts can be explained, and even predicted, with physical indicators of (non)sustainability.

To delimit the analysis, we have selected European organic farming as a paradigmatic example of implementation of numerous public policies over the last decades. It's also an interesting example to focus on because, apart from its significant contribution to the environment, the organic production model also represents a system that contributes to the improvement of the socio-economic elements of agriculture, and therefore to its global sustainability. It is also interesting to note how many processes of *conventionalisation* and loss of its genuine values have been described, partly linked to certain public policies that have not been through a holistic evaluation process (Best, 2008; Darnhoffer et al., 2010; De Wit & Verhoog, 2007; Wilairat, 2010)

### **Public policies for sustainable agriculture in Europe. Methods and indicators for multi-target policies**

Over the past years many policies have been implemented throughout Europe to foster a transformation of agriculture towards a more sustainable model, from a local dimension to a wider communitarian scope. If we focus on European scaled policies, some of them have a clearly defined environmental target, even though most of them are multi-target policies included in complex programmes (policy mixes). It is, for instance, the case with the first CAP pillar (Common Agriculture Policy) or with the Rural Development Programs (RDP) in which we could highlight the Agri-Environment Schemes (AES) present in almost all EU countries.

The General Directorate-Agri of the EU, indeed, fostered the IRENA (indicator reporting on the integration of environmental concerns into agricultural policy) project in 2002 in order to assess the environmental impact of some of these measures.

These programs, especially the RDP, are usually proposing mid-term and final reviews to evaluate the efficacy of their measures. However, as we have already mentioned, several studies show that the grants are inefficient to achieve their expected objectives for environmental or socioeconomic impacts (Petrick & Zier, 2012; García, 2010). They also demonstrate that the way policies are designed is not adequate for the generation of the information needed for their assessment (Subirats, 2005; Nicholas et al., 2006; Caporal, 2013). That is why it is important to rely an adequate methodology for evaluating the impact, the design and the spreading of the measure itself.

A special mention can be given to the grant for integrated agriculture for the wine sector in Galicia (Spain), (García, 2010). The dissemination of the measure was mainly done by agrochemical firms, a situation that prevents the conditions required for decreasing the use of agrochemicals.

We have revised the assessment methodologies employed for CAP subsidies, AES regulations and, in the case of organic farming, we have widened the scope to other specific policy mixes with the aim of compiling the different methodologies for impact evaluation in the sustainable agrarian systems sector. There is a wide bibliography. The Table included in the Annex sums up some examples of the evaluation of these policies and the scope they have, in the sense of understanding: if they include methodologies or indicators to measure the three dimensions of sustainability (environmental, economic and social); if they are applied for the design and ex-ante evaluation or if they are ex-post evaluation of the impact; and finally, if they include participative methodologies to involve different stakeholders.

Quite a high number of the evaluations only aim at measuring environmental indicators. Modelisation techniques are also getting widely spread. Primdahl et al. (2010) analyse and discuss the actual and potential use of impact models in supporting the design, implementation and evaluation of AES. Impact models identify and establish the causal relationships between policy objectives and policy outcomes.

Every day, classic indicators for environmental impact evaluation are getting improved and their scope widened, as for instance the techniques employed for measuring biodiversity (Kleijn et al., 2006). In general, the research around the environmental impact is modifying its approach, and it is integrating the context complexity by using multi-criteria assessment methodologies (MCA) or using expert judgements (Finn et al., 2009; Park et al., 2004), looking not only to improve the impact but also the design of the policy itself.

Uthes and Mardorf (2013) developed a wide review of studies on AES in Europe from 1994 to 2011. They found 419 studies including empirical-statistical, model-based, methodology, review and discussion papers - quite a large quantity! Nevertheless, they state that the existing research is usually based either on ecological or economic perspectives and fails to provide a holistic picture of the problems and challenges within the agri-environmental programming (e.g. multiple measures, multi-target areas, legal aspects, financial constraints, transaction cost, etc.).

