Cross-sectional analysis of 28 agrifood value chain initiatives: Various innovation dynamics related to their commitment to agroecology

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Abstract

Plant and animal supply chains may choose to reinforce or adopt agroecological principles in various ways. Twenty-eight case studies on initiatives claiming to differentiate themselves through practices related to agroecological principles have been analysed across different fields of production. The analytical framework used is based on the innovation functions implemented by value chains. The different actions taken within the value chains are analysed relatively to their capacity to feed into a process of collective learning in the transition towards agroecology. The presented results show a variable transformative capacity of the value chains, but we observed several regularities based on which the agroecological transition in France may take place. This article makes suggestions regarding collective actions that can support the agroecological transition in France.

Keywords: agroecology; sustainability; value chain; supply chain; innovation functions; innovation system; case studies

1. Introduction

Within the French plant and animal sectors, various agroecological practices are claimed by operators or inks to these practices are suggested, as explained in previous articles. During this exploratory research, various practices at different stages in the agrifood chains were identified on the basis of their communications (article, website, claims and CSR report) that mentioned practices that could be linked to agroecology. Twenty-eight case studies were selected for illustrative purposes (see the first article in this issue) then analysed. Each of the selected cases was confirmed to fall within at least two of the agroecology dimensions published by the FAO (Food and Agriculture Organisation of the united nations) in 2018, and presented in the first articles of this issue. However, the farming practices promoted by these initiatives have not been analysed across the board. In fact, they are very diverse and heavily dependent on the areas of production. The preceding articles, which were specific to certain sectors, explained some of these practices. The cross-sectoral analysis presented in this last article focuses on the results as regards the innovation functions deployed by the value chain initiatives studied to support their development.

More specifically, the objectives of this study are, first, to understand how such initiatives could feed a transformative innovation dynamic at the level of the agrifood sector and, second, to identify the potential market value of these more sustainable systems of production. More than 60 interviews were conducted and transcribed, through the 28 chain cases under study (Tables 1 and 2). These interviews were analysed thematically (Paillé and Muchielli, 2021) using the analysis framework based on innovation functions (guidance of the search, market formation, knowledge development and diffusion, governance and relationship control, legitimacy creation, network extension and resource mobilisation) presented in Magrini et al. (2025). This framework, adjusted on the basis of the literature and shared within INRAE sector research groups, structured the analysis of the case studies. The results are discussed in a synthetic way and illustrated with a few anonymised verbatim quotes.

On the basis of this cross-sectional analysis, we examine the transformative capacity of the agrifood sector (Section 1). The results suggest a set of regularities on which the agroecological transition in France seems to be based. We conclude (Section 2) with a set of questions that this research has enabled us to formulate, addressed both to public authorities and to researchers, in order to pursue this analysis and support the agrifood sector's agroecological transition.

Table 1: Illustrative initiatives whose principles are linked to agroecology.

Sector	Claim/sign
Horticulture	HVE (High Environmental Value), Blue plant
Pulses	SAI (Sustainable Agriculture Initiative)
Oilseeds	Fleur de Colza, Oleoze, French Soja
Cereals	Harmony, Limagne Charter
Wines	HVE, Terra vitis, Committed winegrowers, Sustainable champagne
Fruit & vegetables	Carrefour Quality, Bien Cultivés d'aucy brand
Equine	Equures
Rabbit	Lapin & Bien
Sheep	PDO Prés-Salés Lamb, 'Le Grévin' brand
Dairy cattle	Farm prosperity - regenerative agriculture
Beef cattle	Label rouge, Charal pack grass
Pigs	Jambon Noir de Bigorre, Be Good
Fish farm	Aquaponic Management Project

Table 2: Five illustrative initiatives across several sectors whose principles are linked to agroecology

Cross-sector	Claim/Sign
PADV (for a living agriculture) Bleu-Blanc-Cœur Demain la terre Low Carbon	Collective brand
Mac Donalds	Internal approach

2. Dynamics of transformative innovation at the sector level

The actions taken by the value chain initiatives studied are analysed through a set of innovation functions that confer a greater or lesser capacity for their development and effects on the transformation of the sector.

2.1 Guidance of the search and societal expectations

The directionality of change is based primarily on consumer expectations. Environmental issues are given priority in plant sectors, with many focusing on the issue of pesticides. Animal welfare issues are mentioned most often in the animal sectors. There is a nuance to be noted in the winegrowing sector, where the change of direction in favour of agroecology was initially driven by the demand for a reduction in the use of pesticides by people living near winegrowing estates.

