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Linking the agricultural knowledge and innovation system's subsystems: the case of the Flemish ornamental plant production

Knowledge and innovation are keywords in a context of resource scarcity and sustainable intensification of agriculture. But in order to fully use the knowledge potential and to transform research results into innovative practices, there is a need for an adequate configuration of the agricultural knowledge and innovation system (AKIS). This configuration should be considered in relation to its own specific context and history. This paper focuses on the particular situation of ornamental plant production in Vlaanderen (Flanders), Belgium. In practice, we see that innovations in this sector are not limited to individual companies, but that new collective structures are put in place. The sector's geographical clustering within the province of Oost-Vlaanderen is hereby an important facilitating factor. The new AKIS constructions have their own logic and objectives, but illustrate the need for further development of interlinkages between AKIS subsystems. The four examples of networking initiatives focus upon the production practices of ornamental plant production companies (VMS), alignment of research (Technopool Sierteelt), knowledge transfer and interaction between research and primary production (Sietinet) and, finally, co-creation of new varieties between research and the growers (BEST-select and Azanova). The results show that such initiatives can indeed contribute positively to the functioning of the AKIS. A partial approach, which looks at specific interactions instead of the AKIS as a whole, is thereby a more practical starting point than an integrated or overarching strategy.

Keywords: Agricultural knowledge and innovation systems (AKIS), ornamental plant production, Vlaanderen, innovation, networking initiatives

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Introduction

The agricultural and food sectors face a huge challenge to boost production without exceeding the world's ecological boundaries. Research and innovation are hereby of crucial importance as sustainable intensification will largely depend upon the increase of productivity (instead of farming more land). Increased investments in agricultural research are thus an important, but not the only, factor (FAO, 2009). Significant gains can also be realised through an improved translation of research results into practical innovations. The interaction between knowledge users, research, education, extension and other stakeholders is thereby of crucial importance. A recent reflection paper (EU SCAR, 2012) points out that although research, extension and education are part of the same agricultural knowledge and innovation system (AKIS), they are faced with different problems and react to other incentives. This causes fragmentation instead of synergy and collaboration.

Policy attention for research translation and multi-actor approaches is growing, as illustrated by the European Union's (EU) Europe 2020 strategy and the European Innovation Partnerships. This is enforced by a shift in research funding from research and development to innovation in products and processes. Simultaneously, the system is evolving from the traditional linear and top-down approach to an innovation systems approach. The latter are not only more reactive and interactive, but are also characterised by agents that collaborate to find innovative solutions (OECD, 2012). The general assumption is that, in a context of limited natural resources and additional pressure from climate change, AKIS will have to adapt and to improve their functioning to meet the future needs in food and agriculture.

Within this discussion, the institutional design of AKIS is a crucial element. Experiences reveal a large diversity amongst European countries and regions, mainly as a consequence of the different country contexts, history and available actors. In several countries, examples of networking practices between AKIS subsystems occur and can serve as good examples (EU SCAR, 2012; OECD, 2012).

In this paper, we study AKIS developments and new networking initiatives that are occurring in Vlaanderen (Flanders), Belgium. Through the discussion of examples in ornamental plant production, we aim to better understand the context in which such initiatives grow and to learn lessons on key factors and bottlenecks. Our analysis starts with a context description. The objective is to give an overview of the circumstances in which the sector operates in order to better understand the AKIS configuration. The elements that are addressed comprise, amongst others, the production characteristics, the sector's innovation profile and the actors involved in the AKIS. The next section elaborates upon new AKIS constructions in the sector and discusses four initiatives. Two initiatives work within a certain AKIS subsystem: *VMS* aims for the implementation of more sustainable practices in primary production and the *Technopool Sierteelt* focuses upon improved alignment of research. The other two initiatives concern the interaction between research and the production sector. In the example of *Sietinet*, the objective is to generate a better knowledge transfer and interaction, while *Best-select* and *Azanova* aim to co-create plant varieties between research and companies. The discussion section brings together the findings and formulates the paper's conclusions.