In that sense, the evolution of new methods should evolve towards: (i) the integration of systems' complexity that are currently assessed in such a way that the impact of a defined policy could be predicted regarding environmental criteria but also regarding the social and economic sustainability of this agrarian system; and (ii) the integration, in the design and evaluation of specific measures, of the social agents involved in the implementation of this particular action as a means for facilitating the encompassing of the complexity itself. The appropriate quality management of the policy would be enriched by including the multiplicity of participants and perspectives (Subirats, 2005). Quality criteria presuppose ethical principles that should be explicit and integrated within the dialogue.

Recent European regulations for rural development also emphasise the requirement to involve stakeholder groups and other appropriate bodies in the policy-making process (Refsgaard &

Bryden, 2012; Mills, 2013; Prager & Freese, 2009) thus implementing the bottom-up approach. Whilst some research has looked at the more easily quantifiable economic impacts of agri-environmental schemes (AES), there is a paucity of research exploring the social dimensions (Mills, 2013). Munda (2004) has however proposed methods for Multi-Criteria Social Evaluation Methods that have been successfully applied for the design and evaluation of policies for the management of natural resources. These methodologies are facing the complexity of policies and the plurality of objectives and values to be measured. Multicriteria methodologies do not provide a single criterion for selection, since they do not reduce all the values to a single scale, but they include uncertainty and conflicts of values. The methodology defines in a participative way which criteria have to be assessed after the stakeholders involved have been identified.

The Participatory Action Research (PAR) techniques that are already used for agroecological actions can be very interesting for integrating stakeholder actions in the evaluation processes, especially for qualitative aspects (semi-structured survey or discussion groups) (Ibáñez J., 1979; Ortí, 1986). As Salazar (1992) notes, PAR is seen as a movement necessarily linked to political actions, as a generator of theories and methodologies that guide information, and finally as a methodology that emphasises the intervention of intellect in communities' processes in terms of communicative actions (Guzmán et al., 1996). There are also interesting antecedents in other fields of study, such as policies for natural resources management (Martínez Alier, 2004; Munda, 2004) whose methodological successes could be brought to the agrarian context.

Finally, as we mentioned above, the institution itself has to establish as an objective, the inclusion, *a priori*, of tools that will enable it to do a good evaluation of the policy they are designing, facilitating the generation of information and enabling participation. The non-inclusion of those features in the policy framework during the decision-making process, does not allow, *a posteriori*, the making of adequate decisions.

The SEAMLESS project conclusion affirms that institutional effectiveness is often ignored and that policies implemented are not compatible with formal or informal norms of our society. Therefore, the policy becomes ineffective even though it pursues a holistic sustainable development. In addition, policies that address global sustainable development, by integrating the economic, social and environmental dimensions, often require specific institutional actions so as to meet their aims (Schleyer et al, 2007). This project tries to develop predictive models *ex ante*, for measuring the impact of public policies and it analyses the previous conditions required introducing the *institutional dimension* as a fourth sustainability dimension.

Subirats (2005) considers that the first step is to define if we want to evaluate management or government tasks, and cross them with the different areas of action (operational or strategic) of administrations.

The governmental tasks are evolving in a political and social legitimation context. The unit of analysis has to be clearly defined by establishing a division between the different types of organisations, tasks and operators, and generating different power and mutual influence relationships.

### **The case of organic farming**

The main policies implemented in the organic farming sector are derived from the CAP under Axis 2 (improving the environment and the countryside) of their rural development programmes (RDP) or under Article 68 of Council Regulation 73/2009 (specific support to farmers) among others from Axes 1 and 2 (Sanders, 2013). Besides CAP measures, a wide range of national or regional policy instruments exist e.g. several National Action Plans for organic farming. Added to that, the current organic EU legislation (R834/2007) is another policy instrument impacting the organic sector throughout Europe.

The volume of examples of holistic evaluation of policies specifically devoted to organic farming decreases significantly in comparison to other assessments for AES.

