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Visualised AKIS Diagnosis – an Instrumental Approach to Support AKIS Appraisal

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Visualised AKIS Diagnosis – an Instrumental Approach to Support AKIS Appraisal

Diagnostic visualisé du SCIA – une approche instrumentale pour soutenir l'évaluation du SCIA

Visualisierte AKIS-Diagnose – ein instrumenteller Ansatz zur Unterstützung der AKIS-Beurteilung

Andrea Knierim and Fanos M. Birke

From 2023 onwards, the new Common Agriculture Policy (CAP) of the European Union (EU) provides a clear orientation for strengthening national agricultural policies, which is to be achieved through the development of 'national strategies' that define measures for overarching target areas and operationalising their implementation on the basis of verifiable indicators (Regulation (EU) 2021/2115). A new element in the CAP is the concept of the Agricultural Knowledge and Innovation System (AKIS), which refers to the cooperation of actors from extension, research, professional organisations and other stakeholders in the sector (SCAR AKIS, 2015). The predominant function attributed to these (plural) AKIS is to provide timely and relevant information, knowledge and support to innovation processes, with particular emphasis on agricultural advisory services as service providers (Ingram and Maye, 2020; TAP, 2016).

Although an incentivising potential is frequently observed with the innovation system approach, the AKIS concept also comes with challenges: the term AKIS as such is fuzzy, as the system boundaries cannot easily be detected, and for many political and administrative decision makers it is a new and weakly defined concept. Given the broad range of expectations that have been formulated regarding the effects and impacts of well-functioning AKIS (EU SCAR, 2012, 2015), it is public authorities in particular that face a huge learning step and shifting roles towards the coordination and governance of AKIS actors as they are responsible for the implementation of the respective instruments (EU SCAR, 2015). This is particularly challenging as national-level AKIS can and does have many faces due to the historical, socio-political and market context of every country (Knierim *et al.*, 2015; Toillier *et al.*, 2022). For the success of the new political orientation, it is therefore of importance that there is clarity and common understanding of (i) what is meant when referring to a Member State's AKIS, and (ii) how to use the concept in policy related dialogue and decision making. In this respect, practical knowledge has been gained with the development of a visualised AKIS diagnosis approach that was developed and applied to describe and assess national AKIS in the EU Member States, focusing on different types of corporate actors and the linkages among them (Birke *et al.*, 2022; Knierim *et al.*, 2015). With this article, we present and discuss these experiences with an instrumental focus and conclude with reference to the upcoming CAP policy implementation.

Conceptual background

Concepts are abstractions, simplified representations of concrete reality for the transmission of general experience, and devices for improved perception of particular settings that help to orient in and evaluate situations experienced as new. Their choice influences human perception, the making of connections, and thus the reasoning logic of a situation; their utility is therefore both intrinsic and consequential if implicit assumptions are not made transparent (Hoffmann *et al.*, 2009: 48ff). Therefore, an effective use of the AKIS concept requires a chosen meaning-making context, specification of the system's components, and disclosure of the assumptions made about linkages and interdependencies. Here, we refer to four conceptual approaches that have been described and operationalised for Agricultural Innovation Systems (AIS) and applied analogously to AKIS in the literature. These are:

- the **infrastructural** perspective, by means of which an overview is provided of the organised actors, structures, institutions and policy instruments involved in the provision and use of knowledge in relation to a spatial unit (e.g. national) or a particular sector (e.g., horticulture or organic agriculture) (see for example, Hermans *et al.*, 2015; Klerkx *et al.*, 2012; Lamprinopoulou, 2014; Toillier *et al.*, 2022);
- the **process or procedural** perspective, by means of which knowledge exchange and learning are brought into focus as communication and interaction between actors who are

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Tractor spraying vines over vineyard in Europe © Valentin Valkov/Shutterstock.

independent of each other and across different levels of intervention and governance, often operationalised using network thinking (e.g. Ingram, 2015; Moschitz *et al.*, 2015);

- the **functional** perspective, which introduces a normative component, namely requirements for an AKIS that must be met in order to grant satisfactory performance (e.g. Nagel, 1979). In this area in particular, general innovation systems research has also provided impetus (Faure *et al.*, 2019; Hekkert *et al.*, 2007), and finally;
- the **capacity-oriented** perspective where the individual actors' abilities to shape promising transformational change through intentionally targeted strategic planning and decision-making in the AKIS or AIS contexts take centre place (Toillier *et al.*, 2022).

Depending on which conceptual focus is given priority for the AKIS under consideration, the system's elements and their respective linkages will vary, as well as what would be considered the system's boundary and its environment. Therefore, it is necessary to reveal the chosen conceptual perspective.

> “Dans de nombreux États membres, les rapports nationaux sur le SCIA, y compris les diagrammes le représentant, ont servi à la préparation du plan stratégique pour la PAC en 2022.”

