



HAL
open science

How to support the development of crop diversification? The importance of an approach at the value chain level

Clémentine Antier, Walter Rossing, Abel Villa, Mhand Fares, Antoine
Messéan

► To cite this version:

Clémentine Antier, Walter Rossing, Abel Villa, Mhand Fares, Antoine Messéan. How to support the development of crop diversification? The importance of an approach at the value chain level. UCL Belgique. 2022. hal-04235574

HAL Id: hal-04235574

<https://hal.inrae.fr/hal-04235574>

Submitted on 10 Oct 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

How to support the development of crop diversification? The importance of an approach at the value chain level

Clémentine Antier, Philippe V. Baret, Walter Rossing, Abel Villa, M'hand Fares, Loïc Viguière, Antoine Messéan

- The implementation of crop diversification requires multiple changes, not only within farming systems but also in terms of creation and development of new value chains.
- Providing support for the many actors that compose and contribute to new value chains, and ensuring better coordination among them, are thus critical to the development of crop diversification.
- Key policy recommendations include allocating public and private resources towards actors involved in crop diversification, with special attention paid to the starting and scaling-out phases. Specific support should be provided to help mitigate or share the investment costs and risks along value chains, e.g. through the development of innovative contracts and subsidy schemes.
- Creating a favourable environment including regulatory stability for new crops, as well as undertaking wide communication campaigns, are critical to increase the share of crop diversification products.

Introduction

Crop diversification means increasing the diversity of crops in space and time using diversification practices such as rotation extension, multiple cropping, intercropping, and/or a combination of these practices. Crop diversification can support agroecological transitions towards more sustainable agri-food systems, mitigate climate change and help achieve the Sustainable Development Goals^[1].

Barriers hindering the development of diversified cropping systems are found not only at the farm level but also at other stages of value

chains^{[2][3]}. The multiple changes required to create and develop new value chains for crop diversification products range from technical to economic, organisational, regulatory and cognitive aspects.

This is why value-chain coordination is paramount to support diversification. Beyond creating new value chains or adjusting existing value chains to new production systems, it is necessary for actors to work collaboratively in order to “co-adjust/co-optimize” value chains. However, as multiple stakeholders must be involved in crop diversification value chains, implementing such coordination is not an easy shift.

1 Within the DiverIMPACTS project, value chains are defined as the organisational structure that encompasses farming, collecting, processing, retailing and marketing actors ensuring the production of a crop, its processing into a final product and distribution towards consumers.

The large number of actors involved in food value chains, and the interrelatedness of barriers^[3], implies that a systems approach at the value chain level is needed in order to overcome barriers. This Policy Brief provides recommendations for public policies to effectively support the implementation and scaling-out of crop diversification value chains.

Key research results at the value chain level

Coordination challenges and relevant responses

Multiple stakeholders are involved directly (value chain actors) or indirectly (external stakeholders) in crop diversification value chains (Figure 1):

- Operational actors: farmers (individually or as a group); intermediaries who collect, store and sell primary agricultural products; processing industries; retailers; and consumers;

- Other value chain actors: farming advisory services; input providers; banking, insurance and risk management services;
- Education and research actors: agricultural education institutions; agronomic R&D; socio-economic research;
- External stakeholders: public administration and policy makers; environmental NGOs; and civil society.

Coordination is needed both within value chains as well as with external actors.

- Within value chains, farmers, intermediaries, processing industries and retailers have to coordinate regarding: the expected volume and quality standards of the new crop, the strategies to handle risk and variability of production, and the approaches to prevent or lower these risks through sharing of information on crop diversification practices, co-creation of knowledge, and collaborative problem solving (see DiverIMPACTS case studies 15, 19 and 24 for examples^[4]; and research results presented in^[4-6]).