> 'We must give ourselves the means to aim for environmental excellence.' (Interbranch organisation)
>
> 'A major environmental impetus.' (First-stage processing industry)

For many operators interviewed, committing to a more sustainable approach across the supply chain also helps strengthen a company's image and reputation. A number of operators stress the importance of displaying such commitments in modern times in order to gain access to public funding or credit from banks, which are themselves seeking to demonstrate to their customers that they are committed to supporting sustainable approaches. This was particularly emphasised in the vine and wine sector.

> 'A reputational risk for companies if they fail to take the environment or animal welfare into account.' (Producer organisation)

> '[Farmers] tell us, "We've got into this because we need to get up in the morning and give meaning to our activity and restore our image with the general public."' (Interbranch organisation)

For first-stage processors, these expectations of more sustainable practices are strongly driven by secondary and tertiary processors in contact with end consumers. This involves communicating a commitment to 'French origin' sourcing from sustainably grown raw materials. This was particularly expressed in the arable field crop and fruit and vegetable sectors.

For some, the expectations of the region in which they are based are also a strong motivation to match the image of their region.

> 'There is a desire to combine all this with a territory.' (Cooperative)

Not surprisingly, we also observed an anticipation of regulations linked to the regular evolution of phytosanitary product bans, which is already leading to the search for alternative solutions: *'Instead of being required to change, it's better to anticipate',* says one supermarket operator interviewed. For example, an initiative launched by a manufacturer in the first stage of pea processing, based on the sustainable agriculture initiative (SAI) guidelines, has chosen to draw up a list of banned molecules, going beyond current European regulations, to reinforce its commitment to sustainability of farms with High Environmental Value (HVE) certification.

Ultimately, however, the development of these value chain initiatives generally results from the choice of a promise to easily communicate to consumers: *'When it comes to technical dimensions, we lose the consumer'* (Cooperative). As a result, these approaches often develop from an issue that is 'isolated' in relation to the diversity of agroecological practices that can be deployed but serves as a starting point for broader reflection. Transition paths can therefore vary in relation to this anchor point. We have identified several elements of these anchor points: 'reducing phytosanitary products', 'living soils', 'preserving biodiversity' and 'saving water'.

Finally, the operators interviewed stressed the importance of farmers' receptiveness. Their motivation to commit to new practices or to consolidate and better promote sustainable practices that have already been implemented is not necessarily self-evident. The fear is that new practices will become too standardised and restrictive, while the increasing vagaries of the climate call for agility and adaptation. A number of cooperatives (harvest and storage organisations) have argued that it is important to start with a group of pioneering farmers, given their experience, to test and develop a basis that can then be the subject of specifications or a charter of commitment that can be disseminated to a larger number of farmers. In arable farming, for example, these are often farmers who are already involved in experimental networks, such as the Dephy farms,[1] or in economic and environmental interest groups (GIEEs in France).

This process of promoting more sustainable practices is generally accompanied by a strategy of enhancing the value of the product through market signals.

[1] https://agriculture.gouv.fr/les-fermes-dephy-partout-en-france-des-systemes-de-production-performants-et-economes-en-0

2.2 Market construction and value-adding terms

For the operators interviewed, agroecology made sense in terms of their practices, but for most of them (at the time of the interviews), agroecology was not a unifying communication term, either internally or externally, and did not enable them to promote their initiative on the market. Other terms were preferred, including 'ecoresponsible', 'proenvironmental' and 'sustainable'. Others chose a conceptual positioning that differentiated their initiative from agroecology and was inspired by other countries and foreign markets, such as regenerative agriculture for the Danone group, an approach that is also very present in the SAI private standard.

There are two main approaches to the direction of change and its positioning in the market. Some operators choose to develop their own approaches, such as Mondelez's 'Harmony' Charter or Hénaff's 'Be Good' Charter. Other operators use existing standards to provide a framework suited to their practices or to their markets. This is the case, for example, of the adoption of HVE public certification developed by the Ministry of Agriculture, Food Sovereignty and Forestry (MASAF) at the farm level. Another example is the adoption of private certification, such as SAI, which aims to harmonise different standards around the world to meet the needs of international customers of companies such as Roquette (HVE is included in this benchmark). This point thus refers to a mixed strategy of creating a private approach that finds levers of legitimacy in public standards. In particular, French level 2 environmental certification (CE2+) is associated with the recognition of a range of equivalent approaches. All in all, we can see a diversity of approaches, resulting in a proliferation of endorsements on the market.