Visualisation is a good means to make such system components explicit and share one's understanding with others. A rich experience with the broad range of visualisation tools for collective analyses has been gained through the use of participatory rural appraisal (PRA) methods (Pretty, 1995). In particular, *relational mapping* or a *Venn diagram* is a tool that works well for the co-creation of representations of social networks and organisational constellations. Such maps do not replace dialogue, but '*can be used to engage with stakeholders to better understand the dynamics of a system, as an analytical tool for codifying stakeholder inputs and research results or as a visual aid to present (part of) a complex system in a more digestible form to decision makers. The tool does not attempt to replace qualitative research outputs (e.g. reports, research articles, etc.) but intends to complement research methods*' (Nikas *et al.*, 2017, p. 1021).

The methodology for the visualised AKIS diagnosis builds upon stakeholder analysis (Grimble and Wellard, 1997), PRA (Pretty, 1995) and agricultural knowledge system analyses (Blum, 1994; Knierim

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Box 1: Methodology

'i2connect' is a multi-actor project, funded in the research frame EU Horizon 2020, with the overall aim of empowering advisors and their organisations to engage and support farmers and foresters in interactive innovation processes. Diagnosing and understanding the AKIS of 28 European countries, was one of the main activities project partners and/or experts implemented in the year 2020/2021.

A generic guideline that supports authors in conducting infrastructural AKIS diagnosis was developed to facilitate the AKIS diagnosis (Knierim *et al.*, 2020). The methodological approach is structured in four phases. During the **review**, an overview is created of corporate actors that are considered as influential in the AKIS through document review, and based on researchers' previous expertise. The overview results in a diagram sketch that shows the different actors, and their relationships, possibly differentiated with, for example, distinct colours or geometric forms. The diagram is used in the **empirical phase** as a basis for discussion in interviews with a range of AKIS stakeholders. These stakeholders are experts with an overview of (parts of) their country's AKIS and are affiliated with or overseeing prominent knowledge organisations. The draft AKIS diagram functions as a visual reference to capture stakeholders' opinions and perceptions of actors and relations. Statements induce a cross-check, modifications and refinements of the diagram. During the **analysis,** the various findings are integrated into one diagram, accompanied by a background report that includes not only widely confirmed but also diverging and contesting viewpoints. Finally, **reporting** occurs through documents and group discussions in workshop format on the understanding and appropriate representation of the AKIS and the conclusions based on it, for its future performance and necessary interventions.

et al., 2015). Visualised AKS/AKIS diagnoses have been applied in earlier projects such as the SOLINSA project (Moschitz *et al.*, 2015) and the PRO AKIS project (Knierim and Prager, 2015), which applied graphic representation of the knowledge actors in European countries. The data in this study stem from recent EU-wide AKIS diagnosis cases, realised in the H2020 project i2connect (www.i2connect-horizon2020.eu) See Box 1.

Results

In the following, we first highlight selected features of the visualisation tool that were found to be appropriate to represent meaningful characteristics in a concise manner and without major risks of ambiguity. Second, we report on the diagrams' use in workshops related to AKIS appraisals.

In general, the strong points of the tool are (i) the organised representation of AKIS actors and infrastructures, (ii) the insights it can provide on the diversity of relations, linkages and gaps among the various actors, and (iii) the impulses it can give to targeted and systematised exchange and diagnosis of AKIS stakeholders. An organised **representation of AKIS actors and infrastructures** can be achieved by grouping actors following organisational characteristics, such as belonging to the public or the private sector, being of (predominantly) administrative, entrepreneurial or research and education related vocation or a domination of professional or civil society-based actors. Through harmonised, codified colours and through grouped positioning of similar types of organisations, a good overview can be created about the amount and the

Wheat field along old oak track at sunset on Dutch countryside © Rudmer Zwerver/Shutterstock.

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diversity of actors present and engaged in an AKIS at national level and/or at regional and local levels. Excellent examples in this regard are provided by the AKIS diagrams of Austria (Figure 1), Estonia (Figure 2) and Luxembourg (Figure 4), with some of them even specifying the broad range of actors within the various categories (e.g. Figure 2, the Austrian AKIS). Since representation of the AKIS diagrams is dependent on author's perception, there is a risk that some diagrams are presented in a rather summarised manner showing actors per category (e.g. Figure 5, the Hungarian AKIS), a way that allows for an easier overview but is less effective in conveying how AKIS components are understood and addressed by the authors.

The **linkages within an AKIS** are another decisive characteristic of the system in consideration. Depending on the chosen conceptual frame, linkages can represent among others, policies, regulations and coordinating mechanisms in an infrastructural perspective, and in contrast, stand for communicative interaction, information sharing and knowledge exchange in a procedural networking view. In the visualised AKIS diagnosis method, linkages constitute the second important element besides the actors. Two relevant distinctions are used to further qualify the linkages: (i) the degree of a connection is expressed with the boldness or fragmentation of the line, and (ii) the directionality is indicated with one or two arrows, differentiating between a uni-lateral or a bi-lateral relationship. In this respect, many of the diagrams represented bilateral connections between actors, except in some cases, such as in the Hungarian AKIS diagram (Figure 5). Degrees of linkage, for example in Figure 1 the Estonian AKIS, Figure 3 the German AKIS, and Figure 4 the Luxembourg AKIS, were emphasised in many of the diagrams implying the stronger partnership and good AKIS performance. However, in almost all cases, authors do not further characterise the kind of relations.

