



Prospects for Farmers' Support:
Advisory Services in European AKIS

AKIS and advisory services in The Netherlands
Report for the AKIS inventory (WP3) of the PRO AKIS project

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Executive summary

The main aim of the report is to provide a comprehensive description of the Agricultural Knowledge and Information System (AKIS) in The Netherlands, with a particular focus on agricultural advisory services. The description includes history, policy, funding, advisory methods and a section on how the Farm Advisory System (FAS) was implemented.

This report represents an output of the PRO AKIS project (Prospects for Farmers' Support: Advisory Services in the European Agricultural Knowledge and Information Systems'). It is one of 27 country reports that were produced in 2013 by project partners and subcontractors for compiling an inventory of Agricultural Knowledge and Information Systems. AKIS describe the exchange of knowledge and supporting services between many diverse actors from the first, second or third sector in rural areas. AKIS provide farmers with relevant knowledge and networks around innovations in agriculture. Findings from the 27 country reports were presented at three regional workshops across Europe in February and March 2014, discussed with stakeholders and experts, and feedback integrated in the reports.

The Dutch system is the most efficient agricultural sector in the European Union: with only 133.708 annual work unit, 68.810 holdings and 1.841.700 ha of UAA (CBS 2013), this small country produces 6.2% of the EU's Agricultural goods outputs (while it possesses only 1.1% of the total EU-27 UAA), with an agri-food export of 80 billion EUR in 2012 (Eurostat 2013).

The average size of farms in the Netherlands in economic terms is relatively high compared to other countries, whereas the size of the farm in terms of hectares is not as high (about the 58% of Dutch farms are under 20 ha and the UAA per holding was 25.9 in 2010). This reflects the intensive use of land, with the use of high inputs of both capital and consumables per hectare.

The Dutch AKIS is a very dynamic system, presenting private extension services with direct payments from farmers, coupled with state funding for research and for improving different forms of *Public Private Partnership* and actors networking.

The relevant AKIS literature and the interviews highlight the central role of agricultural entrepreneurship with high educational levels and willingness to pay for advisory services. The Dutch farmers are heavily involved in processes of knowledge co-production and innovation through peer to peer information exchange. More and more farms are becoming real corporations and the growing power of agribusinesses operating throughout the whole agri-food chain is also evident in the knowledge systems, influencing the R&D demand, the innovation policy, the educational funding, etc.

The Dutch AKIS experiences a great crossbreeding of functions with respect to the classical roles. This aspect makes it difficult to have a comprehensive and clear profile of the players involved. In addition the geographical boundaries of the AKIS actors are not well defined, due to the increasing internationalization that concerns all the players without distinction.

The Dutch extension service includes a multitude of actors with very different characteristics. They are mainly private firms or farmer based organisations (cooperatives, farmers' unions or study groups); to a lesser extent the providers could also be R&D institutions, NGOs or Foundations. Some advisors have only recently entered the market, while the leading provider,

DLV, has a long history in the field (although its organisation and its function have completely transformed over time). Some actors do not provide agriculture extension services as their core business product/activities, such as the more classical downstream/upstream industries or the consulting companies that have recently diversified their business portfolio by entering the agricultural advisory market or even ICT companies developing farm management software.

The services market is a very competitive arena, increasingly affected by a trend of internationalisation. Some advisors also work outside the Netherlands or have foreign business units.

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List of Acronyms

Acronym	Explanation
AIA	National Breeders' Association
AKIS	Agricultural Knowledge and Information/ Innovation Systems
ANVUR	National Agency for the Evaluation of Universities and Research Institutes
APA	Provincial Breeders Association
ASSOCAP	Consorzi agrari Association
AWUs	Annual Work Unit(s)
CAA	Agricultural service center
CAF	Tax assistance center
CIA	Italian farmers confederation
CIDA	Interregional Committee for Agricultural Advisory
CIFDA	Interregional Training Centre for Agricultural Advisory
COMPAG	National Federation of Agriculture Products Traders
CNR	National Research Council
FAS	Farm Advisory System
HNV	High Nature Value Farming Systems
INEA	National Institute of Agricultural Economics
ISMEA	Institute of Services for the Agricultural and Food Market
ISTAT	National Institute of Statistics
GAEC	Good Agricultural and Environmental Conditions
GDP	Gross domestic product
MIPAAF	Ministry of agriculture forestry and food policies
MIUR	Ministry of Education, University and Research
NGO	Non-Government Organisation
POs	Producer Organisations
R&D	Research and Development
TAA	total agricultural area
UAA	Utilised Agricultural Area
UNIMA	National Union of Agricultural Mechanisation Companies

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1. Main structural characteristics of the agricultural sector

The Netherlands is one of the world's largest exporters of agricultural and food products, despite the fact that it is a very small country (41.528 km²) with a high average population¹ density (over 400 persons per km²).

The Dutch system is the most efficient agricultural sector in the European Union: with only 133.708 annual work units, 68.810 holdings and 1.841.700 ha of UAA (CBS 2013)², this small country produces 6.2% of the EU's Agricultural goods outputs (while it possesses only 1.1% of the total EU-27 UAA), with an agri-food export of 80 billion EUR in 2012 (Eurostat 2013).

The whole Dutch agri-food cluster represents a gross added value of approximately 10% of the GDP, including processing, trade and services, while the Agriculture's contribution to GDP is around 2% (CBS, 2013). The sector has a strong international focus and accounts for almost 20% of the Netherlands' total export value, and as a result is of central importance to the Dutch economy.

In the last few decades the number of agricultural holdings reduced greatly (-15.8% between 2003 and 2010, Eurostat), while the land used for agriculture reduced less significantly (-6.7% between 2003 and 2010, Eurostat), reflecting a long-term trend of declining numbers of small farms together with an increase in farm size and productivity. The most important driving forces of this large decline and concentration are: the lack of availability of a successor, the age distribution and the technological innovations including labour-saving techniques (LEI 2013). Only 18.3% of Dutch farmers were older than 65 in 2010, compared to 29.5% in EU-27 (European Commission 2013). The participation of women in agriculture is lower than in other economic sectors. Five percent of workers in the agricultural holdings were women in 2007 (Eurostat 2013), and 34.7% of the labour force in farm holdings of more than 2 hectares 34.7% were women (European Commission 2013).

In recent decades Dutch farm holdings are becoming more specialized with a regional concentration of sectors, mainly connected to the variety of soil types. In fact, the greatest concentration between 2000 and 2012 was in the number of combined holdings (almost 60%).

The average size of farms in the Netherlands in economic terms is relatively high compared to other countries, whereas the size of the farm in terms of hectares is not as high (about 58% of Dutch farms are under 20 ha and the UAA per holding was 25.9 in 2010). This reflects the intensive use of land, with the use of high inputs of both capital and consumables per hectare.

Agriculture intensely competes with alternative land users (housing, infrastructure, recreation and nature). In spite of these strong pressures, two thirds of the land area is still in agricultural use. In 2012 grassland (permanent, temporary and natural) occupies 54% of cultivated land, green fodder crops 13%, other arable land 28%, open-field horticulture 5% and greenhouse

¹ The total population is 16.779.575 in 2013, CBS 2013.

² Since 2010 the Dutch agricultural census has included only holdings above 3 NGE (Nederlandse Grootte Eenheid). The NGE is the Dutch equivalent of the European size unit, but it is influenced by the differences in inflation, for instance in 2007 the NGE was 1420 euros. To have an idea in 2007 all holdings above 3 NGE were about 77.000, while about 91.000 farms holdings were registered in the National Farm Register including all holdings engaged in agricultural activities. To comply with the requirement of EU Farm Accountancy Data Network, from 2010 the Netherlands census includes holdings above 3 Standard Output (SO).

horticulture 0.5%. The Netherlands is a world leader in the production of seed potatoes (22% of the world's potato exports), grass seeds and wholesale trade in cut flowers and pot plants. Dairy farming is also very important. The sector uses about 60% of the UUA of the Netherlands. Milk alone accounts for 17% of the production value of Dutch agriculture. The Dutch dairy sector has 20.000 farms with nearly 1.5 million cows. The Netherlands has the highest density of pigs and cattle per area of EU 27.

In the past few decades, Dutch agriculture has succeeded in maintaining its leadership in the world market by continually investing in innovations. For instance, the Dutch greenhouse horticulture industry has a lead over international competitors in high-tech innovation (such as innovation in production systems and automation, in reduction in energy consumption and sharing limited space). The high efficiency and productivity of the agricultural sector has had negative environmental effects, especially environmental pollution (due to the intensive use of pesticides and artificial fertilizers), loss in biodiversity and natural habitats deconstruction³. In recent years there has been a growing dualism between developments towards 'upscaling' on the one hand and 'downscaling' on the other: large companies have become more and more efficient at bulk production for the world market, while smaller companies focus on social services and multifunctional agriculture, such as hospitality, tourism, health care, retail, landscape and water. In 2009 multifunctional agriculture accounted for sales of € 411 million (<http://www.government.nl>). They mainly sell products on the local market and their customers are also local authorities. The direct economic effects of multifunctional agriculture in the Netherlands are relatively small when compared to primary agriculture, and they vary between the Dutch regions (Heringa 2012). Considering the distribution of the CAP expenditure 2007-2011, only 7% is devoted to rural development (while it is 23% of EU27). According to the framework adopted to represent MFA in the PRO AKIS project, the relations between Productivity, Environment, and Food Safety are the priorities of Dutch agricultural policy, including agricultural R&D and AKIS policies (Figure 1 Appendix).

³ According to the Netherlands Environmental Assessment Agency (MNP) the Dutch Natural Capital Index (NCI) in 2007 was 18%. So roughly speaking, 18% of the average abundance of the original species remains in comparison with the baseline state. The NCI for agricultural land was 17% (<http://www.pbl.nl/en/>).

2. Characteristic of AKIS

2.1 AKIS description

The Dutch AKIS is a very dynamic system, presenting private extension services with direct payments from farmers, coupled with state funding for research and for improving different forms of *Public Private Partnership* and actors networking.

The relevant AKIS literature and the interviews highlight the central role of agricultural entrepreneurship with high educational levels and willingness to pay for advisory services. The Dutch farmers are heavily involved in processes of knowledge co-production and innovation through peer to peer information exchange. More and more farms are becoming real corporations and the growing power of agribusinesses operating throughout the whole agri-food chain is also evident in the knowledge systems, influencing the R&D demand, the innovation policy, the educational funding, etc.

The Dutch AKIS experiences a great crossbreeding of functions with respect to the classical roles: the actors who traditionally do research have begun to provide services; advisors may perform applied research, the University works as a facilitator in innovation processes, etc. This aspect makes it difficult to have a comprehensive and clear profile of the players involved. In addition the geographical boundaries of the AKIS actors are not well defined, due to the increasing internationalization that concerns all the players without distinction.