Methodology

The paper builds upon a case study analysis of the AKIS in Vlaanderen (Vuylsteke and De Schepper, 2011). This study was carried out in the framework of the Standing Committee on Agricultural Research's working group on AKIS. This mixed working group of civil servants and researchers aims to reflect upon national and regional approaches with regard to research and innovation policy. Practical examples are used as a starting point for more profound discussions and analyses of the situation of AKIS in European countries and regions (EU SCAR, 2012).

Our focus is upon the northern part of Belgium (Vlaanderen) and the particular case of ornamental plant production. The decision to study a region (Vlaanderen) instead of a country (Belgium) is motivated by the fact that policies on research (partly), innovation, education and agriculture are regional instead of national matters. In order to better focus and understand the results, the paper explores the specific situation of the ornamental plant production sector. This is one of the most dynamic and innovative subsectors in Flemish agriculture (Deuninck *et al*., 2007; 2008).

In the paper, we present an integrated analysis of primary and secondary data on the sector, innovation at farm level and experiences with the networking initiatives under study. The analysis also benefited from earlier analyses of innovation policies and instruments (Deuninck *et al*., 2007, 2008; Vuylsteke and Van Gijseghem, 2010). Alongside the available statistical and farm economic data, the implementation of innovation was measured through surveys (in 2007 and 2012) with the participants in the Flemish Farm Accountancy Data Network (FADN). High response rates were achieved through individual follow-up by the responsible accountants.

In 2007, 747 surveys were sent out to FADN participants and, of the 715 surveys received, 49 were from specialised ornamental plant producers. In the questionnaire the respondents were asked through a series of general questions to describe the product, process, organisational, marketing and other innovations they implemented in the last five years, whether they were the first to implement this innovation, and to estimate the rate of adoption in comparison with other growers.

In 2012, 711 surveys were sent out to FADN participants and, of the 663 surveys received, 31 were from specialised ornamental plant producers. A similar, but more elaborate questionnaire to that used in 2007 was employed in which respondents were asked to describe, in specific, separate questions, the product, process, organisational, marketing and other innovations they implemented in the last five years.

The descriptions of the networking initiatives are based upon secondary data analysed and experiences from the initiatives.

The current status of ornamental plant production in Vlaanderen

The objective of this section is to describe the current status of ornamental plant production in Vlaanderen, in order to capture the context in which new AKIS initiatives originate. Four aspects are addressed: the sector's characteristics, innovations at farm level, the actors involved and the relevant AKIS policy instruments.

Characteristics of ornamental plant production

In 2011, 995 or ca. 4% of all Flemish farms were involved in ornamental plant production (Figure 1a) and they cultivated 5,808 ha or 1% of the total agricultural area (Figure 1b). The data show the effects of intensification. The older growers have left the sector and the younger ones are buying the available land. The process is reinforced by high energy costs (which cause drop out) and scarce land availability (farmers catch opportunities when they arise). The geographical clustering is an enabling factor. More than 88% of the ornamental plant production is used for outdoor cultivation. Ornamentals such as roses, shrubs, bushes etc. have the largest area (62% of the total area). The sector's production value was estimated at EUR 509 million in 2011

