



# How are innovations in the Agrofood sector going to scale?

Towards a methodology for comparative analysis of transitions towards sustainable food provision in Europe and Africa

Agrofood is one of the nine economic sectors in the Netherlands selected by the Dutch government as a key sector for development and innovation. The Agrofood sector in the Netherlands aspires to be a strong sector excelling in innovation and productivity. The sector aims to strengthen its international position by investing even more in knowledge and innovation. Furthermore, it is committed to engaging in joint actions, measures and innovations that contribute to generating food security worldwide. Innovation is a leading theme in this investment policy. The two year strategic research project 'Innovation systems and scaling in practice' introduced in this project brief and implemented by Wageningen UR broadens the perspective on innovation by zooming in on how novel practices spread or multiply: how innovations scale?

In working on innovations, the Agrofood and other sectors face the challenge of bringing new practices and techniques to scale. Many parties, including policy makers, business partners and researchers, often mistakenly believe that either scaling is an automatic outcome of an innovation process or that the scaling process can be easily engineered or managed. This research is motivated by the observation that whether an innovation is adopted on a wide scale largely depends on complicated interactions between the nature of the innovation itself and the context wherein it lands. This implies that scaling of an innovation can take place in one context and not in the other. A 'one size fits all' approach to steering processes of scaling is often insufficient. It is necessary to assess when, where and why some innovations lapse into inactivity while others

go to scale and even indicate system change. This project brief outlines the approach to innovation and scaling and introduces the case studies of innovation that ground the methodological and conceptual discussion in concrete realities in Europe and Africa.

### What do we mean by innovation?

Innovation is the process of making changes to something established by introducing something new (The New Oxford Dictionary of English, 1998, p.p. 942). A new 'thing' is generally defined as an invention or novelty. Innovation differs from an invention in that innovation refers to the use of a novel idea or method, whereas invention refers more directly to the creation of the idea or method itself, irrespective of whether it is being used and with what effect. An important question for government, business and research is how the reach/ impact of innovations extends beyond initial investments and pilots in novelty development.

The case-based approach used in this project studies novel practices in different fields. The more technical practices include endeavours to achieve sustainable soil management in West Africa, integrated pest management in Europe and reliable product quality in East Africa. These new technical practices are linked to new modalities in service delivery, organisational forms linking farmers to buyers and processors, as well as consultation processes involving multiple stakeholders. This gives the innovation a socio-technical nature. Recognising the socio-technical nature of innovation also informs the discussion on scaling, as this becomes not only a matter of optimising the technical measures. Scaling an innovation is intertwined with human behaviour and institutional arrangements.