Together with a denationalization process, agriculture and agricultural knowledge is undergoing a desectorialization. The success of a systemic approach in the literature, together with the increasing integration of agriculture in the agribusiness sector are the major driving forces of this trend which is clearly evident in the use of the word "green education", but also in the merger, in 2010, of the Ministries of Economic Affairs and Agriculture, Nature Management and Fisheries into the Ministry of Economic Affairs, Agriculture and Innovation. Since 2012 this Ministry is again called the *Ministry of Economic Affairs* (in Dutch: *Ministerie van Economische Zaken*; EZ). The following description summarizes the major actors in the Dutch AKIS.

2.1.1 Education

In The Netherlands, agricultural education is embedded in the so called *green education* (agriculture, nature and food) and is organized through close cooperation with the agricultural sector, under the responsibility of Ministry of EZ.

The green education is subject to the regulatory framework of the Dutch education system (Fig. 1 Annexed), thus the secondary education includes pre-vocational education (VMBO) programmes (four years), that combine general and vocational education and prepare pupils for senior secondary vocational education and training (MBO- four years).

The Netherlands has 110 green schools (76 VMBO/MBO establishments and 33 comprehensive schools that offer VMBO-green training), coordinated in 12 Agricultural Education Centres (AOCs) and one Regional training centre (ROC) with MBO-green.

Higher education is provided by two institutions: Research universities and Universities of applied sciences (Hoger Beroepsonderwijs- HBO). Research universities are primarily focused on research-oriented programs, while HBO are more practice oriented, offering programs of higher professional education to prepare students for specific professions. There are 5 HBOs providing green curricula (4 HBOs-green and one university of applied sciences with a green department) and only one green Research University (Wageningen University). In Utrecht University there is a Faculty of Veterinary Medicine.

According to the Dutch Inspectorate of Education, in the year 2011/2012 there were 78,300 green education students (31,700 enrolled in VMBO, 30,500 in MBO, 9100 in HBO and 7000 in Wageningen University).

In addition, the Practical Training Centre (PTC+) provides supplementary and specialist education for horticulture, livestock and other specialized areas. This organisation offers courses and training programmes not only in the Netherlands but all over the world.

To improve its attractiveness and to suit the labour market⁴ better, in recent years, the agricultural education has been involved in a process of change along the following lines: de-sectoralization (from agriculture to green education), externalization (more extramural activities, more external funding, more demand oriented), cooperation (more close relationship with research and private sector and between the education institutes⁵), internationalization (more involvement in international projects, promoting students mobility, enhancing the attractiveness to foreign students and funding) (Kupper et al. 2012).

2.1.2 Wageningen University and Research Centre

Wageningen University and Research Centre (WUR) is the consortium of the Wageningen University, the DLO Research Foundation and the *Van Hall Larenstein*, University of Applied Sciences (VHL). The DLO agricultural research institutes (Stichting DLO) used to be divisions of the old Ministry of Agriculture⁶. In the second half of the 1990s, they became independent from the Ministry forming the DLO Foundation which subsequently merged with the Wageningen University to form WUR. Up until November 2012, VHL was also a part of this consortium. The members are separate (legal) entities, but they are integrated into five Science Groups⁷. Apart from the main complex in Wageningen, WUR are found in other locations throughout the Netherlands (30 in total) and beyond.

⁴ The *green students* are relatively few (around 5%) respect to the total students population, while according to the Council for Agricultural Vocational Education the green sectors has a market potential of 15%. In addition the number of students declines from low to high level green education (Kupper et al. 2012).

⁵ For instance, in collaboration with professional higher education, several AOCs have developed new programs redesigning the VMBO – MBO – HBO learning pathway as if it were a single program, the so called “Green Lyceum” (AOC 2009). In 2012, the Van Hall Larenstein University of Applied Science, became part of WUR.

⁶ The nine institutes of Stichting DLO are: AFSG (Agrotechnology & Food Sciences Group), Alterra (in the field of green living environment), ASG (Animal Sciences Group), CIDC (Central Veterinary Institute Lelystad), LEI (Agricultural Economics Research Institute), PRI (Plant Research International), RIKIL (Institute of Food Safety), Wageningen IMARES (Institute for Marine Resources & Ecosystem Studies).

⁷ The Science Groups are: agrotechnology & food, animal, environmental, plant and social sciences. Each Group consists of a Wageningen University department and one or more application-oriented DLO institutes.

In 2012 WUR employed 6495 staff (5653 full-time equivalent employees-FTE)⁸.

A large part of the WUR total budget (more than 50%) is provided by the Ministry of EZ (Tab 1 Annexed). In 2012, the budget of WU was 304 million EUR. The so called first flow, consisting of direct Government funding including research and education (based on the number of students), represented 55% of total budget. The contract research used 35% of the total budget, including the so called second and third money flows. The second flow consists of government subsidies which universities (individual researchers and research projects) must apply to and co-finance. The third money flow is a financial input from the industry and from public sector to perform contract research. Tuition and course fees provided 7% of the total University funds. The DLO Institutes, in 2012, received 40% of their total funding by the Ministry of EZ and 45% by contract research from private and public donors.

In addition to research and education (and well integrated with the other functions), the third task of the WUR involves the dissemination of knowledge to make the research results useful for the larger society. WUR follows a well-defined knowledge valorisation strategy which, among other things, should make WUR employees and students more aware of intellectual property (IP) and valorisation opportunities⁹. Valorisation of knowledge, in many cases, is achieved in collaboration with industrial partners and, in some cases, new enterprises (spin-offs) have been established on the basis of WUR's IP.

WUR is considered to be a Third Generation University, adopting an integrated and systemic approach that combines social and natural science to develop knowledge, skills and competences needed to society¹⁰. The WUR is able, and flexible enough, to work with very different partners including those from the private sector (Rabbinge et al. 2009). WUR also acts as a facilitator within the new Dutch knowledge infrastructure, as in the case of Network greenhouse Innovation network Nieuwe Energie Systemen (INES) [New Energy Systems] in North Limburg or in the dairy sector programme Netwerken in de Veehouderij (Wielinga et al. 2009).

2.1.3 Research and development (R&D)

The Netherlands has a world-renowned knowledge infrastructure in agricultural R&D. The main actor for executing agricultural research is WUR, but a variety of other organisations, including public, private and non-profit institutes, carry out research in agriculture and food production. For some, research is their main task, while for others it supports their main task. A characteristic of the Dutch R&D institutions is that they generally operate globally. Aside from WUR, other major R&D executors are:

- TNO (Netherlands Organization for Applied Scientific Research), a non-profit company with 3,900 employees;

⁸ In Wageningen University the total staff was 2639,5 FTE (1555,4 FTE of total academic staff, 588,6 FTE of support and administrative staff and 463,2 FTE total general services).

⁹ Various tools are already available, such as an IP strategy, IP management, business development services, and a valorization centre that supports starters in the agro-food field.

¹⁰ In the last years, WUR has further developed a strong strategy for international cooperation. WUR's international activities in 2012 covered a range of projects in various fields, from smaller projects to multi-million euro projects, in more than 110 countries worldwide. In addition the WUR has also a centre of excellence in Chile and an office in China.

- NIZO food research, a research company with 200 employees;
- the Louis Bolk Institute, an international knowledge institute focused on sustainable agriculture, nutrition and health. Due to the merger with Agro Eco in 2008 it also provides advisory services to transfer knowledge into practical knowledge and applications. The institute has more than 50 employees and about 20 freelancers; the National Institute for Public Health and the Environment, a governmental research institute of public health and environment. It has a total of approximately 1500 staff.

Historically there is intensive cooperation between the private sector, scientific institutes and the Government. Successful examples of this cooperation are the Top Technological Institutes (TTIs). Two TTIs are active in the agri-food field (Food & Nutrition and Green Genetics¹¹), hosted by the WUR. They stimulate private companies to cooperate with research and education institutions by giving financial support to joint research projects.

Private investment in agri-food R&D is 0.06% of the Dutch GDP and 12 of world's top 40 Food & Beverage businesses have R&D facilities located in the Netherlands (such as Unilever, Heineken, VION, etc.) (Schans 2013). Many actors of upstream and downstream industries have their own research centres.

According to our interviewees, the Royal FrieslandCampina which is the largest Dutch dairy cooperative and currently employs some 400 R&D professionals most of whom work closely with dairy farmers /members.

These companies and research centres are mainly found in the Food Valley, a regional agri-food cluster in the region surrounding Wageningen concentrated around WUR. Within a 50km radius the cluster includes over 70 food enterprises and around 1400 other companies associated with the food industry. 15,000 scientists and engineers engaged in R&D activities (the total number of people working in Food Valley is about 20,000) give the valley the highest density of food scientists and researchers in the world. In 2004, Food Valley NL, a cluster organisation, was funded by the Dutch business community and Government to promote the innovativeness of Dutch companies by fostering cooperative links between business, knowledge institutions and Government¹².

There are also several organisations supporting and facilitating R&D, such as Academic libraries and Koninklijke Bibliotheek (the national library of the Netherlands), as well as the NL Agency (a division of the Ministry of EZ that carries out policy and subsidy R&D programs), the NARCIS (the science portal of the Royal Netherlands Academy of Arts and

¹¹ "Since its establishment in 2007, TTI GG has supported joint research projects by companies and knowledge institutions with a total budget of € 46 million and has made a contribution to several new initiatives in the field of education. 65 research projects were initiated, involving 140 partners – knowledge institutions and companies, from SME's to multinationals – putting well over 150 scientists to work. The results of the TTI GG projects have been, and will be materialized in patent applications, spin-off companies, PhD dissertations, scientific publications and of course further research by companies and universities" (<http://www.groenegenetica.nl/site/public/go/default.aspx?rid=1>).

¹² Food Valley NL is a public-private partnership, its main funding stems from Government, whereas companies contribute by paying a membership fee. The about 100 members of FVO include SMEs (62%) and large companies (38%). The companies differ in size from 1 employee to over 10.000 employees.

Sciences that lists research organisations in the Netherlands) or the Statistics Netherlands (CBS) that collects, edits and publishes statistics for practice, policy and science.

2.1.4 Extension services

The Dutch extension service includes a multitude of actors with very different characteristics. They are mainly private firms or farmer based organisations (cooperatives, farmers' unions or study groups); to a lesser extent the providers could also be R&D institutions, NGOs or Foundations. Some advisors have only recently entered the market, while the leading provider, DLV, has a long history in the field (although its organisation and its function have completely transformed over time). Some actors do not provide agriculture extension services as their core business product/activities, such as the more classical downstream/upstream industries or the consulting companies that have recently diversified their business portfolio by entering the agricultural advisory market or even ICT companies developing farm management software.

The services market is a very competitive arena, increasingly affected by a trend of internationalisation. Some advisors also work outside the Netherlands or have foreign business units.

Despite the large number of providers, after privatization some sub-sectors/fields are no longer covered by the provision of advice because they are considered to be unprofitable, such as the goat and sheep sectors (Labarthe 2006).