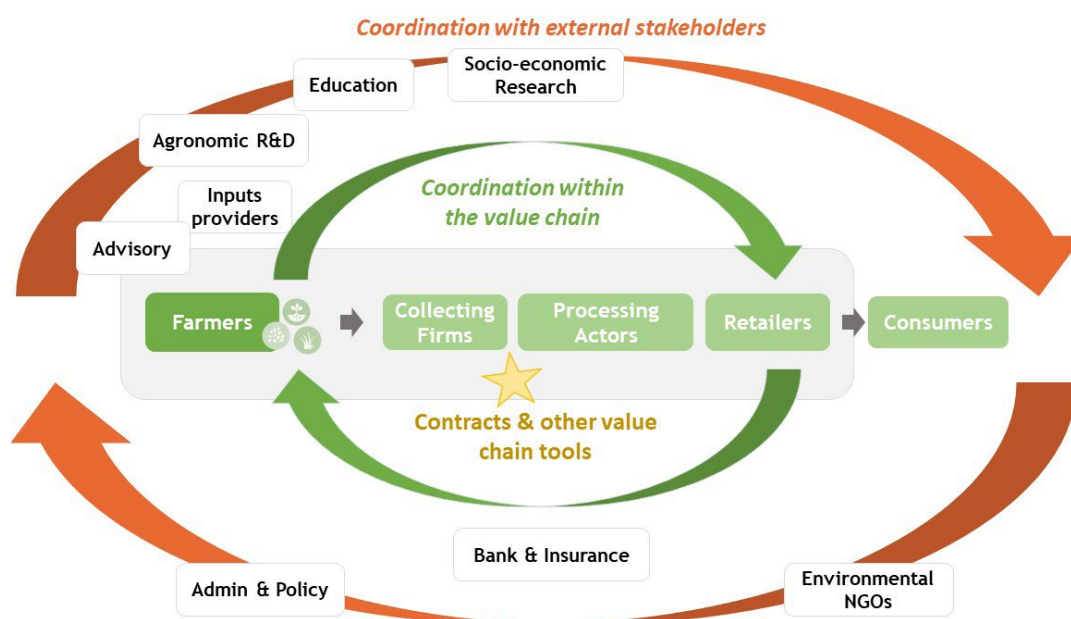


Figure 1: Crop diversification's value chain, actors and coordination levels and tools.

Crop diversification implies setting up new relationships between actors of new value chains. Both value chain actors and external actors must be involved in, and can contribute to, the creation and development of crop diversification value chains. Operational value chain actors include farming, collecting, processing, retail and marketing actors ensuring the production of a crop, its processing into a final product and distribution towards consumers. Other value chain actors include farming advisory services; input providers; banking, insurance and risk management services. Other actors and external stakeholders affect the context of crop diversification - either by providing specific services, information or advice, or by changing the societal context and public policies. This includes education and research actors (e.g. agricultural education institutions; agronomic R&D; socio-economic research) and policy makers, NGOs, etc.

- Coordination is also needed with external actors e.g. upstream actors able to engage in specific input developments, advisory services, R&D, financial and insurance services which can improve, facilitate and encourage the implementation of new technologies and practices (see case studies 6 and 7 for examples^[4]; as well as research results presented in^[5]).

Operational solutions are needed, both in short and long value chains, as tools for framing impactful coordination and sustainable collaboration.

- An example is innovative contracts which encourage farmers to diversify their cropping systems, and lead to the development of new value chains. Key features of contracts to encourage crop diversification include novel agreements about volume, quality, variability, as well as specific contract duration, risk management, price setting and economic benefits sharing^[7]. Such contracts can involve two or more actors, and should take into account the challenges faced by farmers and downstream actors, and incentivise change by ensuring risk sharing during learning phases. Examples of novel arrangements are illustrated by case studies 15, 17, 19, 23^[4,7]. In some cases, contracts may take the form of a joint venture involving various actors.
- It must be noted that in early stages of value chains, no formal contracts may be needed, and concrete solutions may take the form of small investments to keep ideas developing. In this case, not only coordination but also trust is especially important to facilitate coordination.

Types of value chains for crop diversification, and their specific challenges

Crop diversification can successfully take place both in short and long value chains.