> "Die AKIS-Länderberichte und Diagramme wurden von vielen Mitgliedsstaaten bei der Vorbereitung ihres GAP-Strategieplans 2022 verwendet."

Based on the final reports and AKIS diagrams produced by the respective

Cattle grazing in mountainous European country © tommy101/Shutterstock.

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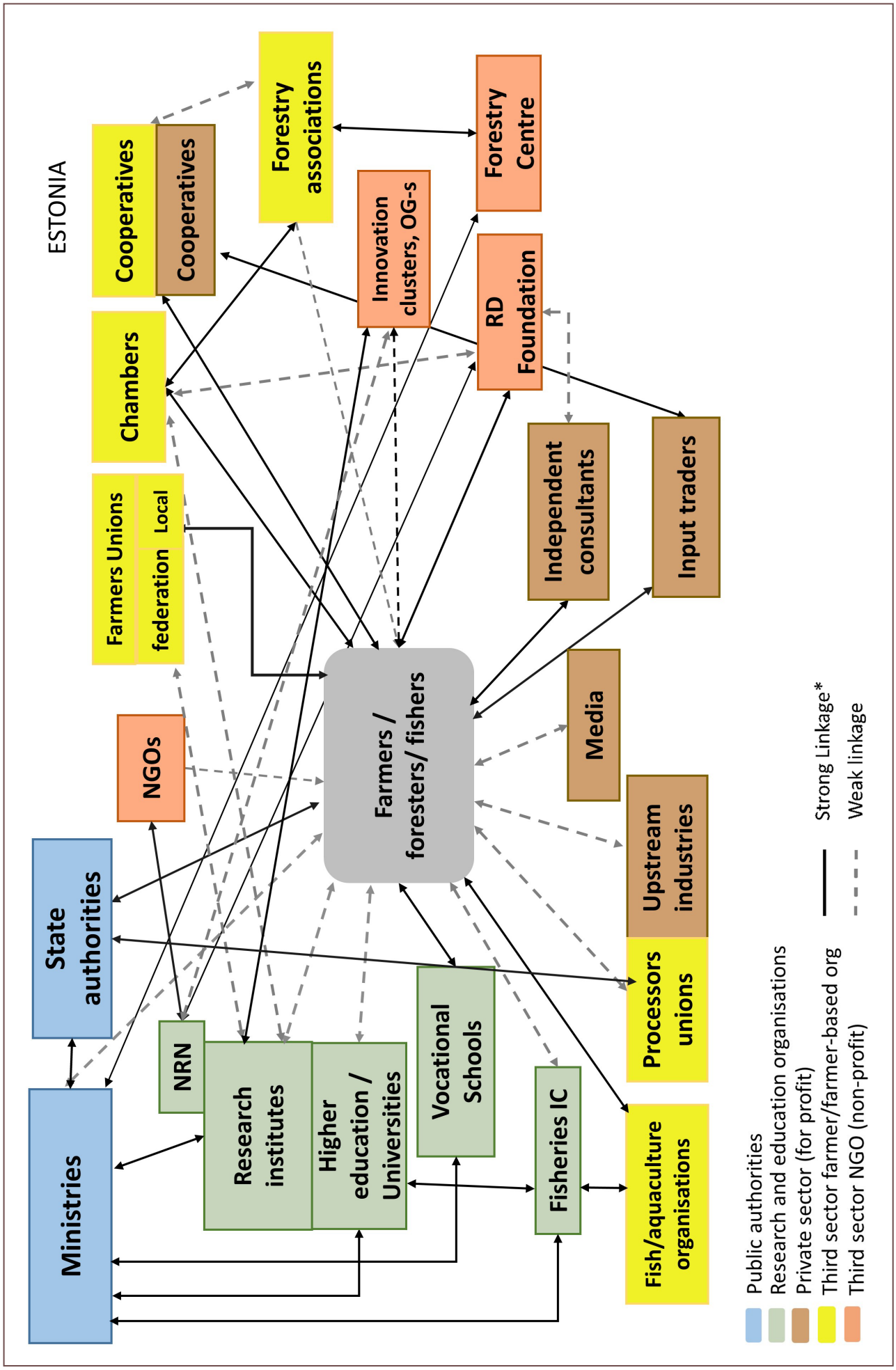

Figure 1: Estonian AKIS diagram (Tamsalu, 2021)

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Figure 2: Austrian AKIS diagram (Herzog and Neubauer, 2020)