2.1.5 Regulatory framework

Different institutions contribute to define the Dutch AKIS regulatory framework, including international governing authorities (EU, WTO, etc.), national Ministries and independent Advisory councils (likes the Council for the Environment and Infrastructure -Rli¹³, the Advisory Council for Science and Technology Policy¹⁴, etc). Among the major public institutions for inspections, control, certification there are: the Netherlands Food and Consumer Product Safety Authority (NVWA), the Netherlands Controlling Authority for Milk and Milk Products (COKZ), the Animal Health Service (GD), the Netherlands Inspection Service for Horticulture (Naktuinbouw) and the Dutch General Inspection Service for Agricultural Seeds and Seed Potatoes (NAK).

The environmental and spatial regulations are also very important in defining the agricultural framework, they are shaped by different actors such as the Netherlands Environmental Assessment Agency (PBL)¹⁵.

¹³ The Council for the Environment and Infrastructure (Rli) is the primary strategic advisory board for the Dutch government and parliament in matters relating to the physical environment and infrastructure.

¹⁴ The Advisory Council for Science and Technology Policy advises the Dutch government and parliament on policy in the areas of scientific research, technological development and innovation.

¹⁵ The Netherlands Environmental Assessment Agency (PBL) is the national institute for strategic policy analysis on environment, nature, and spatial planning issues of national and international significance.

2.2 Policy framework

The Dutch government supports the AKIS through investment in education and research, but also in public-private partnerships to promote innovation and knowledge exchange. The Government also invests in dedicated support organisations such as Food Valley NL and Innovation Programs.

In 2011 the Dutch government (together with entrepreneurs and researchers) launched a new national R&D strategy: the so called *Top sectors approach*. The Ministry of EZ identified nine key sectors¹⁶, which are characterised by a strong market and export position and high knowledge intensity, to strengthen their international competitiveness by investing further in knowledge and innovation. The *Top sectors* include horticulture and propagation materials and agri-food. The related policy measures are aimed at promoting closer cooperation between knowledge institutes, businesses and public authorities in the programming of fundamental and applied research. In 2012 the Government invested 1.3 billion EUR to these sectors and it plans to increase the allocation to 2 billion EUR in 2015. The finances are allocated to fund venture capital, innovation loans and tax deductions to stimulate the private firms spending on R&D¹⁷.

The *Top sectors* policy foresees that entrepreneurs and researchers collaborate on innovative products in "Top consortia for knowledge and innovation" (TKI). The Government supports these consortia by providing an annual contribution of 90 million EUR with the operational objective to increase the application of knowledge in/by SMEs.

This *new enterprise policy* is seen as the successor to *innovation policy* adopted in the previous period. The Court of Audit, in its published report about the effectiveness of innovation policy in the Netherlands for the period 2003-2010, concluded that "the efficiency and effectiveness of innovation policy cannot be determined"¹⁸ and recommended that the coordination of Ministry of EZ needs to be improved.

¹⁶ The top sector are: life sciences, energy, water, chemicals, horticulture, food agriculture, high-technology materials and systems, logistics and creative industries. Another area of focus is head offices.

¹⁷ For each top sector has been created a top team, including researchers, to identify concrete proposals to put in the Innovation contract. These documents set out arrangements and financial agreements between businesses, researchers and the Government to develop public-private partnerships. In addition the *Human capital agenda* includes proposals on how to strengthen the link between education, labour market and lifelong learning. The innovation contract of the Topsector Agri-food (*Agro&Food: de Nederlandse groeidiament*) gives direction to market-driven top-quality research and innovation, identifying objectives of 11 innovation themes (such as food safety, health and international business development) to reach until 2016. Topsector Agro&Food has a budget of 195 million EUR, that is financed 61% by the Dutch government, 31% by the agri-food industry and 8% by the European Union. In the innovation contract of the sector horticulture and propagation materials, the industry has planned to contribute with 130 million EUR to public-private partnerships and the Government with 60 million EUR for the years 2012-2013.

¹⁸ "The number of grant schemes to promote innovation has increased sharply in recent years. There is no coherence, however, between the schemes and the goals. Most evaluations do not include the information necessary to assess the efficiency and effectiveness of expenditure on innovation policy. Most evaluations, for example, provide little information on a scheme or instrument's effectiveness: the increase in innovative strength. In the period 2003-2010, no policy reviews were made of the effectiveness of innovation policy. Furthermore, evaluations did not consider all economic externalities and only minimal attention was paid to the coherence between Dutch and European innovation instruments and goals", Court of Audit (Algemene Rekenkamer) (2011). http://www.courtfaudit.nl/english/Publications/Audits/Introductions/2011/09/Innovation_Policy.

2.3 Governance and coordination structures

In the old so-called OVO-triptych, Education (“Onderwijs”), Extension (“Voorlichting”) and Research (“Onderzoek”) used to work closely under the the aegis of the Ministry of Agriculture and their interconnections were well defined through a clear institutional arrangement. After the privatisation of extension, several *market failures* and *system failures* occurred. This resulted in the disintegration of the knowledge system and a lack of knowledge towards farmers (Leeuwis, 2000). To tackle these market and system failures several brokering network initiatives emerged. After the privatisation the Dutch Government tried to establish the first central innovation broker, but this attempt failed because it was not considered to be impartial due to the close connection to public sphere (Wielinga 2001). Thus in a previous time the brokering network initiatives *“don't appear to be the result of coherent policy. Rather they have resulted from dispersed initiatives that in turn have been fed by general policy discourse. Recently a more coherent policy with regard to public support for innovation brokers appears to have been developed”* (Klerkx and al. 2009). In fact the Government in the last few years has supported these initiatives, funding several programs including innovation brokers, at national, regional and local levels, such as in the case of InnovationNetwork¹⁹. In some cases the public sector participates as stakeholders in the knowledge networks that could involve a wide range of actors, either private (research and extension providers, farmers’ organisations) or public. In other cases, only the Government participates during the launch of the initiative, such as in the case of the Green Knowledge Cooperative (GKC). Following the classification proposed by Klerkx and Leeuwis the numerous functions of innovation brokerage were reduced to three generic functions: demand articulation²⁰, network composition²¹ and innovation process management²².

The recognition of the value of innovation brokers in the Netherlands is evident in several studies (Klerkx et al. 2008, 2009a, 2009b; Batterink et al., 2010), that consider their influence *“on the way innovation arrangements are organised (roles, responsibilities and patterns of interaction) and how routine working practices and policies (institutional setting) have changed. No studies have been carried out so far on the economic efficiency of innovation brokers. Such a study is not easy to carry out given their rather intangible and behind the scenes mode of operating”* (Klerkx et al. 2009a).

Klerkx and Leeuwis also identify several tensions within the Dutch innovation broker sector concerning: the neutrality, functional ambiguity, legitimacy, funding and willingness to pay.

¹⁹ InnovationNetwork was set up by the Ministry of EZ and it is also affiliated with this, but it fulfils independently its tasks, under the management of its own board. InnovationNetwork works within three domains: Agriculture & Horticulture and Agribusiness, Nature, Landscape and Space and Nutrition. Within the agriculture, horticulture and dairy farming sectors we are also pursuing a series of themes in alliances with the business community as well as with such organizations as Kiemkracht, which is a program that involves also LTO Nederland and NAV (the Netherlands Agriculture Union).

²⁰ Articulating innovation needs and visions and corresponding demands in terms of technology, knowledge, funding and policy, achieved through problem diagnosis and foresight exercises (Klerkx et al. 2009a).

²¹ Facilitation of linkages amongst relevant actors, i.e., scanning, scoping, filtering and matchmaking of possible cooperation partners (Klerkx et al. 2009a).

²² Enhancing alignment in heterogeneous networks constituted by actors with different institutional reference frames related to norms, values, incentive and reward systems (Klerkx et al. 2009a).

Sometimes these tensions affect the smooth operation of innovation brokers and networks (Klerkx et al. 2009a).

2.4 AKIS diagram

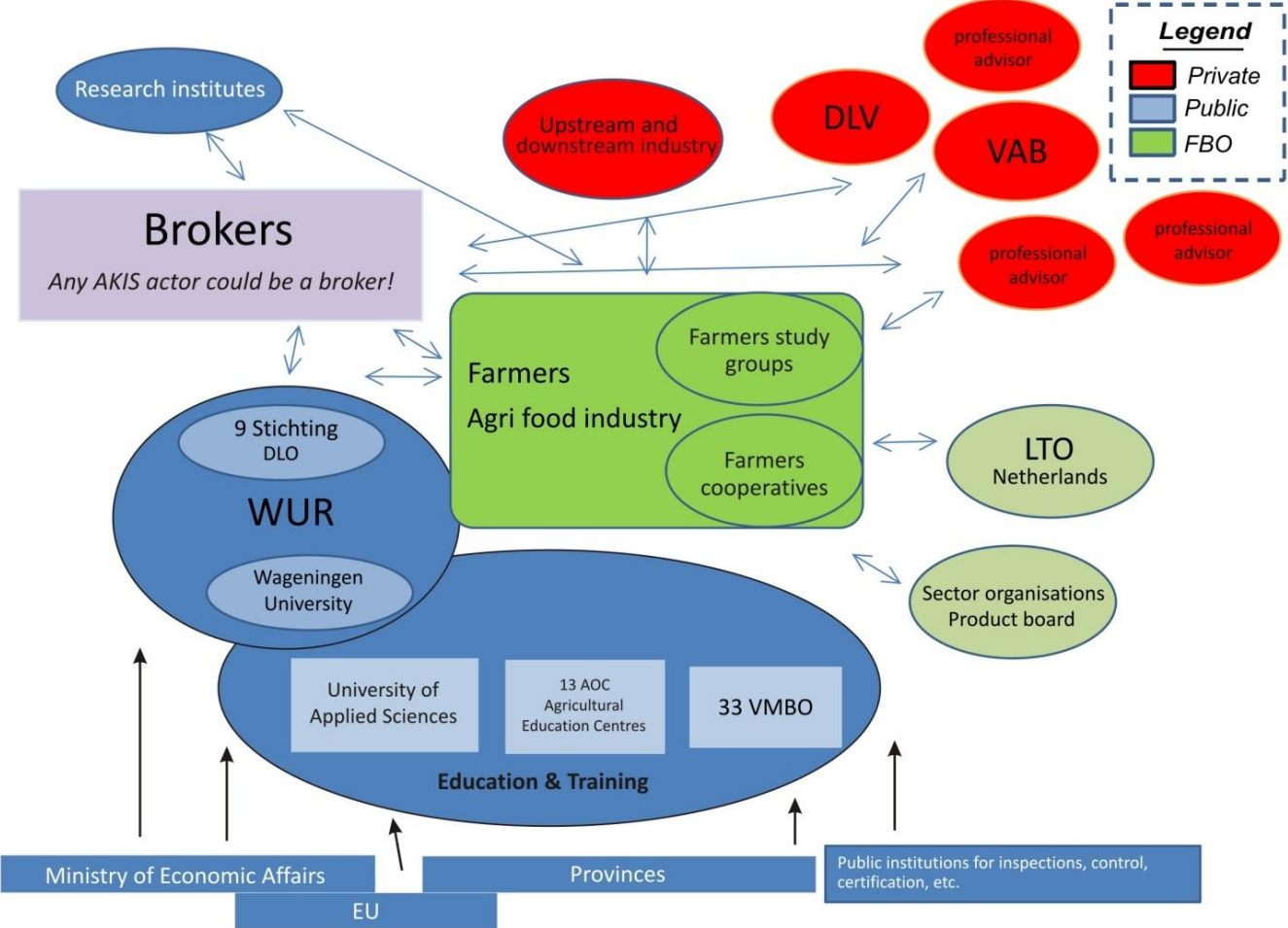


Figure 1. Overview of AKIS actors in The Netherlands

3. History of the advisory system

In 1906, the Dutch government officially established the rural extension service, as a response to the agricultural crisis which greatly affected the Netherlands in the late 19th century. At the time, the Dutch Government starts to delineate the so-called OVO-triptych, investing in public education, extension and research and creating strong connections between the three areas.