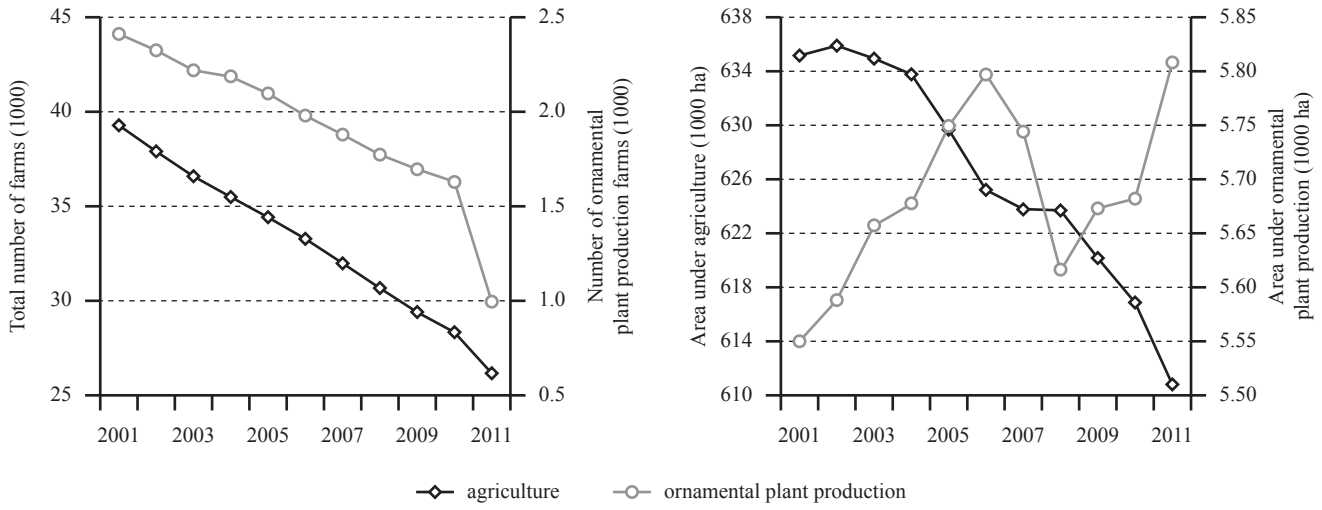

Figure 1: (a) Number of farms and (b) area for the entire agriculture and ornamental plant production in Vlaanderen, 2001-2011.
Source: Directorate-general Statistics and Economic information, Vlaanderen, Belgium.

(Algemene Directie Statistiek en Economische Informatie, 2011; Platteau *et al*., 2010).

A remarkable feature is the sector's strong geographical clustering, with the majority of the production concentrated in the province of Oost-Vlaanderen (surroundings of the city of Gent). But at the community level, geographical differentiation occurs between potted plants (Lochristi, Destelbergen, Merelbeke and Melle), ornamental trees (Wetteren, Oosterzele, Laarne, Wichelen Lede), the cut flower industry (direction of Brussels) and forest tree cultivation (Maldegem, Waarschoot, Evergem) (Platteau *et al*., 2010).

Micro-economic data are only available for specialised ornamental plant production companies under glass. Table 1 gives an overview of the economic results of the companies monitored in the FADN. While the average area increased slightly between 2006 and 2010, there was an increase in the full-time labour equivalents. The figures furthermore illustrate that the sector has been struggling for years with low incomes. While there is a small but positive family income per hectare, the net farm result (after deduction the family labour compensation) has been negative for years. The solvency ratio (equity over total assets) fell in 2010 to 62% (Platteau *et al*., 2010; Raes *et al*., 2012).

Table 1: Economic results of specialised ornamental plant production companies under glass in Vlaanderen, Belgium, 2006-2010

	2006	2007	2008	2009	2010
Average area (ha)	1.05	1.07	1.06	1.20	1.19
Number of FTE	2.61	2.79	3.14	3.14	3.09
Return (EUR/100m²)	2,610	2,722	2,999	2,769	3,051
Cost (EUR/100m²)	2,306	2,514	2,938	2,702	2,875
Family income (EUR/100m²)	305	208	61	67	175
Family labour compensation (EUR/100m²)	653	695	661	657	580
Net farm result (EUR/acre)	-348	-487	-601	-590	-405

Source: Raes et al. (2012)

Innovation in ornamental plant production companies

The strong international competition and the increasing production costs are the main factors that explain the sector's difficult economic position. Companies are continuously looking for scale advantages and all kinds of innovations to counter these trends. The survey results show that the percentage of companies that had an innovation in the last five years increased significantly between 2007 and 2012: from 47% to 84% (Figure 2). These percentages are by far the highest compared to other agricultural sectors in Vlaanderen. Also the diffusion rate is higher, with more than half of the population categorised as innovator (20%) or early adopter (33%) (Vuylsteke, unpublished).