With regard to HVE specifically, the reasons for adopting it vary. For some, the standard is appropriate because it helps consolidate an existing approach, thereby encouraging its adoption (this is the case, for example, with the 'Bien cultivés' d'aucy cooperative brand for fresh and dried vegetables or the 'Demain la Terre' collective brand for fruit and vegetables). Others are more cautious and explicitly choose not to adopt HVE.

> 'I have everything I need to be [HVE] certified.' (Farmer)
>
> 'HVE? The answer is no, we don't want to be locked into a system; we want to be in control of our commitments; we're capable of doing more, and that's why, in the end, we went back to work on our own charter.' (Storage organisation)

For certain products, such as wine, the strong growth of HVE (in 2024, 40% of winegrowing farms were HVE) means that it is increasingly becoming a requirement for listing in supermarket distribution channels, alongside organic, which concerns 22% of winegrowing farms.

> 'Everything [sold] in supermarkets has to be HVE, because otherwise we don't sell.' (Wine cooperative)
>
> 'HVE is already the norm.' (Winegrower)

On the other hand, HVE farms are less developed in other production sectors (3% are in vegetables, 8% in field crops)[2] and has very little development in livestock farming (4%). The absence of any reference to animal welfare is often the main reason given by these sectors for not adopting HVE.

> 'There is no HVE criteria for livestock production.' (interbranch organisation)

These results suggest that the question of the development of HVE environmental certification remains open. Either this certification is to be considered as one approach among others, or it is on the way to

[2] By cross-referencing MASAF data on HVE certification and Agreste data on the number of farms by type of production, in 2024 almost 7% of field crop farms, 8% of industrial vegetables farms and 6% of livestock farms will be HVE-certified, compared with 40% of winegrowers.

becoming a market entry standard for certain productions, such as winegrowing; however, its generalisability to the animal sectors requires a review.

Finally, it should be noted that the premium positions of products marketed in these sectors are generally established on products with high added value, such as wine or certain cheeses, compared to products with low added value, such as pasta, milk or tinned vegetables. Processors who have initiated these initiatives prefer to align themselves with brands that are already considered *premium* to attract customers with high purchasing power (e.g. the d'aucy or Demain la Terre brands). In this way, the market positioning of these initiatives results either in a price supplement or—in the absence of a price supplement—easier access to distribution channels or better listing or positioning on shelves.

> 'Production charter gives rise to specific remuneration.' (Producer organisation)

> 'They don't sell for more, but they sell better.' (Producer organisation)

All the operators interviewed stressed that the market positioning of these products is difficult to establish because of a lack of consumer purchasing power. However, this lack of consumer purchasing power needs to be put into perspective in terms of consumer preferences. Some operators have also noted that while food purchases are still very restricted for some people, this is not the case for all social categories. The lack of enthusiasm of one part of the population to buy products from these differentiating approaches and support their economic development through regular consumption requires further investigation. In fact, according to Ministry of Energy Transition (MTE) surveys concerning consumers' environmental practices, only 6% defined responsible consumption as buying products that are more environmentally friendly, and between 35% and 40% of them said that these products should not be more expensive to encourage them to buy them, figures that have remained stable over the last 10 years.[3]

Finally, it should be noted that to strengthen their signal on the market, most of these initiatives rely on external certification of their specifications and are therefore not limited to internal audits. The costs of certification are generally offset by tax credits or access to certain forms of aid.

> 'Certification provides better proof of commitment' (Manufacturer)

The fear that consumers will be confused by value-adding terms was expressed on several occasions. This is a recurring theme that is regularly highlighted in the literature (Prag et al., 2016; Tavoularis et al., 2007).

> 'In my opinion, the excess of official certification signs and designations is increasingly confusing … and there is a real problem with how products are displayed.' (Producer organisation)

However, from the point of view of transition processes, we can also consider that the multiplication of such initiatives in value chains is a normal process that contributes to the construction of different paths that are likely to hybridise over time, gradually leading to a refoundation of the agricultural sector towards agroecology (Magrini et al., 2025). The proliferation of value chain initiatives can also be seen as a form of sectoral resilience, as they each experiment with different practices that will prove to be more or less adapted to climate change over time. Thus, the challenge is to consider the forms of support that could be put in place by public authorities to strengthen the legitimacy and clarity of these approaches for consumers and reduce the loss of reference points for them.