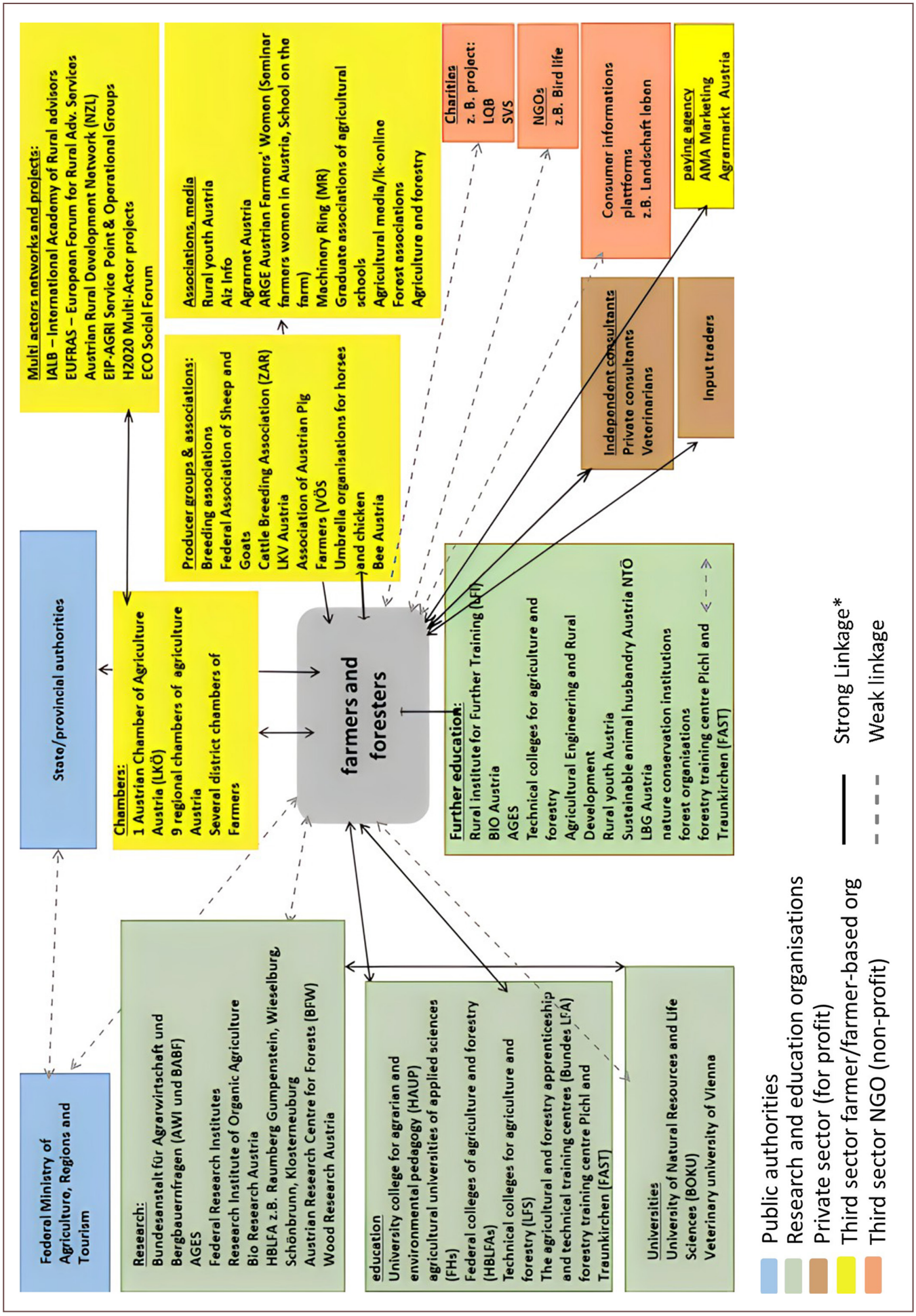

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Figure 3: German AKIS diagram (Birke *et al.*, 2021)