With regard to the type of innovation, there is a growing importance of organisational, marketing and other innovations at the expense of product and process innovation (Figure 3). The increased detail in the questions in the 2012 questionnaire can partly explain these findings, but they underpin the on-going evolution in the sector. The interpretations of the types of innovations are very diverse and often company-specific. New breeds, cultivars and varieties are most often cited as examples of product innovations, but other examples

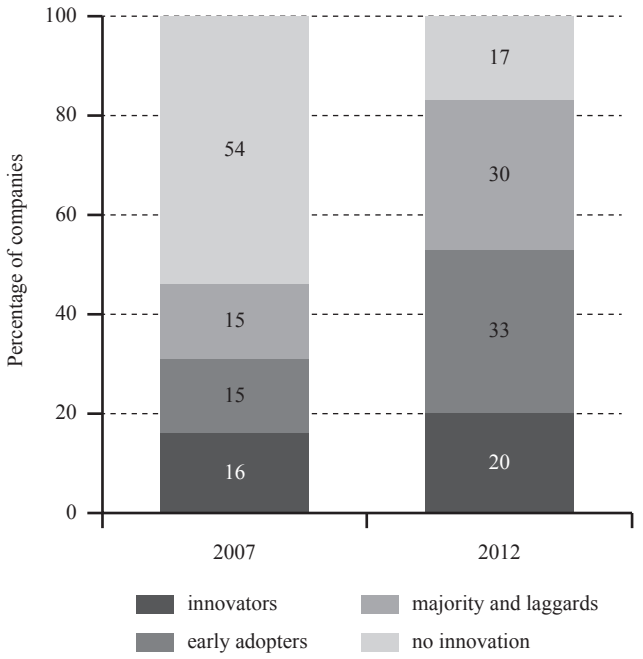

Figure 2: The degree of innovation diffusion in specialised ornamental plant production companies in Vlaanderen, Belgium in 2007 (n=48) and 2012 (n=30).

Note: In each year the status of one company could not be determined

Source: Own survey data

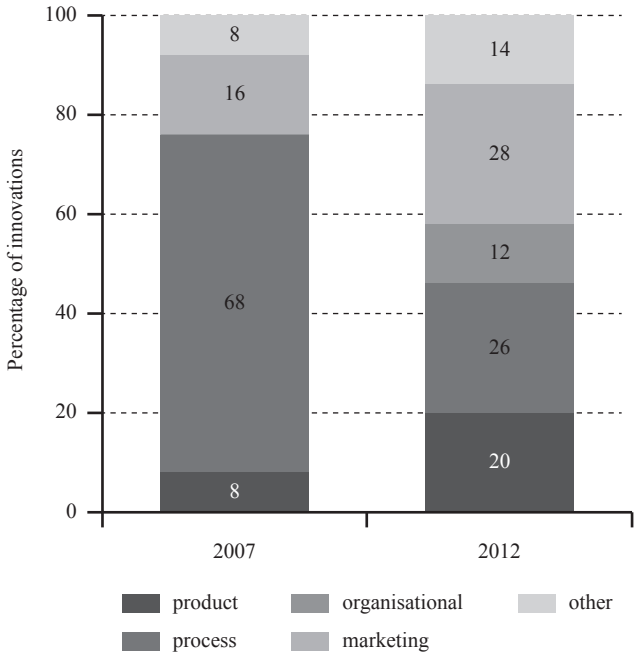

Figure 3: Distribution of the types of innovation in specialised ornamental plant production companies in Vlaanderen, Belgium in 2007 (23 companies, 25 innovations) and 2012 (26 companies, 50 innovations).