The OVO-triangle was strongly supported after World War II, when food security became a high priority task within national policies. The public organisation Dienst Landbouvoorlichting (DLV) was fully financed by the government and the number of its advisors significantly increased. DLV was supported by an extensive network of committees at national and international levels, in which the most important stakeholders were represented²³.

During the 1980s the Government decided to privatise extension services through a gradual transition. These changes came about for various reasons, emphasised by different authors (Proost and Roling 1991, Wielinga 2001, Rivera 1993, Roseboom and Rutten, 1999). First of all, in the 1980s and 1990s the general Dutch policy was influenced by the global trends of neo-liberalism and privatisation, and followed the general principles of "less government and more market" and "user-paid-services".

Between 1975 and 1984, the overproduction and the negative environmental impacts of intensive agriculture became more and more evident. In 1982 the Ministry of agriculture also became responsible for natural conservation and open air recreation, focusing more on the sustainable development of the agricultural sector. The first legal restrictions on farm management showed a discrepancy of interests between farmer's goals and Government objectives. The growing tensions among these actors revealed the ambiguous and problematic position of public advisory services. The DLV had a double, and sometimes conflicting, role: to give advice to farmers and to implement the government objectives.

In the meantime the concept of knowledge was changing, with a growing recognition of its interaction with nature. Also, the increasing power of multinational corporations led to a transformation of the knowledge agricultural system which became much more dependent on the needs (and inputs) of the industry, stimulating the transition from knowledge-driven towards demand-driven research.

Finally to remain competitive in the increasing global market, it was necessary to improve the efficiency and the efficacy of the Dutch agricultural knowledge system further. All these factors, together with the emergence of neo-liberal policies, converged in the extension privatisation and strong redefinition of the OVO-triptych.

²³This phase, from 1956 to 1975, is called by Wielinga as the "flourishing" of Dutch agriculture that conquered a strong position in agricultural world market. Government and farmers association supported a well-integrated knowledge system, resulting in an extraordinary innovative agricultural sector. The increase of productivity was mainly driven by economies of scale and introduction of new technology (Wielinga 2001).

The privatisation process was much more radical than expected²⁴. In 1990 DLV became an independent service of the Ministry of Agriculture. After 1993 it was converted into a Foundation with 750 employees and farmers starting to pay for services.

From 1993 to 1998, 60% of the DLV budget was financed by farmers and the rest by the Ministry on a contract. The DLV's own capital was around 10 million EUR.

From 1998 to 2004 DLV became a limited company, with 82% of shares held by Ministry of agriculture, later on by Finance Department, and 18% of shares held by personnel.

The governmental contribution to DLV budget decreased rapidly, to just 15% in 1999, and since 1995 all the lump-sum subsidies were cut. Until 2000 the Dutch Government maintained a direct bilateral financial contract with DLV for specific project/programs, and subsequently government contracts for the provision of extension began to be tendered in the open competitive market. In 2005 the DLV became a holding company, in order to spread of the risk management and to improve the organisation's entrepreneurship.

During the privatisation process a major restructuring of DLV occurred with staff numbers being cut from 750 employees in 1993 to 400 in 2005. Some of the field extension personnel were transferred to the farmer associations; others were absorbed by the Ministry of Agriculture. Finally some of the employees were also dismissed or placed in early retirement.

The extension privatisation also changed the focus, the users and the way of providing services, and it also changed the knowledge management and the relations between the AKIS actors (see section 4.8).

In recent years, many new extension companies were created to provide extension services in agriculture and related fields, such as construction, meteorology, food quality system, countryside.

²⁴ The original program was to arrive in ten years to fund DLV through 20% of direct payment for advice, 30% of levies farmer organizations and 50% of government subsidy.

4. The agricultural advisory service(s)

This section contains a non-exhaustive description of the main agricultural extension providers in the Netherlands. A full description of the providers is very difficult to achieve for different reasons: one is that they are private actors for which there is no official census. In addition, the advisory arena shows a strong dynamism, changing extremely quickly and becoming increasingly globalized, and as a result many AKIS actors developed a hybrid identity as they perform different functions from the original tasks and many new actors that traditionally were active in other areas/sectors break out into the advisory market. Finally the strong competition that exists within the advisory market may make the players less inclined to give out internal information.

4.1 The upstream and downstream industry

The upstream and downstream industries can play a very important role in providing agricultural extension services, although there are no statistics available on this.

The Dutch upstream industry is highly innovative and has an internationally leading position for different products, such as ingredients, enzymes, animal breeder material and biological crop protection²⁵. Furthermore, the Netherlands is a global market leader in machinery such as that used for poultry processing, red meat, bakery and cheese production.

In some sectors, the role of these industries as extension providers is particularly important, for example in the case of pork production chain, where in many cases the pig semen supplier is also the buyer of the fully grown pigs. Another example is the large scale open air growing of vegetables which is mostly governed by a strict contract with detailed instructions and requirements provided by the processing industries.

The role of Dutch Food Retailers is also growing in importance within the agricultural innovation process, due to the high concentration of trade (5 players control more than 90% of the market), their high buying power and the development of retail labels²⁶.

4.2 Private professional advisors

DLV Advisory Group is the largest Dutch consultancy firm, providing technical, economic and management advice to farmers and other agri-food businesses, as well as consultancy services to private and public institutions. As mentioned earlier, it used to be a Government institute, and now the DLV is a holding company to the five business units (Plant production, Animal production, Chain management, Construction, technology and environment, Countryside). The core of the DLV business over the years has expanded widely to include all the technical, economical and environmental issues required to optimize farmers' production

²⁵ For example, in 2011 The Netherlands produced 1.5 million tonnes of nitrogenous fertilisers (N) and 122500 tonnes of phosphate fertilisers (PO). More than 90% of Dutch production is exported. The fertiliser industry generates a turnover of approximately 1 billion EUR and provides jobs to 2.000 employees. While the animal feed industry is the third largest segment of the food and beverages industry (LEI 2013).

²⁶ A clear example is the Beter Leven (better life) concept, developed by the animal protection society (Dierenbescherming), in cooperation with retailer Albert Heijn and meat company Vion, to promote the introduction of higher welfare standard in livestock farming with slightly higher price. Further other retailers and companies have followed the some green marketing concept (Tepic et al. 2012).

(such as energy, soil and water management or farm construction). It employs about 500 people. The advisors work in teams, and since 2005 a Management by objectives (MBO) has been adopted. Each advisor is responsible for the contracts with farmers and has an individual financial goals (approximately 80-100,000 EUR). The advisors offer on-going consultancy to farms, assisting them with tailor made advice.

DLV also provides themed training and study group meetings for producers, organisations and extension officers. DLV's experts also work outside the Netherlands, coordinating and carrying out agricultural development projects financed by national and international donors.

In particular DLV plant (with about 200 consultants and researchers working in the horticultural and agricultural sectors) is active in 50 countries with 8 international subsidiaries (in UK, Belgium, Russia, East Africa, Latin America, Middle East, Spain and Scandinavia).

DLV also undertakes applied research commissioned by its clients to translate new techniques into specific company situations.

In addition to DLV, in the Netherlands there are also **individual professional advisors** and several **other private consultancy firms**, mainly smaller and specialized in different sectors (such as dairy farming, construction) and/or target groups (such as organic farming). For instance, the non-profit organisation **ETC**²⁷ focuses on a niche of knowledge (agro-ecology in dairy sector), operating with highly specialised advisors.

Some private companies emerged as an offshoot of the historic farmer based associations, such as **Arvalis**, which is an agricultural consulting firm established in 2006 from the Limburg Agricultural and Horticultural Association (LLTB). Arvalis has four offices and employs 60 people, operating also in Belgium and Germany. Many extension providers operate also outside the Netherlands, while others provide their services only to developing countries, such as **HVA International**.

Other agricultural advisors are consulting companies not specialized in agriculture instead working in a larger market of services provision, such as the ABAB Groep B.V. It has over 700 employees working in 14 offices and a division called Food&Agri.

In addition new players in the market are ICT enterprises developing and/or commercializing agronomic modeling software to farm management (Labarthe 2006).

Private independent advisory services are associated in **VAB** (Ambitious Agricultural Consultants) an association for corporate consultants in agriculture. The VAB was founded in 1997 and currently has over 500 members. The consultants support all types of farmers in the strategic development and optimization of their businesses, especially regarding legal and environmental issues, accountancy, etc. VAB certifies corporate consultants in agriculture, assuring that they have the skills to effectively support farmers when considering complex projects and large investments. Certified consultants are recognizable by the title 'ab'.

The association is a career-network which assists its members in extending their knowledge, organising meetings for knowledge-exchange and supporting members in the development of their consultancy skills.

²⁷ The ETC international has an extension staff of 20 people (only 3 working in Netherlands).

4.3 LTO Nederland

LTO Nederland (Land- en Tuinbouw Organisatie Nederland/Dutch Organisation for Agriculture and Horticulture) is an entrepreneurs' and employers' organisation with three regional divisions, LTO Noord (in the North), ZLTO (in the South) and LLTB (in Limburg Province)²⁸. It represents and supports the economic and social interests of almost 50,000 farmers and growers at the local, regional, national and international levels. Actually LTO is organised in 15 sub-sector organisations, representing the members of their branch, like the Glastuinbouw (Greenhouse Horticulture), Varkenshouderij (Pig farming), etc.

The Confederation supports the interests of agricultural entrepreneurs and provides a large number of additional services for its members, ranging from advice and commerce to real estate and insurance. LTO has its own consultants and specialists who provide tailored advice for individual farmers, especially on business succession, changing to different products and production methods, expansion, specialisation, new business opportunities and business discontinuation. LTO Nederland is an important source of information for its members, and it also functions as a buyers' cooperative and helps the organisation of farmers' study groups.