2.3. Developing knowledge: Internal and external mechanisms

Consolidating knowledge is an essential innovation function. We have observed that all of these value chain initiatives establish internal resources to strengthen the construction of knowledge about new

[3] https://www.statistiques.developpement-durable.gouv.fr/pratiques-environnementales-des-francais-en-2021-agir-lechelle-individuelle

practices through various mechanisms. Many operators provided dedicated technical advice. For example, agricultural cooperatives under contract with manufacturers set up specific monitoring for involved farmers. This monitoring is facilitated by the fact that, with certification, a range of data must be organised and transmitted by the farmer.

> 'A lot of technical work to consolidate the standards was required…' (Producer organisation)
>
> 'We support them [farmers] more closely.' (Cooperative)

This gives rise to the construction of shared databases to develop production benchmarks and monitor the profitability of the approach developed by the value chain.

> 'We manage the creation of a specific decision support tool for our farmers.' (Cooperative)

One interesting point is a new form of downstream involvement in the development of agronomic expertise. Most of the processors involved in these initiatives have set up their own agronomy departments within their companies to establish a dialogue that enables joint development. This takes the form of regular meetings between upstream and downstream actors, with field or plant visits.

> 'What's very important is that we have acquired this expertise internally, so that we can have a dialogue between experts.' (Industrialist)
>
> 'We have annual reviews … meetings … discussions to see if we're going too far on some points and not ambitious enough on others.' (Large retailer)

Cooperatives, such as manufacturers, organise their own experiments and monitor to develop the indicators that are most relevant to them. The aim is to create a collective commitment to the approach developed, a feeling of belonging to a meaningful sector whose interactions encourage progressive collective learning. In this way, the specifications can be said to be evolving in line with the know-how.

> 'We're not saying we're going to be the best in the world …, we're going to try to improve' (Cooperative)
>
> 'What's fundamental is that this knowledge is passed on from one farmer to another and exchanged between farmers.' (Cooperative)

While knowledge building was cited as a fundamental action, few existing schemes supported by public authorities, such as the GIEE or the Dephy farm network, were spontaneously mentioned as incubation spaces for approaches. However, during the in-depth interviews, these schemes emerged as complementary incubation spaces where the farmers involved in the approaches studied had already been able to develop a form of learning (Magrini et al., 2025). It is often mentioned that the first farmers involved in supply chain initiatives were also those who were already involved in experimental networks. These networks have helped to develop the technical skills and agility of farmers who are more willing to take part in audits or certifications and discuss their practices.

One important point is that we have observed that the means and financial resources made available to develop this knowledge vary from one value chain to another. Sectors with high added value have more resources at their disposal. The resources made available by interbranch organisations and technical institutes also vary depending on the size of the associated production chains. Access to research and development (R&D) projects also varies among these initiatives.

> '[Name of an interbranch organisation] helps us … with real follow-up.' (Producer organisation)
>
> 'We don't have much professional advice, so we're on our own. … Research is done in-house; we lack funding.' (processor)

These observations led us to ask how the various existing knowledge-building mechanisms can be brought together and made to interact, with the goal of contributing to the dissemination and sharing of knowledge between sectors. Given that these approaches involve different networks, how can we

encourage the dissemination of knowledge between approaches and between interbranch organisations and technical institutes?

The development of knowledge therefore calls for a series of interactions between upstream and downstream sectors, which also depend directly on the value chain's choice of governance mode.

2.4 Governance and securing relationships in the sector

For most approaches, there is a gradual inclusion of different links in the decisions concerning the direction of the approach. Decision-making is most often collegial, involving different links in the chain; some even include consumer representatives. All of them stress the importance of the chosen mode of governance in developing trust between operators in the sector. This also helps unite operators around shared values.

> 'A coconstructed initiative … we began by working with farmers, administrators and colleagues from the various processing facilities. … We worked together to build something that meets everyone's needs … we have a steering committee for our charter, and we meet almost every month.' (Cooperative)
>
> 'It's important for them to know that we have good relations with our farmers, because that's a guarantee of reliability.' (first-stage processor)

The commercial relations of negotiation, which are generally based solely on price, are replaced by broader discussions on practices, quality market choices, etc., thus encouraging the development of a collective progress approach. Some operators noted that when interbranch organisations are heavily involved in the development of an approach, the knock-on effect seems stronger, as demonstrated by the 'Agneau de Prés-Salés' approach.

Some operators, however, deplore the fact that these initiatives too often fall under the responsibility of marketing departments or isolated services within groups of companies, while others have chosen to disseminate the approach more widely throughout the company or have working teams that closely associate the marketing and agronomy departments (e.g. the d'aucy brand). The management strategy associated with an initiative reveals, in a way, its market niche and/or niche innovation status. The existence of an approach that has been in place for several years but does not spread throughout the company and remains limited to one market segment reveals a lack of transformative capacity.