## What do we mean by scaling?

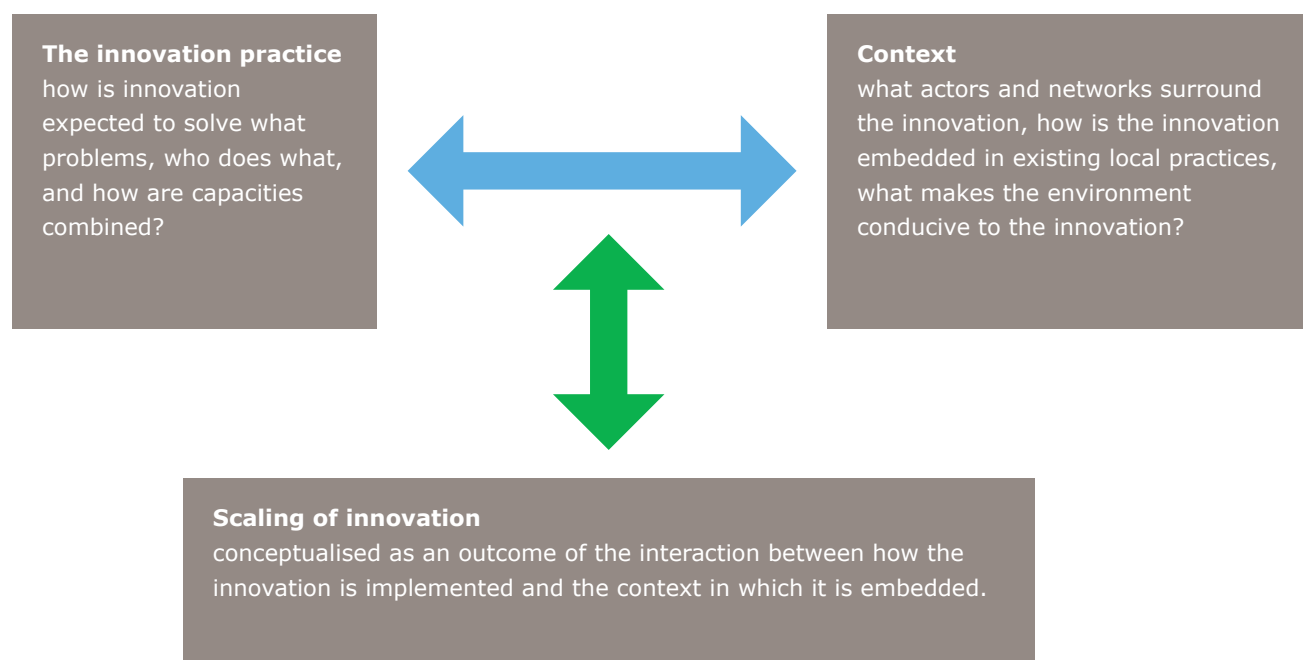
The concept of scaling (often called 'scaling up') is used in different ways by different authors and organisations and is applied in relation to different types of processes. It may relate to intensifying and catalysing existing efforts, multiplying what is considered to be good practice or aligning technical opportunities with policy, governance or organisational processes. In any situation where the term is used, it is therefore important to understand what type of process it is applied to. Alternative terms used for related processes include 'intensification', 'dissemination', 'mainstreaming' and 'institutionalisation'.

Two types of scaling processes are distinguished in the project: vertical or scaling up and horizontal or scaling out. Scaling up refers to the capacity of an innovation to accommodate changes in larger volumes of products or numbers of people without changing the processes and structures underlying the innovation process or changes

to the innovation itself. This focus helps to detect what the limits to scaling are and how these limits relate to the nature of the innovation. Scaling out is the replication of interventions or practices, or doing the same thing with a similar scale in a different context. The way in which scaling occurs becomes relevant when an intervention reaches its 'natural' limits, for example the number of farmers that can join a field school.

Neither type of scaling is mutually exclusive and they are often linked in practice. The case studies carried out in the project on innovation and scaling will document how specific innovations were able to include larger numbers of people, to spread over larger areas or to multiply in different circumstances. The case studies focus on understanding 'how scaling happens', i.e. to detect scaling mechanisms, in order to create more insight in how to strategically guide processes of scaling.

### *Scalability as outcome of an interplay between innovation and context*



The scalability of new practices, rules and interaction patterns does not solely depend on the design of an intervention or a facilitated transition process *per se*. Whether such an intervention or transition process is able to include large numbers of people, to cover an extensive area, or to accommodate growing transaction

volumes is an outcome of the interaction with the context wherein it touches down. The figure above makes scalability dependent on the nature of this interaction: is the fit between intervention and context conducive to scaling?

## Scaling as an emergent outcome – a methodological challenge

The strategic research project aims to achieve methodological and theoretical progress by developing a grounded approach that takes into account that scaling of innovation involves multiple stakeholders and depends on how a socio-technical innovation interacts with local conditions. Since the project does not regard scaling as a natural result of innovation or technical change, it aims to enhance capability to monitor whether scaling emerges and how it evolves. Building on case studies and cross-case analysis, the project intends to develop a 'dashboard' that can provide such strategic guidance.

The basic assumption underlying the project on innovation and scaling is that scaling largely depends on how an innovation becomes embedded in the local context (see figure). Understanding the conditions that affect the scalability of an innovation would then in principle provide clues as to what conditions would need to be met in order for the innovation to (be able to) go to scale. Better understanding of these relationships in turn provides ideas as to whether or not engineering would be feasible and if so, what kind of strategies would fit the purpose.

Not every innovation can easily be scaled and the nature of innovations should be understood well in terms of what would be involved in going to scale.