4.4 Farmers' Cooperatives

In the Netherlands there is an important tradition of large cooperatives, including those in the agricultural sector. The data provided by the Statistics Netherlands indicate that 55 agricultural cooperatives were active in 2010. The sector is affected by a rapid decline in the number of enterprises; especially due to the continuous consolidation process through mergers; from 2006 to 2010 the number of active agricultural cooperatives decreased by 33%.

According to research conducted by the National Cooperative Council (Nationale Coöperatieve Raad), 11 of the 100 largest farmer-led businesses in Europe are Dutch. Among them, **FrieslandCampina** is the largest agricultural cooperative in Europe with revenue of 9.6 billion EUR. FrieslandCampina has offices in 28 countries and employs a total of 19,946 people. The Company is fully owned by Zuivelcoöperatie FrieslandCampina U.A., with 19,487 dairy farmer members in the Netherlands, Germany and Belgium.

As the farmers' union in the past, the agricultural cooperatives were organized along religious lines. To pursue competitive strategies many cooperatives are evolving into new organisational models, for instance some local companies now operate internationally. The crucial aspect of these new cooperative models is the increasing distance between the cooperative management and its members. However, the cooperatives continue to provide several services to their members, including commercial or technical advisory services. A recent study on Dutch cooperatives highlighted that they are a rich learning environment for their members (Mulder et al. 2013)²⁹.

²⁸ The Confederation was formed in 1995 through the merger of KNBTB (Dutch Catholic Federation of Farmers and Horticulturists), KNLC (Royal Netherlands Agricultural Board) and NCBTB (Dutch Christian Federation of Farmers and Horticulturists), that were organized along religious lines.

²⁹ "They can get relevant and specific information in many different ways, for which the cooperative intranet is becoming increasingly important. Opportunities to learn via networks or in groups are abundantly available in all cooperatives, although collegial contacts via working groups are not equally intensive within all cooperatives; in some cooperatives these seem more prevalent than in others. The conclusion is that for members of a

In the 1990s a new kind of cooperative, the so called “Environmental cooperatives” (ECs), emerged. They represent an innovative form of social organisation (Wiskerke et al. 2003) defining a new mode of rural governance. ECs involve farmers but also non-farmer actors, working in close collaboration with local, regional and national authorities to integrate environmental management into farming practices by adopting a regional perspective. The first environmental cooperative was established in 1992 as a self-help group with voluntary membership. Actually there are about 150 environmental cooperatives which have an important role in the Dutch agri-environment policy.

4.5 Farmer study groups

The study groups are farmers’ organisations which are based upon a cooperative spirit of self-help and solidarity. They are based on a sectoral perspective and/or geographical proximity. However, if most of the study groups are established at local or regional levels, then thanks to the ICT support their boundaries are expanding. The groups may have a long history or they have a very limited existence when they are organised with the aim of finding a solution to a concrete problem. Usually they are autonomously managed by farmers, but in some cases they may have an external facilitator. Several interviewees indicated that the study groups were one of the most important sources of farm innovation. Each farm could participate in several networks in different fields and aspects of the farming system. It is difficult to accurately estimate the number of study groups, because some are informal networks. A study indicates that approximately 60% of Dutch horticulture growers participate in study groups (Miyabe 2012).

The study groups could be open networks or closed organisations. Some study groups are established thanks to public subsidies, then the subsidies failed as a result of the extension privatisation and they were organised differently. For instance the Landbouwvoorlichting Dalflen e.o is a club with about 160 members and it was founded more than 75 years ago by government subsidies. Actually the Association is a completely independent club.

The high value of farmers’ study groups is recognised by both policies and academics. They are used also in publically funded innovation programmes as effective tools to improve knowledge and innovation.

4.6 Product boards (Productschappen)

The Dutch agricultural products boards operate as a chain platform to support their sector companies³⁰. They also function as a centre of knowledge to sustain the members’ decisions, organising a wide range of information activities such as newsletters, websites, symposia, magazine publications, but also providing specific extension services. In this regard, their presence in several chains of quality assurance schemes is very relevant. For example, in the Dutch pork supply chain the sector product board for Livestock, Meat and Eggs (PVE)

cooperative, the added value of the cooperative is not in the skills being taught, but in the environment in which can be learned” (Mulder et al. 2013).

³⁰ The major products boards are: Main Product Board Arable Farming, Product Board for Beer, Product Board for Sprits, Product Board for Grains Seeds and Pulses, Product Board for Horticulture, Product Board for Cattle, Meat and Eggs, Product Board for Wine, Product Board for Dairy.

organises the Integraal Keten Beheer (IKB, Integrated Supply Chain Management) Pig Scheme. The purpose of IKB is to guarantee issues such as quality, animal origin and production, through the transfer of information along the chain. IKB is voluntary and approximately 85% of pigs are raised according to this quality assurance scheme (Boston 2004). The various products boards participate also in programming, coordination, financing and guidance of research.

4.7 Innovation network and knowledge brokers

In recent years, as already mentioned, numerous new innovation networks emerged within the Dutch AKIS. In addition to the traditional players these new networks included informal actors delivering advisory services.

Klerkx and Leeuwis, adopting a function-based typology, identified seven distinct types of agricultural innovation brokers currently in the Netherlands, the complete scheme being available in the Tab3 of the Appendix (Klerkx and Leeuwis 2009):

Types 1 and 2: Innovation consultants. They focus either on the individual farmer (Type 1), or on a collective of farmers with a common interest, who wish to jointly develop or implement an innovation (Type 2). They help the farmers in demand articulation and in network composition, such as the Poultry Centre or the Platform Agrologistics.

Type 3: Peer network brokers or so-called study clubs (see par.4.5).

Type 4: Systemic instruments. They are systemic intermediaries for the support of innovation at higher system level, involving complex constellations of business, government and societal actors, dealing with complex problems and radical innovations. This type of innovation broker is often a civil society organisation (but with public funding), reflecting its interests in innovation and policy issues that go beyond the conventional domain of government or the private sector, such as the Innovation Network Rural Areas and Agricultural Systems (INRAAS).

Type 5: Internet portals and databases. They display knowledge and information relevant to farmers and related parties, such as Agroportal.

Type 6: Boundary organizations. They act at the policy/research/user boundaries in research planning. For instance they operate as research councils with innovation agency, such as Bioconnect³¹.

Type 7: Education brokers. They are boundary organisations that act at the policy/education/research interface, such as the Green Knowledge Cooperative (GKC).

4.8 Characteristics of advisory services: topics, clients, methods

The features of advisory services (methods, human resources, topics, etc.) differ greatly depending on the actors involved. However, the documents available on the subject, together with the interviews showed some common trends for the most important actors.

³¹ Bioconnect involves more than 600 farmers, companies, research organisations and the government to work together to improve organic farming, promoting knowledge and policy development projects.

Before the privatisation the matter of services was mainly related to government policy, all the services were free with a great emphasis on group activities. Every extension officer guided several study groups, while individual advice was not very important. After the privatisation the DLV's scope, as well as that of its competitors, was also gradually broadening in terms of clients, activities and expertise. The services started to be addressed to all the agribusiness actors, including suppliers, producers, wholesalers, processors, retailers.

The role of Government has changed from providing services to being, among others, a client.

In recent times, all the agricultural advisory providers have experienced an increasing specialization of technical extension services, as well as a growing offer and demand of strictly non-technical advice such as construction, nature management, rural recreational activities, real estate, etc. There is also an increasing role for economic advice, including tactics and strategic planning. The focus of advisors is on the entire production chain and it is more and more market oriented, reflecting the growth of chain integration and food retailers' power.

Advisory clients are private firms, public institutions and NGOs. The importance of *one to one* and *tailor made* advice is increasing, however their role depends on the nature of the provider (for instance in DLV individual contacts accounts for 50% of all business). The advisors have a strong orientation on the farmers needs balancing the growing specialization with the expertise in new areas by working in a group including several practitioners from different backgrounds.

The advisory organisations adopt several methods of accountability, monitoring the individual and group performance of advisory work in terms of quality, turn over, loss and acquisition of clients. Consequently there is strong pressure, also in terms of incentives, to orient the staff and the entire organisation towards quality, customer satisfaction, efficiency and effectiveness. As mentioned earlier, in DLV for example, there is a management by objectives with individual financial tasks and productivity bonus, but there is also space for individual initiatives and actions. The DLV advisors create and manage their own client portfolio; they heavily use ICT and often work from home with a flexible working place in the office.

The advisory organisations need to be flexible in their culture and structure to easily adapt to changes and follow the needs of the market. They put a lot of emphasis into providing training for extension staff to improve communication, problem solving, client orientation and other commercial skills.

Until 1990 DLV had free access to information provided by research institutes and agricultural research stations, with a continuous and frequent exchange of information between research and extension services. These preferential relations were possible because all these actors were public and funded by the Dutch Government. Since 1990, there is more and more research paid by the industry (about plant protection, fertilisation, etc.) and its results are not always freely available or even accessible, and also sometimes research institutes are competitors on the farm services market.

5. Characteristic of Farm Advisory System

The Dutch FAS was originally planned to be introduced in 2005, but due to the continuing debate with the European Commission over the Nitrates Directive its operational introduction started in 2006.

In the Netherlands, the FAS covers not only SMR and GAEC related issues, but also safe working conditions³². The Ministry of EZ is the authority responsible for the FAS implementation and coordination, for the designation/ certification and for the monitoring of FAS operating bodies. The Ministry of EZ is also a payments agency. The Government strategy was to implement a transparent, flexible and simple system with minimal administrative burden and costs for both farmers and national authorities.

The FAS implementation is defined within existing services, maintaining the separation between the policy elements, which remain the prerogative of the Government, and daily implementation in the hands of private bodies.

The Ministry only gives information about cross compliance and FAS through brochures, newsletters and the website.

The accreditation process is realised through open and published tenders for services, adopting a set of well defined criteria that the organisations have to meet, regarding experience, equipment, good reference, qualified education. A governmental body (Dienst Regelingen) has the task to check the compliance with these accreditation criteria. During the first FAS application period there were 41 operating bodies accredited, but only 11 had effectively been active in supplying advice during the 2006-2008 period. Currently, there are 45 accredited operating bodies accredited (the complete list is in Tab. 3 Annexed). In 2006, advice was co-funded through the national budget. Since 2007 FAS became part of the RDP of 2007-2013 and the measure 114 of RDP has been mobilized to cofound the FAS. The co-funding became 50% farmer, 25% EAFRD and 25% Government.

The farmer is completely free to choose an advisor. The advice is provided by on-farm one-to-one or a small groups approach. Farmer groups could be promoted by advisors or by farmers themselves that submit a topic request related to cross-compliance to be examined as a group with the FAS advisor. In this way the groups share the costs of an advisory service.

The advisor is obliged to use a checklist with all the SMR's and GAEC obligations.