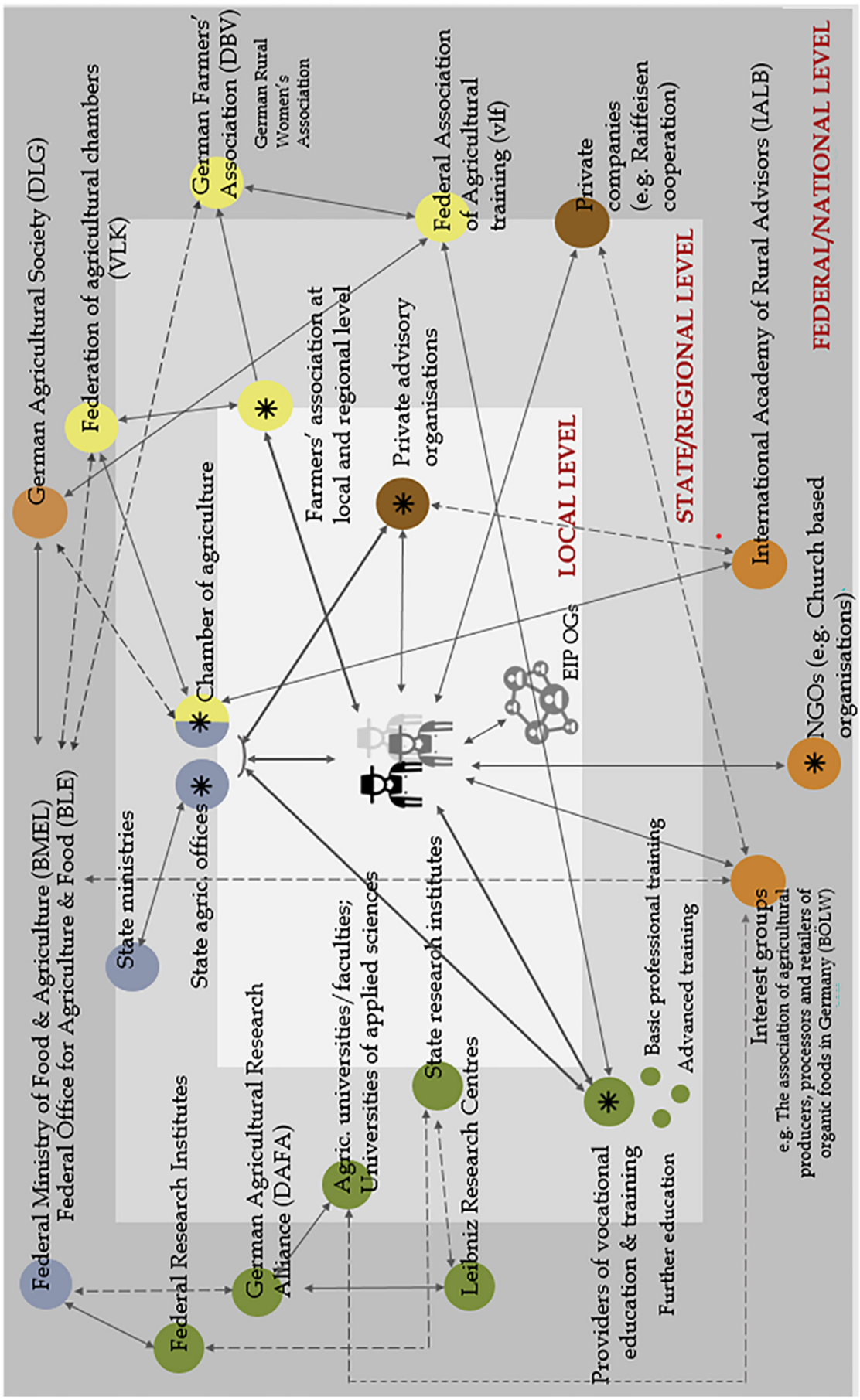

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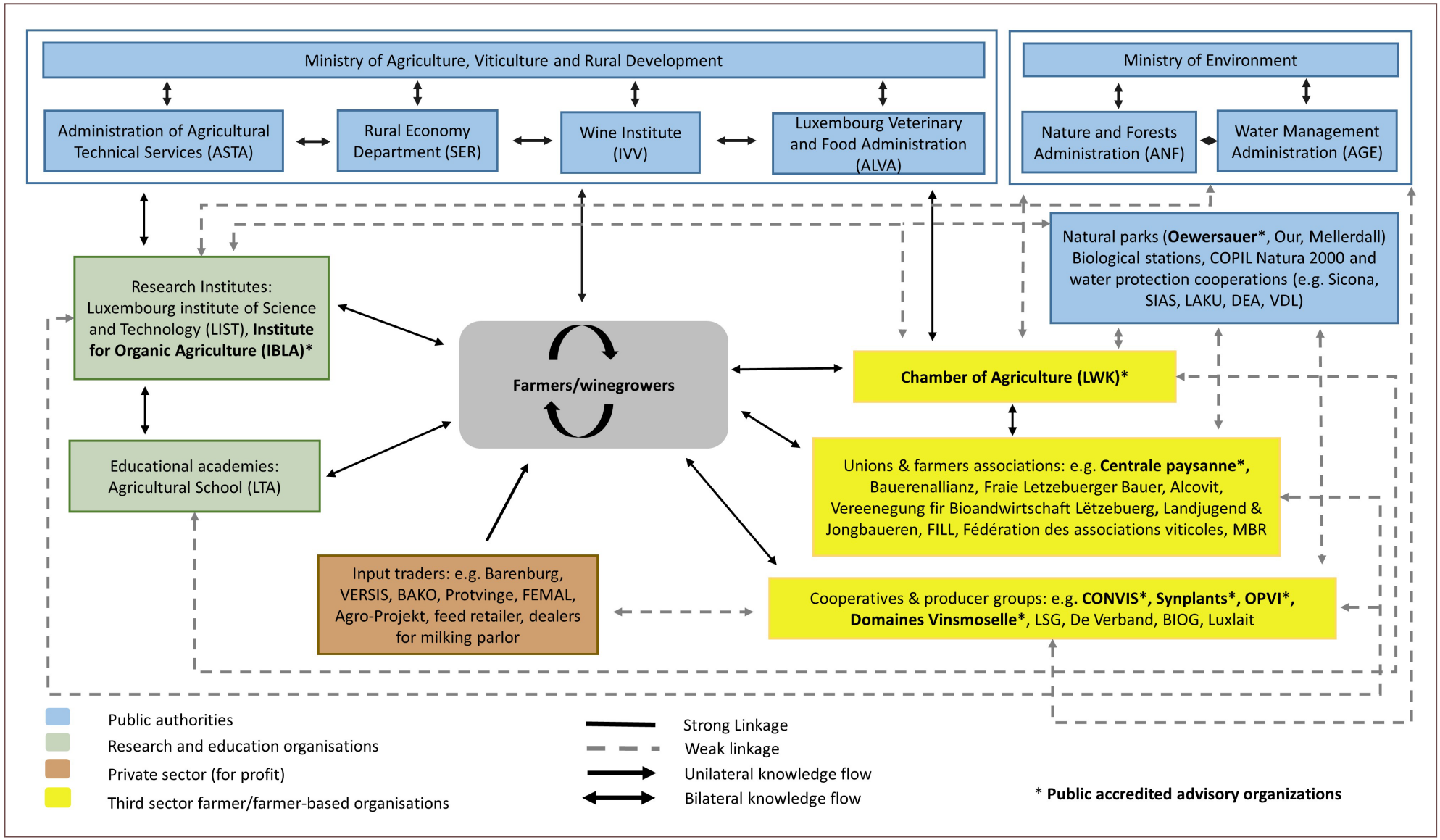