- Short value chains involve a limited number of local actors and ensure the creation of added-value in a specific territory. Some of the actors engage in various activities to collect, process, transport, pack, or market the products, and may create their own distribution channels (such as on-farm or

Collaborative approaches contribute to a mutual understanding and the identification of new arrangements that are advantageous for all actors of the value chains.

online shops) to create added-value. Some short value chains are organised as community-based food systems. Specific challenges faced by short value chains include limited access to grants and subsidies as the size of their organisation may not fit with the target group of these supportive policies or they may lack time to apply for them.

- Long value chains are made of multiple actors, who are usually only responsible for one specific service or production step. These value chains generally allow large quantities of products to be processed and reach wider markets at the national or even international level. Specific challenges in long value chains are related to the larger volume to be processed, which implies steady access to a significant volume of agricultural production, as well as high investment at the downstream stage of value chains and the need to reach a wider market.

Critical phases for crop diversification value chains

Coordination challenges are a transversal aspect that hinder crop diversification at the starting, sustaining and scaling-up phases.

- In the start-up phase, numerous challenges appear for farmers who have to gather knowledge for new practices and crops and reorganise their cropping system. Challenges are also present from harvest to retail, at the market level as well as in the coordination between actors, e.g.: assessing the feasibility and return-on-investment of the innovations, creating new and fair business-to-business relationships with relevant types of contracts and value distribution, designing new markets and building a reputation for the new products, and balancing investment and risk between the different stakeholders. A collaborative problem-solving approach can

help overcome the challenges that could otherwise not be tackled by actors separately. Collaborative approaches contribute to a mutual understanding and the identification of new arrangements that are advantageous for all actors of the value chains.

- To sustain newly created chains, communication between actors, and ensuring continuous improvement through relevant sources of information and knowledge, are critical. In addition to this, maintaining a fair value distribution across stages and ensuring longer-term commitment of all value chain actors are crucial.

- In a later scaling-up phase, financial aspects become critical, especially at the downstream stage of value chains where investments for wider processing and marketing capacities are needed. Organisation, regulatory or administrative, as well as marketing strategies to expand market shares are also critical.

Coordination is facilitated by trust, a key element of forging networks and engaging in change ^[5: 8-9]. Coordinated investment and actions imply building social capital as well as developing a common (market) vision.

Key principles for policies to support crop diversification at the value chain level

1 Support coordination and collaboration at the value chain level.

Support should be directed at exploring and building cooperation at the value chain level rather than towards individual actors. Public policies should facilitate the following aspects using both incentives and relevant regulations:

- Novel types of contracts can help improve coordination between stakeholders in new value chains.
- Mechanisms for sharing the investment costs and risks of innovation (e.g. insurance options, incentives to be shared consistently between value chain actors, etc.) are important to balance the efforts between value chain actors.
- Transparency at the sector level about investment costs, margins and benefits will help to ensure fairness, coordination and the efficiency of financial support.

2 Support crop diversification value chains in their critical phases

Policies should support both the experimentation and innovation phases (i.e. before value chains are already competitive) as well as the upscaling phases (i.e. when significant investment is required to enlarge the production and marketing of crop diversification products). Policies can support the viability of crop diversification by:

- Integrating monetary incentives such as premiums for ecosystem services to increase the attractiveness of diversification crops.
- Ensuring a stable and favourable regulatory context regarding quality standards of new crops in order to create conditions for easier transition to diversified cropping systems.

3

Consider a strategic vision for crop diversification value chains

Crop diversification is an opportunity to set up new values in the agri-food system, with more attention on ecosystem services, both in the form of short and long value chains. We recommend strategically targeting crops, products, and consumers' groups to ensure the most efficient transition process. This can be achieved by:

- Defining quantitative targets for crop diversification that are consistent with the farm-to-fork strategy and protein transition.
- Reallocating public and private resources towards products that have the highest potential added value (not only economically but also in terms of environmental and societal impact) in each region.
- Facilitating access to grants, especially for small-scale, short value chains.
- Encouraging existing labels to include and promote crop diversity and biodiversity criteria.