The frequency of FAS services for on-farm one-to-one advice is once every three years.

Since 2011, only quantitative data on FAS performance has been collected for monitoring, namely: the number of pieces of advice given per year and the number of farmers asking for advices/year. In 2011 the Ministry entrusted an evaluation of the Dutch FAS to LEI (WUR).

The number of applications for advice has continuously decreased from 2005 to 2009 (3300 in 2005, 2300 in 2006, 1200 in 2007, 550 in 2008, to 337 in 2009), while in 2010 the

³² However the FAS regulation established that if within the maximum incentive of EUR 1500 the advisory service is capable of giving additional advice beyond cross compliance and work safety, then this is possible without limitations, within the scope of their expertise.

applications increased to 1000. The main reasons identified by the Ministry were: the economic crisis, the strictness of controls, the supposed links between FAS and cross compliance controls³³, and the new possibility of group advice in 2010.

According to the FAS responsible of the Ministry of EZ, the main strengths in the Dutch FAS implementation are the existence of a few, well defined and simple rules and the mobilisation of the extension system which was already in place. They underline, however, that is difficult to get the farmers well informed because of the enormous quantity of obligations, the complexity of the regulations and the continuous changes with both regulations and interpretations.

³³ "For example in NL, in 2008 there have been 25 to 30% of the accepted requests for on farm advice that have not been claimed by the farmers. Reasons for this, according to the responsible agency, are the farmers' "belief" that FAS and control might be interlinked and that if the advice contains evidence of possible compliance breaches, they will be inspected and fined" (ADE et al. 2009).

6. Summary and Conclusions

In the last few decades Dutch agriculture has succeeded in maintaining its leadership in the world market by continually investing in innovation. This has led to a knowledge-intensive agricultural sector characterised by high levels of productivity and efficiency. The Netherlands has a world-renowned knowledge infrastructure in agricultural R&D and historically there is an intensive cooperation between the private sector, scientific institutes and the Government.

After the collapse of the Dutch OVO triptych in the 1990s, the Dutch AKIS has experienced a transition to a new arrangement and *the transformation of the Dutch agricultural knowledge system is still an unfinished agenda*³⁴.

The end of the OVO triptych has meant a transition from a stable system, with well-defined actors, bound together by institutionalised mechanisms to a highly dynamic system with great hybridity of actions and functions. The stakeholders interviewed, while working in the field, have demonstrated a "sense of loss" in describing this arena, revealing a clear difficulty in tracing its boundaries and in clearly defining the identity and the role of each actor.

In parallel with the changing extension arrangements, other changes have also taken place in the Dutch OVO. In education, the transition is towards a so-called OOO network, Education, Research, Entrepreneurship (in Dutch: Onderwijs, Onderzoek, Ondernemerschap), in which academic research, education and industries work together in a network system, to establish effective education programs. However, this transition is not yet a reality, as evidenced by Kupper et al.: *"schools have an image gap to be bridged. There is a widespread assumption that they lag behind in awareness of current research knowledge and in connection with practice"* (Kupper et al. 2011).

In research the transition is toward a public-private partnerships model, involving the so-called Golden Triangle (Government, Private industry, Research and University) with a growing of market-driven research in the context of decreasing public funds and public fiscal crises.

A major result of all these changes (that are strictly connected) is the gradual shift from knowledge as a public good to knowledge as a *marketable* product.

The creation of a *knowledge market* has been viewed as an opportunity by many actors who have entered this vibrant arena, especially as advisory service providers while the more classic AKIS actors have assumed new identities and new features. It is due to the action of different driving forces, including the search for funding, which no longer permanently insured by the Government.

To meet the market needs, innovative demand driven knowledge and services are developed, new arrangement and synergies are defined between the multitudes of AKIS actors.

However as mentioned above, after the privatisation and the end of the public AKIS governance several *market* and *system failures* occurred. Together with the end of the OVO

³⁴ The transformation of the Dutch agricultural research system: An unfinished agenda is the article wrote by Roseboom & Rutten in 1998.

triptych, all the public structures which were previously devoted to the AKIS governance collapsed. This resulted in a highly fragmented knowledge and information system and a lack of reliable knowledge towards farmers (Leeuwis, 2000, Rivera 1993).

Consequently innovation networks and knowledge facilitators have emerged to rebuild the ties between the several actors and to promote knowledge creation and transmission within the system. The value of innovation networks and knowledge brokers in the Netherlands has been emphasised by different authors and also by the policy. The Government, through various programmes, has funded and supported innovation networks and knowledge brokers which were considered to be valid and valuable tools for the Dutch innovation policy.

This “innovation model” is considered to also be the answer to strengthening agricultural innovation capacity in the international context (Klerkx et al. 2009c) and it is adopted by the same European Innovation Policy in the definition of the European Innovation Partnerships (EIP). Although, we argue, that the models which are valid for the Dutch context are not easily adaptable to the rest of Europe as the structural and institutional characteristics of Dutch agriculture are very specific to their context.

However, also, in many cases the innovation networks in the Netherlands could be too limited in terms of time, space, and their respect to the actors involved, as well as to the themes addressed, to be considered as the unique tool and a robust support for knowledge generation, accumulation and transmission. Moreover, the action of innovation brokers’ networks does not act on some critical points of the Dutch AKIS, specifically with regard to access to knowledge in both its dimensions of the front office and the back office. In the aftermath of privatisation several authors (Rivera 1993, Labarthe 2006) already highlighted these critical points, but it seems that these problems are still waiting for a constructive solution. Therefore we can argue that they could be still current relevant issues for today’s debate, although recently only a few authors have become interested in it.

The existence of private advisory services and market-led mechanisms are not a problem for the majority of Dutch farmers, who have the funds available and the willingness to pay for the required advisory services. However the advisory costs may limit their access for a large section of SMFs that do not have the funds available to pay for the services. In addition, some sub-sectors/fields are no longer covered by the provision of advice because they are considered unprofitable, such as the goat and sheep sectors.

It could result in strong inequities between farmers for access to cognitive resources that become more and more vital for the competition and the farm’s survival³⁵.

This may represent a limitation of the Dutch AKIS in supporting Multifunctional Agriculture (MFA) assumed as “*the full range of contributions of agriculture to economic and social development as a whole*” (Renting et al. 2009), because MFA raises needs for new and more complex knowledge, as well as for a diversity of farmers and farming systems.

Recently, the support of small farms was not a priority for the Dutch agricultural policy which aimed at rationalizing the system to improve productivity and competitiveness (in fact, as

³⁵ In the OVO triptych it worked a special organization devoted to small farms the “*Dienst voor Kleine Bordereij*” (translation: “service for small farms”).

mentioned earlier, the small farms have not yet been reviewed by the national agricultural census). However in more recent years, small farmers gain a renewed interest with respect to multifunctional agriculture and, in several cases, the regional or local Government support and fund similar innovation processes to promote the MFA provision of public goods.

Another weakness of the Dutch AKIS is in the back-office dimension of knowledge access and production. With the growing importance of the market led mechanisms, the public investments in knowledge infrastructure³⁶ are decreasing and there is more of a focus on the stronger sectors (as evident in the "*Top sectors policy*"). The need for revenues obtained through market mechanisms also concerns the public organisations, such as WUR, where the cuts in stable government funding for research have made it hard to maintain basic research infrastructures (Klerkx 2012).

Another example is the Green Knowledge Cooperative, a platform for all green educational institutes operating as mediators in the knowledge exchanges with businesses, research and other partners. One of the main tasks of GKC is building a database of scientific articles about specific topics which can be used in the green educational institutes. In 2015 the public funding for the cooperative will end and GKC will have to fund its own programmes (using the payment service or through contributions of farmers' organisations, private, etc.).

On the other hand, the R&D funded by Agro-Industry (also through Public Private Partnerships) is increasing, but it only covers selected profitable topics with short-term return. In addition, knowledge no longer circulates in the system as it used to. The more commercial orientation of the AKIS system implies a more protective attitude regarding innovative knowledge as good with a high market value.

As mentioned already, until 1990, DLV had free access to information provided by research institutes and agricultural research stations. Nowadays, the advisors need to pay to improve their knowledge which results in a lower access of reliable and accurate knowledge by advisory actors.

This problem was already highlighted by several authors in the 1990s (Huang 1992, Rivera 1993), and according to our interviewees, it still remains an issue. Furthermore, the advisors operating in very competitive market invest less and less in technical knowledge and more and more in the commercial skills that are necessary to allow the advisors to sell their services. The payment of advisory services also generates a crisis of a lack of confidence in advisors amongst the farmers. However, to compete in a global market the Dutch farmers are also encouraged to be increasingly market oriented. They need to develop generic business skills, together with technical skills and production knowledge.

The Dutch agricultural sector is primarily focussed on the foreign market and consequently it has a very high international market exposure. To maintain its global leadership the sector needs a continuous growth of productivity and efficiency. However Dutch agriculture is facing a challenge to develop into a sustainable sector and the Dutch agricultural knowledge system is the main support in enabling the agricultural sector to cope with the emerging

³⁶ It includes a specific set of networks and material elements (e.g. databases, experimental settings, laboratories, training centers, etc.) that are considered as key elements in R&D literature dealing with knowledge production and accumulation (Labarthe et al. 2013b).

needs. In recent years, the AKIS concept (*when the I' stands both for 'information' or 'innovation'*) seems to be less and less useful for a constructive analysis of the Dutch system, especially as it is limited in being able to incorporate: the issues, actors and dynamics outside agriculture (it doesn't reflect the agriculture desectorialisation), the international openness of Dutch knowledge system, the strong private/market orientation, the big influence of agro-industry and the informal dynamics of agricultural knowledge.

To overcome these weaknesses, other frameworks have been suggested, either viewed as a complementary or substitute concept (Klerkx and al. 2012; Dockers et al. 2011).

7. Acknowledgement of partners, information sources, gaps etc, reflection on methodology

We integrated desk research of relevant literature and direct interviews with key stakeholders to collect the necessary data for elaborating the present report.

The Dutch agricultural knowledge system is the subject of many studies, even by the foreign researchers who are interested in carrying out comparative surveys and analyses.

There is an abundant amount of literature regarding the history and the extension privatisation process, as well as, in more recent years, different authors developing several research analyses on innovation networks and innovation brokers. However, literature on the current active extension provider is more uncommon or of lower quality. The present agriculture advisory service is a topic which is not often debated in the analyses and there are no systematic pieces of research aimed at identifying, in a more or less exhaustive way, the actors and their relationships.

In recent years Wageningen University has had more of a focus on innovation networks/system or in research outside The Netherlands (following the funders' requirements).

However the Knowledge, Technology and Innovation Group of WU has years of experience on this topic and it still remains as a very important source of information.