Figure 4: Luxembourg AKIS diagram (Zimmer, Stoll and Leimbrock-Rosch, 2020)



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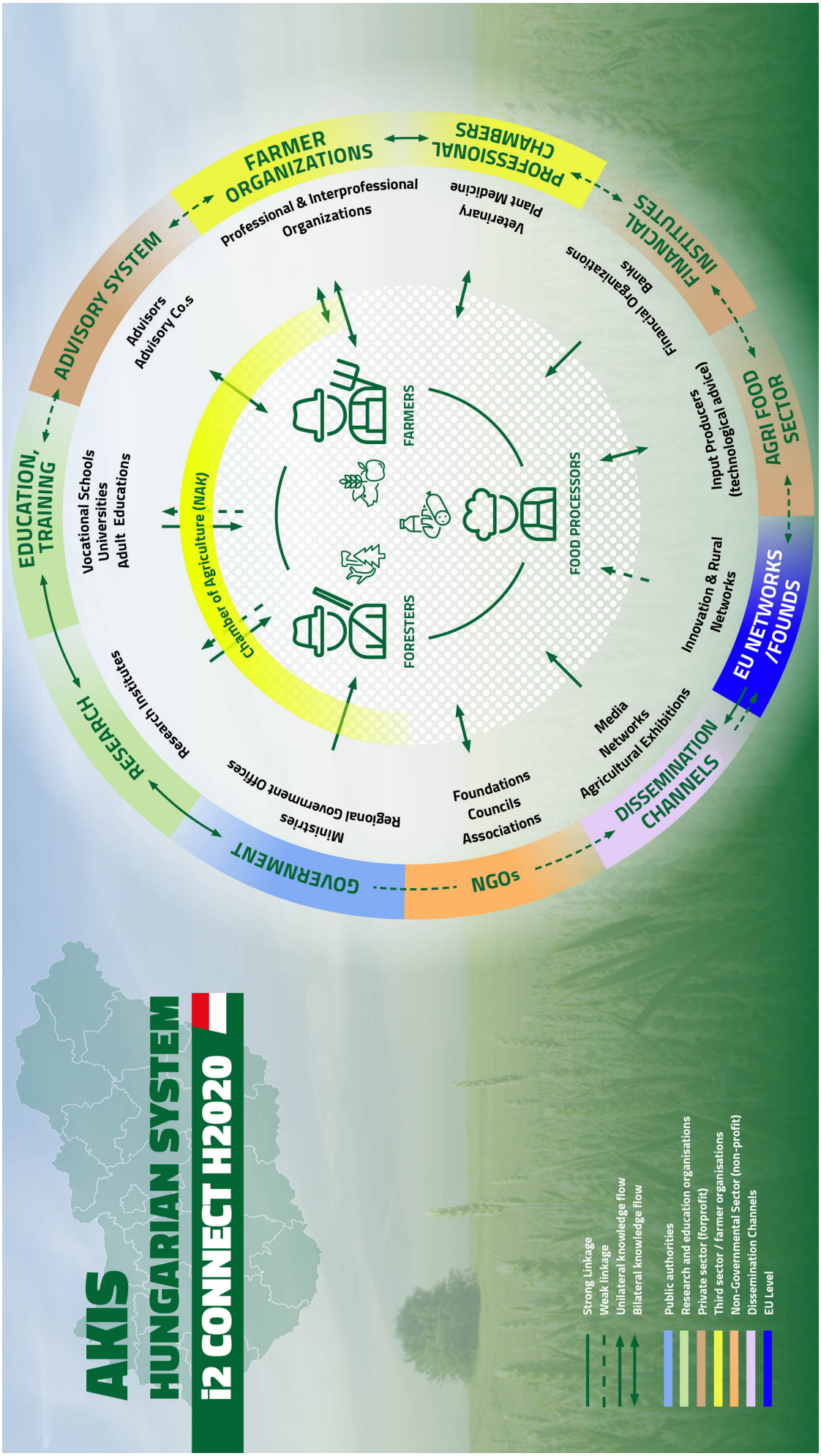