To consolidate an approach, specific organisational arrangements are generally chosen to secure the relationship between the stages of the value chain. For example, most storage organisations set up specific production contracts with farms. These are marketing contracts signed before production begins, with requirements for results and/or means. These contracts ensure the long-term viability of the approach. These contracts are also a way of incorporating more transparent price formulas that are known in advance, most often these price formulas combined with a payment scale that provides incentives for farmers.

> 'These storage organisations are in contact with the farmers, and the contract is signed between them and the storage organisation, which then signs a contract with us.'
>
> 'Consolidate an industry … with our cultivation contracts before sowing.' (Processor)
>
> 'Contracts … we build lasting relationships' (Processor)
>
> 'Transparent pricing' (Cooperative)

The autonomy of farmers or breeders, therefore, remains dependent on the specifications and, therefore, on the mode of governance linked to the construction of these specifications. In most cases, these specifications are said to be coconstructed with the farmers, but this is not always the case. The clauses are reviewed regularly.

> ‘It’s really the experience of our teams that enables us to achieve this level of quality in our specifications.’ (Retailer)

Some operators have chosen to change the name of their specifications to ‘resource specifications’ to enable each farmer to choose the practice or system best suited to their production contexts to reach the expectations of the initiative (this is the case, for example, of the Bleu-Blanc-Cœur value chain, which specifies the various ways in which the fatty acid profile of animal products can be enriched with omega-3 without depending exclusively on the addition of linseed sold by the processor, these practices leading to more positive environmental impacts).

Conversely, these specifications do not seem to encourage a systemic vision of the farm beyond the single production targeted by the contract, which remains a single product. This is often the case with quality and origin identification signs (SIQO). In many other cases, however, it is still very difficult to access the content of the contracts in order to appreciate their broader scope.

2.5. Network extension and associated stakeholders

Governance can lead to the extension of the network of associated actors. Extending the network is seen as key to the collective construction of knowledge, access to external resources and the legitimation of the approach and its reputation. One important point to note is that these initiatives involve an increasingly wide range of stakeholders in their discussions, including NGOs (e.g. the World Wildlife Fund) and associations promoting agroecological practices (e.g. ‘Pour une Agriculture du Vivant’ [PADV], Noé, ‘Sols Vivants’ and Syrphis). These new prescribers are redefining the scope of the more traditional agricultural advice provided by the chambers of agriculture and technical institutes.

> ‘… of a coconstructed approach in which we adhere to the philosophy and we are stakeholders … it improves the notoriety and image of the approach built.’ (Cooperative)

> ‘We wouldn’t have been able to do what we’ve done with our employees if we hadn’t been able to rely on networks, and agro-ecology networks.’ (Livestock farming association).

> ‘... the ecosystem at the local level, we have a producer who is supported by his technical service … The technical service in relation with the chamber of agriculture.’ (Cooperative)

There is also a fairly strong desire for these initiatives to find a rationale for action in the area in which they are based in the context of the support or mobilisation of local mechanisms.

> ‘… creating a bird sanctuary with a local association.’ (Association)

> ‘Collaboration with work integration structures, including ESAT (French establishments or services providing assistance through work).’ (Cooperative)

There is also a desire on the part of some initiatives to join forces. For example, the ‘3ème voie’ collective initiative,[4] which brought together Demain la Terre (to which PADV belongs) and Bleu-Blanc-Cœur in 2022, is pursuing a federation of several value chain initiatives that now also includes the quality sign ‘Culture Raisonée Contrôlée’ (CRC, translated as controlled reasoned culture) for wheat, Goodfish for seafood products and ‘Vignerons Engagés‘ (translated as ‘Committed Winegrowers’). This is an explicit choice to gain greater clarity and market size.

> ‘… the benefits of opening up more widely, and having companies that are sometimes competitors.’ (Association)

Over and above these grouping choices, we see that certain stakeholders such as consumer or advisory associations (e.g. PADV) take part in the working meetings of these different initiatives. These

[4] https://demainlaterre.org/collectif-de-la-troisieme-voie/les-membres-du-collectif/ [consulted on 9 October 2023]

stakeholders then become pivotal actors in the network of these approaches, helping to move thinking in certain directions.