References

- [1] Paresys L., Stilmant D., Baret P., Bliss K., Canali S., Colombo L., Hellou G., Rossing W., Vandewalle A., Willer H., Messéan A. 2021. DiverIMPACTS Policy Brief #1: Systems approaches to promote crop diversification as a lever towards sustainable agri-food systems. <https://doi.org/10.5281/zenodo.5957276>
- [2] Morel K., Revoyron E., San Cristobal M., Baret P.V. 2020. Innovating within or outside dominant food systems? Different challenges for contrasting crop diversification strategies in Europe. *PLoS ONE* 15(3): e0229910. <https://doi.org/10.1371/journal.pone.0229910>
- [3] Antier C., Viguier L., Messean A., Baret P. 2021. DiverIMPACTS Policy Brief #2: Recommendations for overcoming barriers to crop diversification towards sustainable agriculture. <https://doi.org/10.5281/zenodo.5824417>
- [4] Villa A. et al. DiverIMPACTS Deliverable 6.6: Analysis of impact of crop diversification at regional level and for consumers based on selected value chains. 2022 (in review).
- [5] Amrom, C., Antier, C., Baret, P., Courtois, A.M., Farès, M., Hartmann, P., Keiner, M., Le Bail, M., Mamine, F., Marette, S., Revoyron, E., Roiseux, O., Softic, A., Sukkel, W., Van der Voort, M. 2021. Addressing barriers to crop diversification: key elements of solutions identified across 25 case studies. Zenodo. <https://doi.org/10.5281/zenodo.4904532>
- [6] Mamine F. and Fares M. 2021. Product-service systems in direct crop-livestock relationships. *Home International Journal of Agricultural Resources, Governance and Ecology* Vol. 16, No. 3-4
- [7] Antier, C., Fares M. and Baret P. V. 2022 (in prep). D5.6. Consolidated report on logistics and contracts arrangements to enable crop diversification.
- [8] Koole, B. 2020. Trusting to learn and learning to trust. A framework for analyzing the interactions of trust and learning in arrangements dedicated to instigating social change. *Technological Forecasting and Social Change*, Volume 161. <https://doi.org/10.1016/j.techfore.2020.120260>.
- [9] Koole, B. 2022. Veganism and plant-based protein crops: Contentious visioning almost obstructing a transition. *Environmental Innovation and Societal Transitions*, Volume 42. Pages 88-98, ISSN 2210-4224. <https://doi.org/10.1016/j.eist.2021.12.003>.
- [10] Riera A., Antier C. 2022. DiverIMPACTS Practice Abstract: Tools for defining a fair price and strengthening crop diversification value chains. <https://sytra.be/publication/fair-price-tools/>

Imprint

Publisher: Université catholique de Louvain (UCL)

Authors: Antier C. (UCL, Louvain-la-Neuve, Belgium), Baret P. V. (UCL, Louvain-la-Neuve, Belgium), Rossing W. (WUR, Wageningen, the Netherlands), Villa A. (ORC, Newbury, UK), Fares M. (INRAE, Paris, France), Viguier L. (INRAE, Thiverval-Grignon, France). and Messéan A. (INRAE, Thiverval-Grignon, France).

Reviewers: Laura Kemper (FiBL)

Permalink: <https://zenodo.org/record/6382721>

This policy brief was elaborated in the DiverIMPACTS project. The project runs from June 2017 to May 2022. The goal of DiverIMPACTS – Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability – is to achieve the full potential of diversification of cropping systems for improved productivity, delivery of ecosystem services and resource-efficient and sustainable value chains.

Project website: www.diverimpacts.net

© 2022



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727482 (DiverIMPACTS)



DiverIMPACTS is supported by the European Union's HORIZON 2020 research and innovation programme under Grant Agreement no 727482 and by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 17.00092. This communication only reflects the authors' view. The Research Executive Agency is not responsible for any use that may be made of the information provided.