Figure 5: The Hungarian AKIS diagram (Gáborné, Zsuzsanna and Ver, 2021)

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countries (*cf.* i2connect website for AKIS reports), a selection of the diagrams was used in two (online) workshops that united AKIS stakeholders from several EU Member States (organised in 2022, by i2connect). About 200 stakeholders ranging from policymakers to advisors from NGOs and private sectors as well as farmer representatives attended the workshops. AKIS authors presented their diagrams and main findings from their report, which was followed by group discussion about actor diversities, strengths and weaknesses in the knowledge flows and similarities and differences between countries (i2connect, 2022a, 2022b).

> “AKIS country reports along with the diagrams were used as an input by many Member States in their CAP strategic plan preparation in 2022.”

The diagrams were effective in enhancing the general understanding of what was meant by and what was contained within the AKIS concept, and in concretising and focusing questions and discussion points. Codified colours and geometric forms were effective to enhance easy recognition of particular features for people from different backgrounds. Also, diagrams helped to spot weaknesses and gaps in some analyses which could then be directly addressed. In this regard, visualising relationships through solid lines, broken lines and even missing lines represented the degree of partnerships and linkages which are central to AKIS performance. In contrast, an AKIS characterised with broken lines or missing connections indicated weak coordination and cooperation and thus weak performance.

Thus, it can be stated that the diagrams generally fulfil the expectation of transmitting an overview and a comprehensive picture of the situation, and are supportive to an AKIS diagnosis, although sometimes portrayed with quite different formats (Figure 5). Challenges observed are the representation of decentralised AKIS as, for example, in Germany (Figure 3), Belgium or Italy. While for Germany, the attempt was made to realise the actors over three intervention levels (national, regional, local), for Belgium two separate diagrams were elaborated.

Although generally appreciated, the iterative and interactive processes of the diagrams' elaboration and their discussion in stakeholder workshops also revealed shortcomings and misrepresentations of facts. Another critique mentioned was a lack of potential to show the 'innovation' component of the AKIS. Nevertheless, the AKIS diagrams from i2connect provided appreciated insights for a number of policymakers and other stakeholders about the AKIS situation in their respective countries as well as in other countries. In particular, AKIS country reports along with the diagrams were used as an input by many Member States in their CAP strategic plan preparation in 2022.

Discussion and conclusion

Visualisation of AKIS in the form of diagrams can be realised in a systematic and structured way that supports an easy capture of the main features, including particular strengths and weaknesses of organisational settings and existing relationships. In this respect, clear guidelines and templates facilitate a harmonised presentation and by this, comparative views, mutual understanding and learning. The graphical results are useful inputs for group discussions, they support easy access to and understanding of differently perceived realities and the constructive exchange. Additionally, due to the participatory nature, the process offers a low-threshold invitation for those who may not be typically approached, e.g. private advisory organisations or independent advisors to participate and contribute in the AKIS diagnosis.

In general, our experience in using the tool highlights three important points. First, graphic visualisation is a powerful practical tool for facilitating participatory diagnosis of AKIS infrastructures as well as the presence or absence of coordinating mechanisms. A systematic exploration of the tool's applicability for the other conceptual perspectives still needs to be done. Second, the tool has a high practical value, not only for public authorities and coordinating bodies, but also for other stakeholders engaged with knowledge and innovation in agriculture, to gain a more comprehensive understanding of the AKIS in their respective countries. Finally, visualisation of AKIS diagrams is not only a helpful analytical and visual support tool but also a means of codifying tacit knowledge that is embedded in stakeholders. The tool, therefore, is a good starting point to systematically diagnose AKIS.