Source: Own survey data

are the container size, the composition of the product range or improved product quality. Automation and labour savings are the main keywords for process innovations. In addition, companies have invested in water storage, biological control and lighting. The organisational innovations include the evolution towards fewer or more staff, working with other

breeders and changes in the legal structure of the company. The examples of marketing innovations are more diverse and include agreements and cooperation with customers, reorientation towards new customers, creating own brands, more contact with customers, home sales, new packaging and sales through mediation. Other innovations include investments in cogeneration plants (heat and power) and the inclusion of non-farm related tasks (Vuylsteke, unpublished).

The identified drivers for innovation are also reflected in the motivations to innovate cited by the respondents. The most important reasons to innovate are the realisation of a higher income and cost reduction (75% of the companies). The most important bottlenecks are market insecurity (59%), lack of time (40%) and insufficient financial means (37%). Farm leaders most often cite inadequate collaboration (37%), lack of support (28%) and insufficient knowledge (27%) as unimportant issues (Vuylsteke, unpublished).

Actors in the AKIS

The farmers are the central actors within the AKIS of the Flemish ornamental plant production sector, but other actors are also involved. Based on the concept of Dockès *et al*. (2011), we make the distinction between research, extension, support systems and education. The growth and development of the AKIS has been a gradual process, building on the elements available. The AKIS studied here has been rather stable since 2006, after consecutive phases of constitutional reforms in Belgium and the process of improved administrative policy within the Flemish government. The following description is a snapshot of the situation at the start of 2012.

Research. Several actors are involved in agricultural research: universities, the Institute for Agricultural and Fisheries Research (ILVO), university colleges and experimental stations. While research related to ornamental plant production is in general embedded within the overall agricultural research done by these institutions, there are also experimental stations that focus upon ornamental plant production (Research Centre for Ornamental plants, PCS) and the preservation of horticultural products (Flanders Centre of Postharvest Technology, VCBT). Similar to the clustering of the primary companies, most research groups involved in the sector are situated in the province of Oost-Vlaanderen.

Extension. Bergen and Van Gijseghem (2010) made an inventory of extension services in Vlaanderen. The results show that the extension landscape in Vlaanderen covers many and diverse activities, which are often sector-related or even sector-specific. The activities are in general relatively cheap or free, but there is a growing trend towards paid but tailored advice. The Flemish government organises collective information or extension activities and (co-)funds training courses by approved centres. The provincial authorities have complementary activities, which for example cover experimental farms and education initiatives. Other services that aim for individual information and guidance are in general offered by private services (especially the Innovation Centre for agriculture and horticulture) or private services with additional government funding (such as the farm advisory system). Also research actors are - to a greater or lesser intent - involved in extension.

Support systems. The support system covers a very broad field of activities. The most relevant actors in Vlaanderen concern the farmers' organisations, which are for many farmers and growers a first source of information. These organisations provide a wide range of services and one of them (the Belgian nurserymen and growers' association, AVBS) is dedicated to ornamental plant production. Other actors within the support system are knowledge networks and study clubs, input providers and cooperatives.

Education. There is no specific education related to ornamental plant production, but the sector is encompassed in the general and agricultural education system. Next to the general secondary education, there are also around 20 technical and vocational schools that offer an agriculture-related education. Topics covered include agro- and green management, forestry, animal care, agricultural mechanisation, agriculture, horticulture, nature and green technical sciences, plant, animal and environment, gardening and animal production. The higher education system is open to anybody with a qualifying diploma and students can enrol at any institute of higher education of their choosing (except for medicine and dentistry, and arts). This education is organised by university and university colleges. Relevant degrees are for example Bachelor and Master of Science in Bio-science, Bachelor and Master of Science in Bio-science engineering and Professional Bachelor in Agro- and Biotechnology.