This methodological approach is anchored in the work of realistic evaluation, which looks for the processes triggered by a programme or innovation, but recognises that the outcomes can only be explained by including context in the assessment. The interaction between the properties of the innovation and context, visualised in the figure, is where explanation for scaling can be traced, but this can also be the core focus of strategic guidance of an innovation process. This invites practitioners and policy makers to look beyond the technical and organisational boundaries of the new practice and to recognise how scaling and leveraging thereof depends on how interdependencies and embedding are managed. The value of the project's approach to the scalability of innovations will be put to test in case study research and reflective action monitoring involving stakeholders in concrete innovation processes in Kenya, Ethiopia (dairy business hubs and service delivery), Benin (soil fertility management and collective marketing) and Denmark (integrated pest management and regulation).

### *The project innovation systems and scaling (up) in practice*

(KB-16-002.05-006 & KB-11-004-011) is a two-year project funded by the Netherlands Ministry of Economic Affairs. This is a collaborative effort between two strategic research programmes, Transition and Innovation & Global Food Security, run by Wageningen UR and involves researchers from the Agricultural

Economics Research Institute (LEI), Applied Plant Research (PPO) and Centre of Development Innovation (CDI). From a strategic and managerial perspective, the project aims to develop a strategic framework for policy makers and private business to assess whether and how scaling (up) can be steered.





## Case study 1

# Dairy business hubs in Kenya and Ethiopia

A dairy business hub (DBH) is a service point where dairy-related services and inputs are offered to farmers, in order to increase the volume and quality of milk supplied to dairy processors, and hence to improve the income security of the farmers. The central component is usually a collection centre with a milk cooling tank in which milk from smallholders is bulked and chilled before transportation to a processing plant. Additional services such as farm advice, input stores, veterinary services are clustered around this milk collection centre. The concept has been applied in countries like India, Bangladesh, Indonesia and Kenya.

Key contextual issues in the scaling process have been the growing demand for milk and dairy products in Kenya and a private sector that is willing to invest. The revival of the sector was spearheaded by the emergence of (new) producer organisations, processors and service and input suppliers, largely private sector oriented. The hub has proved to be an effective model in organising the supply chain in the major milk sheds, through the clustering of value chain operators and service/input suppliers in a confined space. The case study is exploring further how this process has come about.

In the Kenyan case study of a DBH, experiences with scaling up dairy business hubs are analysed, looking particularly at scalability features, distinguishing between the characteristics of the innovation and context parameters. Particular attention is paid to the role of different actors in the decision making process around the formation of dairy business hubs that lead to different

outcomes in terms of services and the division of roles and responsibilities between farmer organisations and companies.

The DBH as a service delivery model was developed during the seventies and eighties. The actors in the DBH space were then – apart from the farmers – mainly government or parastatals offering services to the smallholders. The nineties saw a withdrawal of services by the government and privatisation of parastatal as a result of the World Bank driven Structural Adjustment Programme. This created a gap that was filled from around the year 2000 by producer organisations and the private sector. This changed the landscape of the dairy sector from a government controlled/steered sector to a vibrant private sector driven industry. The investments in DBHs over the past decade have been large, with farmers and the private sector in the lead, supported by development organisations like BSMD, KDSC, EADD, and SNV.

Dairy cooperatives, processors and development projects in Ethiopia are interested to see whether dairy business hubs are a good innovation for Ethiopia as well.

We expect that analysing the Kenya experiences will not only shed light on this recent innovation process, but will also help understand what would be involved in scaling out the same or similar dairy business hubs in Ethiopia, a neighbouring country with a very different socio-political context. The case study will contribute to assessing issues such as the feasibility of out scaling and provide strategic guidance in taking this innovation to scale in a new (Ethiopian) setting.

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## Case study 2

# Integrated soil fertility management in Benin

Integrated soil fertility management (ISFM) is an approach that aims to enable farmers to maintain or increase agricultural production whilst reducing their financial risks and reversing soil fertility degradation.

The approach has a long history of more than 20 years in Benin and the rest of sub-Saharan Africa.