Nevertheless, it should also be emphasised that any such AKIS diagram with its related diagnosis reflects a picture, a static snapshot of the situation at a given moment in time, established on the basis of selected information. Its validity may not necessarily last. As a cautionary example, an overview chart on AKIS in EU Member States presented in Knierim and Prager (2015) which reflects an analysis from 2013 is still used time and again, although there have been quite a few changes documented since then. Thus, it is important to conceptually ground and situationally frame an AKIS appraisal with respect to its objectives and its context and to develop and use the AKIS diagram accordingly.

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Summary

Visualised AKIS Diagnosis – an Instrumental Approach to Support AKIS Appraisal

The AKIS (Agricultural Knowledge and Innovation System) concept is now widely applied in the EU partly due to latest CAP regulation. Visualisation-based AKIS diagnosis relies on the iterative elaboration of an AKIS diagram that provides a static picture of what elements of the system are linked through what kind of relations in which socio-economic contexts and environments. In this article we discuss the implications of using the visualised AKIS diagnosis method based on our empirical assessment of AKIS in 28 European countries. The method involved drafting AKIS diagrams based on targeted desk research, conducting dialogues with experts affiliated with or overseeing prominent knowledge organisations to adjust and refine the diagrams and to analyse actor diversity and linkages. The final diagrams and the background reports on AKIS appraisal were used to deepen the AKIS understanding among various stakeholders in the agriculture sector, as well as an input for the CAP strategic plan preparation in some countries. We conclude that the visualised AKIS diagnosis has a great potential to make complex knowledge infrastructures and exchange processes tangible. However, it also comes with risks, for example, that the snapshot in time may become misleading, through being an outdated or erroneous representation.

Diagnostic visualisé du SCIA – une approche instrumentale pour soutenir l'évaluation du SCIA

Le concept de SCIA (Système de connaissances et d'innovation agricoles) est désormais largement appliqué dans l'Union européenne, en partie grâce à la dernière réglementation de la PAC. Le diagnostic des SCIA basé sur la visualisation repose sur l'élaboration itérative d'un diagramme qui fournit une image statique illustrant quels éléments du système sont liés par quel type de relations et dans quels contextes et environnements socio-économiques. Dans cet article, nous examinons les implications de l'utilisation de la méthode de diagnostic visualisé sur la base de notre évaluation empirique du SCIA dans 28 pays européens. La méthode consistait à établir des diagrammes du SCIA sur la base d'une recherche documentaire ciblée, à mener des dialogues avec des experts affiliés ou supervisant des organisations de connaissances de premier plan pour ajuster et affiner les diagrammes et analyser la diversité et les liens des acteurs. Les diagrammes finaux et les rapports de base sur l'évaluation du SCIA ont été utilisés pour approfondir la compréhension du système parmi les différentes parties prenantes du secteur agricole, ainsi que comme contribution à la préparation du plan stratégique de la PAC dans certains pays. Nous concluons au grand potentiel du diagnostic visualisé du SCIA pour rendre tangibles les infrastructures de connaissances complexes et les processus d'échange. Cependant, cela comporte également des risques, par exemple, que l'instantané puisse devenir trompeur dans le temps, s'il s'agissait d'une représentation obsolète ou erronée.

Visualisierte AKIS-Diagnose – ein instrumenteller Ansatz zur Unterstützung der AKIS-Beurteilung

Das Konzept des Wissens- und Informationssystems Landwirtschaft (AKIS) findet in der EU inzwischen breite Anwendung. Das ist teilweise auf die jüngste GAP-Verordnung zurückzuführen. Die auf Visualisierung basierende AKIS-Diagnose beruht auf der iterativen Ausarbeitung eines AKIS-Diagramms: Dieses liefert ein statisches Bild davon, welche Elemente des Systems durch welche Art von Beziehungen in welchen sozioökonomischen Kontexten und Umgebungen miteinander verbunden sind. In unserem Artikel erörtern wir, wie sich die Anwendung der visualisierten AKIS-Diagnosemethode in 28 europäischen Ländern auswirkt. Unsere empirische Bewertung umfasste die Erstellung von AKIS-Diagrammen auf der Grundlage von gezielter Sekundärforschung. Des Weiteren haben wir Interviews mit Experten und Expertinnen aus Wissenschaftsorganisationen durchgeführt, um die Diagramme anzupassen und zu verfeinern und die Vielfalt der Beteiligten und ihre Verbindungen zu analysieren. Die endgültigen Diagramme und Hintergrundberichte der AKIS-Bewertung wurden verwendet, um das AKIS-Verständnis bei den verschiedenen Interessengruppen im Agrarsektor zu vertiefen. Außerdem diente sie in einigen Ländern als Input für die Vorbereitung des GAP-Strategieplans. Wir kommen zu dem Schluss, dass die visualisierte AKIS-Diagnose großes Potenzial hat, um komplexe Wissensinfrastrukturen und Austauschprozesse greifbar zu machen. Sie birgt jedoch auch Risiken, zum Beispiel dass die "Momentaufnahme" über die Zeit veraltet oder fehlerhaft wird.

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