AKIS instruments and funding schemes

In Vlaanderen, several instruments and funding schemes exist that aim for research and innovation activities. They are targeted at the agricultural sector in general and are thus not specific to ornamental plant production. Distinction can be made between institutional funding and funding schemes. Table 2 gives an overview of the instruments and the respective budgets in the period 2007-2011.

Table 2: Resources available for institutional funding and funding schemes on knowledge and learning processes in Flemish agriculture, 2007-2011 (EUR million).

Funding schemes	Total budget (EUR million)				
	2007	2008	2009	2010	2011
Institutional funding					
- ILVO	16.030	18.039	17.889	18.362	18.753
- Experimental stations	3.790	4.180	3.954	5.303	4.137
Funding schemes					
- Agricultural research grants programme	9.602	9.602	9.602	9.122	10.122
- Demonstration projects on sustainable agriculture	1.180	1.303	0.982	0.922	1.000
- Stimulation of organic agriculture	NA	NA	0.102	0.098	0.435

Source: Vuylsteke and Van Gijseghem (2010)

Institutional funding. The institutional funding concerns the yearly endowments to research institutes to cover (part of) their operational costs. The Ministry of Agriculture and Fisheries provides such funding to ILVO and the 14 recognised experimental stations. Other research institutes, such as universities and university colleges, receive operational grants via the education policy. This funding is general and not specific to agriculture.

Funding schemes. Different types of funding schemes are available in Vlaanderen and at the federal (Belgian) level. These schemes have a fixed logic (for example: funding of fundamental research), but do not have a thematic programming. Three instruments are specific to the agricultural sector:

- The agricultural research grants programme (operated by the Agency for Innovation by Science and Technology, IWT) aims to acquire, integrate and translate knowledge into innovative applications for agriculture and horticulture. The results of the projects must have a clear added value for the entire sector, with an active involvement of the target group (IWT, 2011).
- Demonstration projects on sustainable agriculture are part of the Flemish Programme for Rural Development. They want to stimulate farmers to adopt more sustainable practices through the fast transmission of innovative practices that have left the research phase and are ready for implementation at the farm level. The instrument is operated through thematic calls.
- Funding of research on organic agriculture is also thematic and is funded by the Ministry of Agriculture and Fisheries through tenders and public procurement contracts. The calls are related to the actions within the strategic plan for the organic sector on agriculture and knowledge exchange.

Other funding mechanisms for research and development have an open approach and concern both research projects and personal grants (PhD or post-doc). These instruments – managed by the Research Foundation Vlaanderen and IWT – are open to all research fields and topics. Simultaneously, a trend towards more integrated programming can be found in the agricultural sector, with the White Paper on Agricultural Research (Van Gijseghem *et al*., 2009; Vuylsteke and Van Gijseghem, 2009) and ILVO 2020 (Van Bockstaele and Moens, 2010) as examples.

New AKIS constructions in the Flemish ornamental plant production

This section elaborates upon new AKIS constructions that have emerged in recent years. The aim is to understand which drivers help to realise and improved interaction within and between AKIS subsystems. We thereby focus on four types of initiatives:

- Implementation of more sustainable practices in primary production: *VMS*;
- Improved alignment of research in the sector: *Technopool Sierteelt*;
- Better knowledge transfer and interaction between research and practice: *Sietinet*;
- Co-creation between research and companies: *BEST-select* and *Azanova*.

In the following paragraphs, all initiatives are described in order to understand their logic and the challenge they sought to address.

VMS. The Flemish environmental plan for ornamental plant production (*Vlaams Milieuplan Sierteelt*, VMS, 2012) was established in 1996 in collaboration with the growers' associations. It is a centre for sustainable entrepreneurship which aims to guide ornamental plant production companies towards a future-oriented, socially responsible business that pays attention to the environmental impact and society without losing sight of the continuity of the company and the economic reality. According to the stepwise approach, the evolution is built on registration, reduced use of pesticides, optimisation of the farm management and evolution towards higher certification schemes (in cooperation with the Dutch MPS). The practical design is done together with the companies and on the basis of common experiences. Nowadays, around 90 companies participate in the scheme. If successful, the companies are certified, which not only has environmental benefits but can also lead to improved farm results and market opportunities.