It is very difficult to highlight an accurate landscape of all of the Dutch AKIS actors and their functions, due to (as already mentioned): they are private actors for which there is no official census, the advisory arena is very dynamic and can change extremely quickly and it is becoming increasingly globalised, many of the AKIS actors have a hybrid nature- performing functions that differ from their original tasks, and there are many new actors breaking into the advisory market that traditionally would have been active in other areas/sectors. Finally the strong levels of competition in the advisory market may make the players less inclined to give out internal information or to waste time contributing to research projects which do not give them direct economic benefits.

With the valuable help of our UK colleagues, we implemented an online version of the survey in Dutch. As of October 2013 we only had a few answers to the questionnaire, despite the dozens of emails sent to organisations working in the field.

This lack is compensated by the high number of interviews conducted. We interviewed 16 stakeholders in May 2013 and in September 2013 we conducted a further interview, giving a total of 17 interviews. The actors involved are representatives of different studies Groups of Wageningen UR, of Ministry of Economic Affairs (including those responsible for the Payment Agency), private advisors (DLV, ETC International), innovation brokers and facilitators, a dairy farmer, a member of Lltb (Limburgse Land en Tuinbouwbond) and members of several study groups.

We would like to specially thanks Laurens Klerkx and Eelke Wielinga, for their availability and for the information provided. We would like to acknowledge also the other WU

colleagues and all the stakeholders for contributing to our survey, in particular the actors interviewed and the advisors that responded to our questionnaire.

List of Stakeholders interviewed

1. **Laurens Klerkx**, Knowledge, Technology and Innovation group, Wageningen UR, May 2013.
2. **Stefano Pascucci**, Management Studies Group, Wageningen UR, May 2013.
3. **Bettina Bock**, Rural Sociology Group, Wageningen UR, May 2013.
4. **Pieter Seuneke**, Rural Sociology Group, Wageningen UR, May 2013.
5. **Hans Schiere**, Advisors, Farmer, ex Professor WUR, May 2013.
6. **Eelke Wielinga**, Innovation Broker, May 2013.
7. **Henk Kieft**, ETC International, May 2013.
8. **Rene van Veenhuizen**, RUAf, May 2013.
9. **Bert Snel**, DLV, May 2013.
10. **Marlies Heerema**, Ministry of Economic Affairs, May 2013.
11. **Marga Rademaker**, Paying Agency, Ministry of Economic Affairs, May 2013.
12. **F.A. Geerling-Eiff**, LEI Wageningen UR, May 2013.
13. **Krijn J. Poppe**, LEI Wageningen UR, May 2013.
14. **Klaas Jellema**, GKC, May 2013.
15. **Guys Huinen**, dairy farmer, member of Lltb (Limburgse Land en Tuinbouwbond) and member of several study groups, May 2103.
16. **Pieter de Wolf**, Rural Sociology Group, Wageningen UR, May 2013.
17. **Martin Mulder**, Education and Competence Studies Group, Wageningen UR, September 2013.

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Annexed

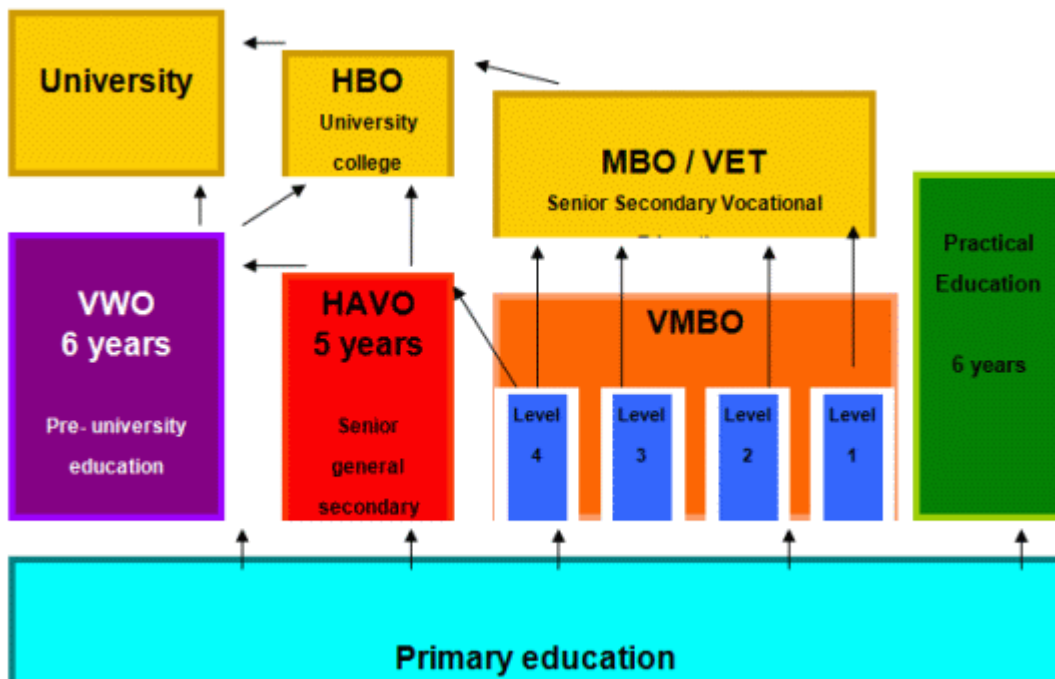


Figure 2. Diagram of the Dutch Education System

Source: The Dutch Inspectorate of Education

Table 1. WUR funding by source, 2012

Wageningen University	Funds (in € mln)	
Direct Government Funding:	166	55%
Contract research (2nd & 3rd flow funds):	105	35%
Tuition and course fees:	21	7%
Other assets:	23	8%
TOT Wageningen University	304	100%
DLO Institutes		
Funding source from EZ:	136	40%
Contract research:	155	45%
Other assets:	52	15%
TOT DLO Intsitutes	343	100%
Van Hall Larenstein (2011)		
Direct Government Funding:	31	58%
Contract research:	11	21%
Tuition and course fees:	8	15%
Other assets:	3	6%
TOT Van Hall Larenstein (2011)	53	100%

Source: elaboration from WUR Annual report 2012.

Table 2. FAS advisors accredited 2013 (Accreditatielijst 2013)

1. ABAB Groep B.V. Bosseweg 45 5682 PE BEST
2. Accon AVM Groep B.V. Postbus 5090 6802 EB ARNHEM
3. ACCRES Accountants en Belastingadviseurs B.V. De Bres 2 9363 TM MARUM
4. Accuraat Accountants B.V. Brinkstraat 5 7683 BM DEN HAM OV
5. AEC Uden B.V. Postbus 94 5400 AB UDEN
6. Aelmans Agrarische Advisering Kerkstraat 4 6367 JE VOERENDAAL
7. Agrovisie B.V. Paulusland 9 1679 GV MIDWOUD
8. Alfa Accountants en Adviseurs Postbus 12 6700 AA WAGENINGEN
9. Antonissen Agrarisch Advies Halfeindschestraat 2 B 5595 AB LEENDE
10. Arvalis Postbus 1257 6040 KG ROERMOND
11. Beumer Agro Service Dixielandkade 16 4533 AB TERNEUZEN
12. Bilanx Adviseurs B.V. Postbus 160 7600 AD ALMELO
13. Buizer Advies De Welle 48 8939 AT LEEUWARDEN
14. CEB Overijssel B.V. Oerdijk 111 F 7434 RA LETTELE
15. ComponentAgro B.V. Postbus 1206 3260 AE OUD-BEIJERLAND
16. Countus Accountants + Adviseurs B.V. Postbus 10055 8000 GB ZWOLLE
17. D&U Advies B.V. Postbus 606 9700 AP GRONINGEN
18. Trippel aaa / De Adviseurs B.V. Postbus 249 7940 AE MEPPEL
19. DLV Bouw, Milieu en Techniek B.V. Postbus 511 5400 AM UDEN
20. DLV Intensief Advies B.V. Postbus 511 5400 AM UDEN
21. DLV Plant B.V. Postbus 7001 6700 CA WAGENINGEN
22. DLV Rundvee Advies B.V. Postbus 511 5400 AM UDEN
23. Exitus Bedrijfsontwikkeling B.V. Postbus 22 8100 AA RAALTE
24. Flynth Adviseurs en Accountants B.V. Postbus 321 2130 AH HOOFDDORP
25. Deelstra Jansen administratie en advies Postbus 52 8900 AB LEEUWARDEN
26. GBV Administraties en Advies Postbus 2250 6040 CV ROERMOND
27. Geerts & Van Spijk B.V. Cereslaan 24 5384 VT HEESCH
28. GIBO Accountants en Adviseurs B.V. Postbus 9221 6800 KB ARNHEM
29. Hans Rietveld Agrarisch Advies B.V. Energieweg 4 A 4231 DJ MEERKERK
30. Houtsma Bedrijfsadvies V.O.F. Postbus 2094 7420 AB DEVENTER
31. Jarick Advies B.V. Postbus 22 4170 AA HERWIJNEN
32. K&G Advies Fokjesweg 24 3752 LT BUNSCHOTEN-SPAKENBURG
33. Kocken Administraties & Adviezen Postbus 16 5370 AA RAVENSTEIN
34. LTO Noord Advies B.V. Postbus 9221 6800 KB ARNHEM
35. Nieuw Veldhoen Accountants & Adviseurs B.V. Postbus 118 2770 AC BOSKOOP
36. PPP-Agro Advies West Dorp 81 3415 PD POLSBROEK
37. PPP-Agro Advies ZuidOost Bosch 53 6021 AN BUDEL
38. Schuiteman Accountants & Adviseurs Postbus 480 3770 AL BARNEVELD
39. Smolders AGRO Advies Kattenbos 7 5541 PJ REUSEL
40. Van Balen Boekhoudburo B.V. Hegedyk 1 9026 BA JELLUM
41. Van der Meer Accountants Postbus 18 8430 AA OOSTERWOLDE FR
42. Van Westreenen B.V. Anthonie Fokkerstraat 1 A 3772 MP BARNEVELD
43. ZNAB Accountants Postbus 157 5490 AD SINT OEDENRODE
44. Zuidelijke Land- en Tuinbouworganisatie Postbus 91 5000 MA TILBURG
45. Proof4Sure Voetsteeg 8 7722 KV DALFSEN

Table 3. A typology of innovation brokers in Dutch agriculture
(Klerkx, L., & Leeuwis, C. 2009b)