Nicholas et al., (2006) highlighted in their study that the data available didn't allow the reader to tell if the policies devoted to organic agriculture had been effective in terms of generating positive externalities with respect to all the dimensions of sustainability. What seems to be clear is that policies have had a certain impact on the growth of areas managed under organic agriculture, and they identified 5 criteria that had improved in the organic farms in comparison to farms receiving agri-environmental grants. However, because the method employed was indirect, and because of the lack of information, it was difficult to establish any clear cause-effect link.

Sanders (2013) has evaluated the impact of the European norms for organic farming on the sustainability of the sector itself. The study recognises that, although rural development has had a positive influence on the spreading and adoption of this production method, there were several aspects of it such as rural diversity, rural employment and the development of human capital, where consolidated evidence for the impact was missing. It even admits that few objectives for environmental sustainability (water, energy, rotations, etc.) can not be met because compulsory legislation is not requiring it. Environmental sustainability of growth in the sector relies partly on the way in which the rules and organic concept have been interpreted, rather than being due exclusively to the legislation. At the same time, other authors, (Lynggaard, 2001; Daugbjerg et al., 2008, 2011; Offermann et al., 2009; Konstantinidis, 2014) have described the relative impact that public policies and the institutional environment have had on various aspects of sustainability within organic production, for instance, as a consequence of the dependence on agri-environmental measures.

In addition, and bringing back the participatory approach, authors such as Häring et al. (2009) propose adopting a bottom-up approach for policy design, based on the definition of the 11 RDP of the countries lately integrated within the EU. The benefits of including stakeholders in the policy-making processes provide these policies with quality, credibility and a higher probability of impact and societal gains (democracy, equity, transparency). This highlights the SMART methodology approach which states that goals should be Specific, Measurable, Achievable, Realistic and Timed.

From the economic efficiency of policy point of view, Schader et al. (2014) have analysed the Tinbergen rule applied to multi-target policies using organic farming in Europe as an example. The importance of targeting and tailoring of policies to achieve maximum effectiveness with a given budget or to minimise spending for achieving the targets set has been stressed by economists and policy makers (OECD, 2007). Multi-target policy instruments, in particular

cross-compliance and support for organic farming via direct payments, have been evaluated as being inefficient as their multi-target character seems to contradict Tinbergen's postulate (Tinbergen, 1956). The main statement of the Tinbergen Rule is that efficient policy requires at least as many policy instruments as there are targets. However, empirical data from evaluation studies is scarce due to methodological constraints and does not permit the drawing of general conclusions on the efficiency of multi-target policy instruments. By using a model of *analytical linear optimisation*, these authors are demonstrating that the efficiency is set due to using several multi-target tools within a policy mix.

The ORGAP project has also realised a first approach to the elaboration and evaluation of strategic plans. It was finalised in 2007 (Schmid et al., 2008). The methodology proposed for the evaluation phase (ORGAPET) recommends the use of several tools and indicators well known, especially in the context of European public policies, such as multicriteria evaluation, IRENA indicators or socioeconomic evaluation programmes MEANS. Due to the wide scope tackled by this tool, the results of the project are quite generic and they require a more specific application according to each of the objectives to be assessed.

Vieweger et al. (2014) developed an impact assessment model based on this methodology for the whole evaluation of the German organic farming research programme. They combined it with an online survey, interviews with stakeholders and workshops with external experts. These authors point out the need for a better link between goals and the design of the programme in order to better assess its impact. Contextualising the programme within the whole policy in which it is developed as well as including the participatory approach in the policy-making and evaluation, are both part of the main conclusions of this work. Again, the difficulty of knowing the impact extent of this research programme is highlighted due to the interrelationships with other measures.