Technopool sierteelt. The *Technopool Sierteelt* (Technopole on ornamental plant production) refers to a declaration of intent between four research institutes: Ghent University, University College Ghent, ILVO and PCS. After a first declaration in 2002, the four partners agreed in 2008 to collaborate more intensively to promote the ornamental plant production sector. The collaboration should lead towards improved knowledge generation, knowledge transfer and the valorisation of knowledge and expertise. The *Technopool Sierteelt* intends to (i) establish and exploit the synergies and complementarities between the research actors involved, (ii) develop a common approach for the establishment of research infrastructures, (iii) realise the optimal use of the available research infrastructures, and (iv) consult and collaborate with regard to the available and future research infrastructures. To make these objectives more concrete, the partnership aims for:

- Initiation and development of a technological platform for ornamental plant production;
- Alignment and elaboration of research skills;
- Joint application for (research) projects and their implementation;
- Support of knowledge transfer towards the primary sector;
- Further expansion of the cooperation with the ornamental plant production sector.

The parties in this collaboration are supported by the Development Agency Oost-Vlaanderen (Gobin *et al*., 2001; ILVO, 2009). The main funding should however come from improved access to project funding. This initiative is perhaps not as visible for the sector as the other networking initiatives, but an improved coordination of research activities and optimal use of infrastructures can only benefit the sector. This is also feasible because of the spatial proximity.

Sietinet. The Ornamental Plant Production Technology and Innovation Network (Sietinet, 2012, *Sierteelt Technologie en Innovatie Netwerk*) is an example of interaction and collaboration between practice (companies) and research. The initiative has grown from the Flemish ornamental companies' strong focus on innovation to take an important role in the world market (including increased international competition). In this situation, technological advances were then important to remain competitive and could be realised through the leading position of Flemish knowledge institutes and their access to scientific knowledge worldwide. Innovative companies in the horticultural industry and nine knowledge institutes joined forces and gave rise to SIETINET in 2004. The initiative was supported by IWT with a grant that covers 80% of the costs, while the remaining 20% is paid by the participating companies. The project funding ended in 2012 and new ways to maintain the initiative are being examined.

In total, sixty ornamental production companies joined the network. They cover different parts of the sector (*in vitro*, young plants and breeding), but are in general rather small and innovative. The access to recently developed techniques in plant biotechnology is realised through the technology consultant employed by SIETINET. Recently developed techniques in the fields of *in vitro* technology and processing, plant physiology and growth regulators, DNA marker technology and genes are made accessible, but the technology consultant can also assist in the innovation process at the farm level. Overall, the actions are very diverse, for example technological advice by telephone, email or farm visit, profound technological advice, workshops, symposia, a newsletter, mailing literature bimonthly and a website (with protected members' area). This variety of interaction has created a dense network with many informal interactions, and illustrates the initiative's success and achievements (Lambrecht, 2011; Sietinet, 2012).

BEST-select* and *Azanova. Finally, there are two initiatives – *BEST-select* and *Azanova* – which serve as examples of the co-creation between plant growers and the primary sector. As the sector is characterised by a constant search for new varieties and novelties, an alliance with research helps to access the latest knowledge of breeding techniques, extensive collections and – above all – very specific skills.

The mission of BEST-select cvba (Best-select, 2012) is to introduce novelties of high quality in the assortment of ornamental plants and to do this under one label. The initiative concentrates on the development of resistant and sustainable cultivars, appealing to the consumer because of their attractiveness. The initiative was founded in 2000 as a loose cooperation between 22 Flemish nurseries and the former Department of Plant Genetics and Plant Breeding (now ILVO). After a successful trial phase, the cooperative organisation was founded in December 2004.