The innovation consists of combining mineral and organic fertilizers, building upon local agricultural practices and available resources while addressing specific farmers' constraints. ISFM implies a social learning process that brings together farmers, extension staff, researchers and agro-input suppliers to experiment and evaluate alternative soil fertility management technologies and to identify and develop initiatives for improved access to agricultural inputs and consumer markets. Research conducted in the framework of the EU funded research project Joint Learning about Innovation Systems in Agriculture shows that although many farmers use methods for soil and water conservation and integrated fertilization technologies either introduced by projects or not, integrated soil fertility management has not become an integral part of agricultural practices among small-holder farmers in Benin. International development organisations such as SNV Netherlands Development Organisation and the International Fertilizer Development Centre continue to promote ISFM in Benin. The challenge faced by these organisations is to get an understanding of why ISFM does not go to scale and ultimately what interventions will provide durability to ISFM.



The case study on ISFM in the innovation system and scaling (up) project takes up this challenge. The workings of past and on-going ISFM projects are being studied in three villages in Benin, situated in different agro-ecological zones. Other differentiating conditions in these three villages are land availability, population pressure and the urgency of soil fertility problems. In two of the three villages, ISFM projects applied a participatory technology development approach. In one village, successive projects used different research and development approaches, including a top-down 'one solution fits all' approach in which farmers have little or no voice. These projects are either funded by international development organisations or the Benin government and include research, NGOs and agricultural extension services. The project partners offer farmers resources to make ISFM work, often through intermediary producer organisations. These resources or so-called mechanisms include technical itineraries (e.g. crop rotation, fertilizer crops, shrubs and trees), on farm demonstration and experimentation, training, input supply and farmer-to-farmer sharing of experiences with ISFM practices. Project partners also often act as brokers for improved farmer's access to agricultural inputs (e.g. mineral fertilizers and seeds), credit and markets.

In order to gain a better understanding of how scaling processes evolve in practice, two different types of innovations are distinguished. Firstly, technical innovations that aim to improve or modify soil fertility management practices and to increase production of cash crops (e.g. cotton, yellow maize, soy). Secondly, organisational innovations that seek to strengthen farmers' organisations and their relationships with other value chain actors in collective marketing efforts. Exploratory field research in the three villages under study reveals that scaling of ISFM practices largely depends on whether the technical innovations generate farmer's income. Hence scaling of ISFM seems to be closely linked with market access issues such as improving the input supply and credit services, increasing the competitiveness of farmer's produce (larger volumes and high quality produce) and strengthening the market powers of farmers. The case study will investigate the level of flexibility of ISFM as promoted by projects in the selected villages, both in terms of the composition of the technological package and market access and value chain development. The results of the study are expected to give clues to development organisations, research and policy makers on how scaling of ISFM can be steered.

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## Case study 3

# Pesticide use reduction in Europe

This case study takes place in the context of PURE (Pesticide Use Reduction in Europe), a FP7 EU research project, aimed at providing integrated pest management (IPM) solutions for key European farming systems. In this four-year project, researchers from different countries work together to develop IPM solutions. Results are disseminated to farmers and other stakeholders. PURE is accompanied by IPM regulations from the EU, which should be implemented in member states in the next few years. The scaling challenge of PURE is immense: all EU growers of wheat, outdoor and protected vegetables, maize, grapes and pome fruit are targeted. PURE also includes a work package which aims to develop a co-innovation approach to developing IPM solutions, based on four national pilots in Denmark, France, Netherlands and Germany.

The case study focuses on Denmark and wheat production. The IPM solution being trialled is a combination of row sowing and variety mixtures in order to reduce the use of pesticides. The solution conforms to new nitrogen directives and aims to at least maintain current farm income level. The techniques are widely used in organic farming. The innovation is being trialled on the land of the participating farmers. The project explicitly applies a co-innovation approach, in which different actors are involved and farmers have the lead in the innovation process. The case study follows this process, trying to find the mechanisms that contribute to the scalability of IPM. Already in the first year, some interesting results became visible. Due to the increasingly strict crop protection policy, the attitude of Danish farmers has become more



defensive. However, the participating farmers feel that the pilot could help them show society that farmers are still willing to do their utmost to reduce pesticide use. By choosing organic farming for example, farmers are more or less preparing for the future scenario without pesticides. It is this interaction between experimental pest management practices, building on the experiences gained in organic farming and social appreciation and public regulation that sets the conditions for scaling the IPM concept in the pilot.

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**Published by** Wageningen UR

**Photography** Marianne Jeannin, Jan van der Lee and Jens Erik Jensen