Type	Functions	Comments	Coverage	Legal form	Funding	Innovation focus	Examples#
1. Innovation consultants aimed at individual farmers and agri-food SMEs	Demand Network composition: scanning, filtering, and matchmaking; Brokerage within established networks (innovation process management, i.e. enhancing alignment of actors and mutual learning)	Connect farmers/ agri-food SMEs with relevant service providers (R&D and KIBS and 'hardware' suppliers), and also with sources of funding and policy information; Publicly funded organizations limited to demand articulation and matchmaking; Private organizations also fulfill brokerage within established networks (i.e. enhancing alignment of actors and mutual learning); Sometimes linked to science parks	Regional (province or sub-province level); Regional focus where coverage is national; Both sub-sectorally and crosssectorally Oriented	For-profit private firms; Quasiautonomous government agencies; Non-profit foundations	Public funding through subsidies; Public/private funding through subsidies and/ or shareholding; User payments	Innovations within individual enterprises; Generally incremental innovation; Short time horizons	Agricultural Knowledge Centre Noord Holland Agricultural Knowledge Centre Flevoland Agricultural Knowledge Centre Zuid-Nederland Agricultural Knowledge Centre Zuid Holland Innovation Support Centre Wageningen Syntens Agro Stimuland, LaMi, Agro&Co, Food Valley Innovation Link, Horti Solutions Poultry Centre, Cropeye, Innovation Support Point Zuid Limburg KnowHouse, Agrichain
2. Innovation consultants aimed at collectives of farmers and agri-food SMEs	Demand Network composition: scanning, filtering, and matchmaking; Brokerage within established networks (innovation process management, i.e. enhancing alignment	Connect farmers/ agrifood SMEs with similar interests, and connect these with relevant service providers (R&D and KIBS and 'hardware' suppliers) and also with sources of funding and policy information	National; Regional (province or sub-province level); Regional; Both sub-sectorally and crosssectorally Oriented	Non-profit foundations; For-profit private firms; Quasiautonomous government agencies	Public funding through subsidies; Private collective funding through subsidies; Public/private funding through subsidies and/or shareholding; User payments	Innovations relevant for groups of similar enterprises and in the context of a production chain; Generally incremental innovation; Short time horizons	Knowledge Grower's Service Technology Department, Platform Agrologistics

of actors and mutual learning)

Type	Functions	Comments	Coverage	Legal form	Funding	Innovation focus	Examples#
3. Brokerage organizations that forge peer (interfirm) Networks	Demand articulation; Network composition: scanning, scoping, filtering, and matchmaking	Aim to bring farmers together to exchange knowledge and experience at the interpersonal and group level, i.e. enterprise development through peer-to-peer learning; Explicit objective is to involve actors from weak networks surpassing regional and sectoral networks), i.e. break out of 'strong-tie networks', avoid lock-in, and stimulate 'new combinations'	National; Subsectorally Oriented	Non-profit foundations	Public funding through subsidies; User payments	Innovations relevant for groups of similar enterprises; Generally incremental innovation; Short time horizons	Poultry Centre, Dairy Farming Academy, Horticultural Cluster Academy, Pignet
4. Systemic Intermediaries for the support of innovation at higher system level (systemic instruments)	Demand articulation (including foresight); Network composition: scanning, scoping, filtering, and matchmaking; Research planning	innovation role, by 1) the management of interfaces between (sub)systems, (2) building and organizing (innovation) systems, (3) providing a platform for learning and experimenting, (4) providing an infrastructure for strategic intelligence, and (5) stimulating demand articulation, and strategy and vision development. Involving several societal actors (e.g. farmers,	National; Subsectorally Oriented	Non-profit foundations; Quasiautonomous government agencies	Public funding through subsidies; Private collective funding through subsidies	Innovation at higher levels of system aggregation (entire production chain/ societal systems/policy systems); Generally radical/system innovation and transition trajectories; Medium to long time horizons	Courage, Greenhouse Horticulture Innovation Foundation, Innovation Network Rural Areas and Agricultural Systems, Transforum, Eggnovation, Germination Power

		supply and processing industry, civic advocacy organization, policy makers)					
5. Internet-based portals and databases that display knowledge and information relevant to farmers and related parties	Network composition: scanning, scoping, filtering, and matchmaking	Portals differ with regard to their prospective audience: these may be all farmers or projectrelated audiences; Rather passive matchmaking role: portals create order in wealth of information sources and give an overview but do not serve as a selection aid	National; Subsectorally oriented with Categorical Subdivisions	Private forprofit firms; Part of publicly financed research and advisory projects	Privately funded if targeted at all farmers (user fees); Publicly funded if targeted at project-related audiences and other specific audiences	Broad range of links for addressing both operational or tactical problems and strategic innovation issues; Short time horizon	Agroportal, Knowledge On The Field (KODA)
6. Boundary organizations that act at the policy/research/user boundaries in research planning (i.e. research councils with 'Innovation agency'	Demand articulation; Brokerage within established networks (innovation process management, i.e. enhancing alignment of actors and mutual learning)	Management of multi-actor R&D planning networks (involving farmers, supply and processing industry, civic advocacy organization, policy makers); Facilitation of participatory/ collaborative R&D (i.e. end-user participation)	Sectorally and sub-sectorally Oriented	Non-profit foundations; Quasiautonomous government agencies	Public funding through subsidies	Incremental and radical innovations; Short to medium time horizon	Transforum, Bioconnect
7. Boundary organizations that act at the policy/education/research Interface	Demand articulation; Network composition: scanning, scoping, filtering, and matchmaking	Provide educational establishments with the latest insights from practice and research to enhance the fit of their education programs with business and societal needs	National	Non-profit foundations	Public funding through subsidies	Aimed at curricular innovation	Green Knowledge Cooperative, Content broker

☒ These organizations have ceased to exist.

Names have been translated from Dutch where appropriate.

Figure 3. The main objective of the support of the Multifunctionality of Agriculture in The Netherlands

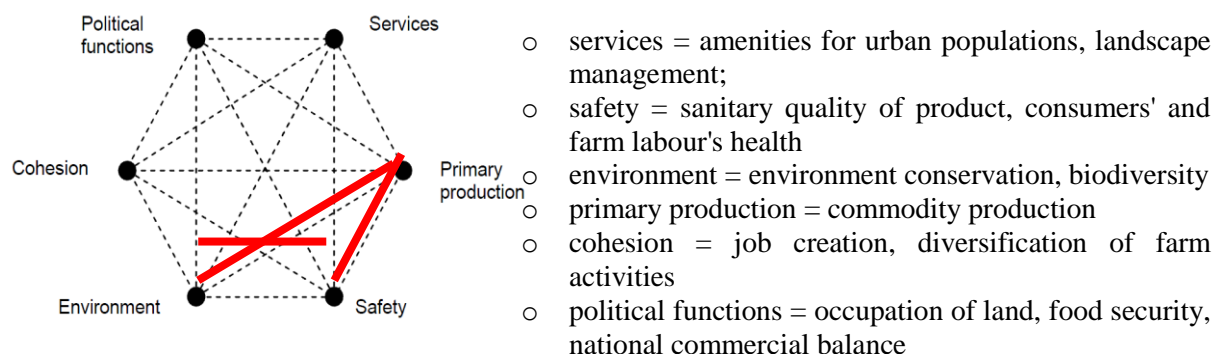


Table 4. Overview of organisations creating the AKIS

Provision of service				Source of financing								
Status of the organisation	Type of organisation	Number of organisations	Number of advisors	Public funds			Farmers			Private	NGO	Other (specify)
				EU funds	National funds	Regional funds	Farmers' levies	Farmers' contribution	Billing services	Other products (inputs, outputs)	fundation	
Public sector	Advisory department of the Ministry of agriculture	-	-	-	-	-	-	-	-	-	-	-
	Local/regional agencies	-	-	-	-	-	-	-	-	-	-	-
	Other (specify)	-	-	-	-	-	-	-	-	-	-	-
Research and Education	University	2	NA	X	X	X	-	-	X	X	X	-
	Research Institute	6	NA	X	X	X	-	X	X	X	X	-
	Other education bodies (specify)	48	-		X	X	-	-	-	-	-	-
Private sector	Upstream industries	NA	NA	-	X	X	-	-	-	X	-	-
	Downstream industries	NA	NA	-	X	X	-	-	-	X	-	-
	Independent consultant ³⁷	500	500	X	-	-	-	-	X	-	-	-
	Private agricultural advice company	NA	NA	X	-	-	-	-	X	-	-	-
	Farmers' owned advice company											
	Other Innovation Brokers	NA	NA	x	x	x	-	-	x	-	-	-
Farmer based organisations	Farmers' cooperative	205 ³⁸	NA	X	x	x	X	X	X	X	-	-
	Chambers of agriculture	-	-	-	-	-	-	-	-	-	-	-
	Farmers' circles/groups	NA	NA	-	X	X	x	X	-	-	-	-
	Product boards	NA	NA	-	X	-	X	X	-	-	-	-
NGO		NA	NA	X	NA	NA	NA	NA	X	NA	NA	-

³⁷ Independent consultant associated to VAB.

³⁸ 150 environmental cooperatives + 55 agricultural cooperatives active in 2010 Statistics Netherlands

Name of organisation (in English)	Address	Website	Status (public/R&E/ private/FBO/NGO) *
VAB- Association for Corporate Consultants in Agriculture	Postbus 1634 3800 BP Amersfoort	http://www.vabnet.nl/agrarische-bedrijfsadviseurs/	Private
ETC International	P.O. Box 64 3830 AB Leusden	http://www.etc-international.org/	NGO
Netherlands Agriculture and Horticulture Organisation (Land- en Tuinbouw Organisatie Nederland, LTO)	Postbus 29773 2502 LT DEN HAAG	http://www.lto.nl/	FBO
Landbouwwoorlichting Dalfsen e.o. (farmer study group)	De Hooislagen 4a 7722PG Dalfsen	http://www.wiekelaar.nl/Landbouwwoorlichting	FBO
Wageningen University (WUR)		http://www.wageningenur.nl/en.htm	Public R&D
Food Valley NL	Postbus 294 6700 AG Wageningen	http://www.foodvalley.nl/	Public/Private organization
PTC+ (Practical Training Institute for businesses plant, animal and technique)		http://www.ptcplus.nl	Public
DLV Plant Head Office	PO Box 7001 6700 CA Wageningen	www.dlvplant.nl	Private
Louis Bolk Institute	Hoofdstraat 24 3972 LA Driebergen		
Netherlands Inspection Service for Horticulture (<u>Naktuinbouw</u>)	Sotaweg 22, Postbus 40 2370 AA Roelofarendsveen	www.naktuinbouw.nl/	Public
The Council for the Environment and Infrastructure (Rli)	Oranjevuitensingel 6 2511 VE Den Haag	http://en.rli.nl/	Public

NRLO The Dutch National Council for Agricultural Research	P.O. Box 20401 2500 EK The Hague		Public
NIZO Food Research Nederlands Instituut voor Zuivelonderzoek	P.O.Box 20 6710 BA Ede	http://www.nizo.com	Public
Arvalis	Steegstraat 5 6041 EA Roermond Postbus 1257 6040 KG	http://www.arvalis.nl/	Private
Netherlands Organization for Applied Scientific Research (TNO)	Laan van Westenenk 501 7334 DT Apeldoorn	http://www.tno.nl	Public
Ministry of Economic Affairs	Ministerie van Algemene Zaken Binnenhof 19 Postbus 20001 2500 EA Den Haag	http://www.government.nl/ministries/ez	Public