The Azanova initiative (Azanova, 2012) is similar, but involves the collaboration between 21 azalea growers and ILVO to realise innovations in the azalea assortment. These innovations are driven by quality and value for the consumer. AIKO® azaleas were developed at ILVO and are marketed by Azanova cvba. In 2008, Azanova received an award from the Innovation Campaign because of the unique collaboration between various individual companies and a public research institution.

Discussion

Starting from a context of resource scarcity and need for improved knowledge and innovations, the paper has illustrated that ornamental plant production is a unique sector in Flemish agriculture, not only because of the geographical clustering of production and knowledge institutes in the Gent region, but also due to its constant search for innovations and novelties as an answer to the companies' challenges and objectives. The sector can thereby rely on the general AKIS. All identified AKIS subsystems occur in ornamental plant production, but the sector is furthermore characterised by a high degree of networking within and between AKIS subsystems. These networking initiatives are often initiated by the growers themselves, to collectively realise promotion, supply and purchase in the absence of cooperatives in the sector, but also other actors are involved.

Innovation policies and instruments in the agricultural sector are in general specific to the sector. Almost all instruments originate from their own policy field – Agricultural and Rural Development Policy – or concern measures within the general science and innovation policy that have agriculture as the sole beneficiary (Vuylsteke and Van Gijseghem, 2010). An earlier analysis based upon Malerba's sectoral systems of innovation and production (Malerba, 2002) indicated that the innovation instruments in Vlaanderen can in practice not be considered as an innovation toolkit. Instruments are considered in relation to their particular objective and/or by the way they are funded, instead of as a coherent whole that stimulates innovation. The instruments primarily focus on agents on the one hand and knowledge and learning processes on the other. Unfortunately, there are currently no tools that directly stimulate the interaction between subsystems.

A closer look at the developments in ornamental plant production reveals that the innovations in the sector originate from both research and the growers and upstream sectors. The diffusion rate is high, thanks to geographical clustering and the quality of extension services, but also due to the actor's economic situation.

Within the AKIS of Flemish ornamental plant production, each of the elements (education, research, extension and support) is well covered by the actors and their activities. When it comes to the interaction within and between the AKIS subsystems, important differences can be found. In the networking initiatives addressed in this paper, we focused upon the interaction within primary production, within research and the interaction between practice and research. This choice is not a coincidence, but points towards the important fields of action. While each of these initiatives has its own history and logic, they all address shortcomings or niches within the AKIS. And above all, the initiatives show that it is possible to move towards improved interaction within and between AKIS subsystems. It is striking that all initiatives have chosen to focus upon specific interactions within the AKIS and not for a general, overarching strategy. By doing so, the work and objectives were more clear and feasible, but also directed towards specific target groups.

Other interactions, such as the relationships between the research and the support system and between extension and the support system, mainly play at an *ad hoc* and informal

base. The degree of interaction depends to a large extent on the actors involved and the upcoming questions. Education, however, is something else. While there is a clear alignment between the growers and education (producers are formed in the education system, with an evolution towards a higher degree of education of the farmers), the relationship between education and the other elements of the system is rather weak and could be improved significantly. It is thus clear that action is also desirable on these interactions and that – in the end – all new initiatives also interact to realise a real AKIS.

The analysis furthermore illustrated that the AKIS functions separately from knowledge and innovation systems in other economic sectors, such as the food or chemical sector. In many cases, the actors and instruments in the AKIS differ from those in a more general context. The policy context (with the EU Common Agricultural Policy and the Rural Development Policy) is a main driver for this observation, but VRWI (2010) advocates an improved integration of agriculture into the general economic context. Owing to the nature of techniques such as breeding and *in vitro* cultivation, this link is stronger in comparison with other agricultural sectors, but is often not made explicit. Further research is needed to investigate the relationship and interaction between the AKIS and similar systems in other sectors.

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