## **Conclusion**

Policies that are fostering sustainable agrarian systems often include in their objectives, achievement of an improvement in the environmental, social and economic impact of the production system they promote and for the rural context in which they are implemented. But, to guarantee that such objectives are met, holistic methodologies have to be designed so as to allow the measure of sustainability in all its dimensions. To do so, those methodologies must be taken into account in the policy-making process, so as to facilitate the generation of the information needed for the adequate assessment and the participation of the stakeholders involved in the measure. The policy design should anticipate the measurement of different indicators and impacts (combining ecological, economic and social evaluation techniques), how and when to do this data collection (for example in a mid-term evaluation) and how the main actors are to be involved in the process. The inclusion of the evaluation frameworks and indicators in the pre-project will allow the collection of different perspectives to be assessed and will permit a more direct cause-effect link between policy and impact. Impact models also help for this purpose. The spreading nature of the measure itself could also influence its final impact. It is the only way to integrate the complexity of the system that is being evaluated, but also the diversity of criteria and conflicts, especially in cases for which these multi-target policies are integrated within a broader policy pack in which they interact one with another. Moreover, the participation of stakeholders will contribute to the success of the policy and will co-responsabilize the society in the fulfilment of the objectives.



For the last years, the assessment methodologies for agrarian public policies have evolved towards more complex systems that integrate qualitative and quantitative techniques and that gather several dimensions of sustainability. Particularly, new methodologies have been defined so to include the social component.

However, there is still a long path to develop new methods that will assess the environmental, social and economic multicriteria, combined with a participatory evaluation. In that sense, techniques from sociological investigation, such as the Participatory Action Research (PAR) techniques, can be of help. These techniques enable us to obtain qualitative information from stakeholders that permits us to identify and prioritise the sustainability indicators in both the policy design and the evaluation stage. The most used methodologies are interviews, discussion groups, expert teams and online surveys.

Finally, the institutional dimension is also relevant. Public bodies must change themselves in order to integrate the multidimensional purpose of the evaluation, sharing the way of working with other actors and multidisciplinary teams in the policy design. Developing predictive models for an ex-ante evaluation could contribute to improvement of the further impact (post) assessment.

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**Annex 1. Examples of methodologies for the evaluation of public policies' schemes that foster sustainable agriculture in Europe.**

Authors	Policy	Methodology	Environmental indicators	Economic indicators	Social indicators	Ex -ante evaluation	Ex -post evaluation	Participatory approach
Mazzocchi et al. 2013	Regulatory impact assessment	Scriyer Fuzzy multicriteria approach		Monetisation of impacts		X	--	--
Refsgaard & Bryden (2012)	CAP subsidies at regional scale	POMMARD modelling	Biodiversity, use of mineral N	incomes	Labour, employment, migrations	--	--	--
Petrick (2012)	CAP subsidies	Dynamic labour demand equation	--	--	Labour	--	X	--
García (2010)	Agri-environmental subsidies for integrated pest management	Interviews				--	X	X
Carey et al. (2003)	Countryside Stewardship Scheme (England)	Surveys, desk study & interviews. Evaluation by an expert team (ecologist, architect, historian & social scientists)						X
Mills (2013)	Agri-environmental schemes (AES)	Interviews			Non-farm employment, Income security, Human capital through skills and training development,		X	X

Finn et al. (2009)	Agri-environmental schemes (AES)	Multi-criteria analysis schemes (MCA), expert panels	X							X									X
Park et al. (2004)	Countryside Stewardship Scheme (England)	Multicriteria analysis schemes (MCA)	X																
Sanders (2013)	European Organic Farming Regulation (R834/2007)	Previous surveys, personal interviews, internet enquiries																	
Schmid et al. (2008)	European Organic Action Plan	ORGAPET							IRENA indicators, others.				MEANS indicators, others						X
Nicholas et al. (2006)	Agri-environmental schemes (AES) for organic farming	Nominal Group Technique in expert panel workshops ('estimate-talk-estimate'), Evidence based expert assessment, Previous surveys.							Energym biodiversity, GMOs traceability, others				Capital investment of farms, diversification, farm income, others.						X
Schader et al. (2014)	Organic farming area support payments (OFASP) in policy mixes	Analytical linear optimisation model							--				Economic efficiency of policies					X	--