Ultimately, extending the network enables the approach to be extended to gain market share and provides access to external resources to help develop or find collective solutions to the difficulties encountered. In particular, some of these initiatives look at the issues of handing down the family business and generational renewal. These initiatives, which began with pioneering farmers or highly committed members, sometimes struggle to renew themselves with new generations, making it necessary to rebuild the direction of change.

2.6. Mobilising resources: Unequal access to resources

The success of these new approaches and new markets depends very much on the sector's ability to mobilise resources efficiently and increase the economic performance of the approach. A frequently used lever is a French tax credit to offset the cost of external certification for farmers or the intermediary organisation (depending on who is responsible for certification).

> '… in the end, we'll say it was a whitewash [thanks to the tax credit].' (Cooperative)

A second lever is the construction of shared financial funds for investments via the organisations' own funds or by mobilising funding from banks or subsidies (Banque des Territoires, Caisse des Dépôts, regional councils, for example). Access to these funds is much easier if the approach has acquired legitimacy in the market. This also compensates for the varying financial resources available to interbranch organisations in these sectors.

> 'Some banks ... [have] obligations on a global scale, and these companies will no longer be able to be part of these groups if they are not able to prove that they are doing green finance; they have to prove that the clients they finance are virtuous.' (Cooperative)

> 'They are two different cooperatives, even competitors. ... We have really pooled our R&D resources.' (Association)

We have observed that these initiatives rely heavily on local and regional mechanisms, with significant support from the regions, particularly in the emergence phase, while more national institutions are involved in the development phase. Meanwhile, participation in R&D partnerships remains variable, with some initiatives having developed an active strategy of responding to calls for projects or funding and relationships with public research, while others remain less agile in attracting external funding or developing partnerships. To mobilise resources efficiently, they are also prepared to invest in new activities necessary for the operation of the approach, such as plant breeding.

> '… we have also consolidated the seed production activity because to do all that, you also need … certified seeds to guarantee stability.' (Processor)

2.7. Scale of action and relations with public authorities

Dialogue with public authorities is essential to drive changes in market conditions and obtaining new support. For example, a number of private label schemes have worked to get their products recognised under the EGalim scheme, which requires 50% of catering to be supplied with quality label products. Interbranch organisations sometimes act as intermediary stakeholders with public authorities to defend these approaches.

> 'We're trying to make the public authorities understand that we need to ...' (Cooperative)

> 'We very much expect the public authorities to do this work. We need this logic of recognition to consolidate our position.' (Association)

> ‘We have a major disagreement [with the Ministry], because we have a better certification approach than HVE, and we are only recognised at level 2, and that doesn’t fit.‘ (Interbranch organisation).

This dialogue remains highly dependent on the size of the initiative. The regions are seen as an important forum for local dialogue for these initiatives.

> ‘The highlight was the signing of the roadmap, which sets out the challenges and actions that the sector has defined for itself in terms of AE and whose importance has been recognised by the Regional Council.’ (Cooperative).

2.8. The most important agroecological principles advanced by these initiatives

In most of the cases, agroecology was a term that made sense in terms of their practices, both from the point of view of the technical practices chosen in production and the modes of governance or management of relations between links in the chain. In relation to the FAO grid shown to them at the end of the interview, the most frequently cited principles were those relating to the social dimension, in connection with ‘the coconstruction and sharing of knowledge‘ and ‘social and human values’, a principle put forward by the operators in relation to their CSR that advocates the desire to promote new values, such as animal welfare in livestock farming.

Next, the principles of ‘responsible governance’ were frequently cited, with regard to the desire to promote more collegial modes of governance and more transparent remuneration; ‘resilience’ was cited with regard to the collective reflection undertaken by these initiatives for new practices and quality criteria in the face of climate change and a greater collective capacity to react to changes in consumer expectations. Less frequently, the principle of ‘efficiency’ was also mentioned in terms of the quest to save resources and reduce the use of synthetic inputs. References to ‘food culture and traditions’ were the most frequently cited within the SIQO and in highly territorial approaches.

Conversely, very little mention was made of the principles of ‘diversity’, ‘synergies’ and ‘circular economy and solidarity’. These principles remain highly dependent on a more systemic vision across sectors, and several operators said they were aware of the lack of concrete action to address these issues. Some of them expressed a desire to look at ways of encouraging synergies between sectors. However, most of these initiatives currently focus on individual production sectors.

While agroecology makes sense for these various initiatives, most of these initiatives have not chosen to refer to it explicitly in their communications strategy, preferring terms that are more commonly used by consumers, such as ‘ecoresponsible‘, ‘proenvironmental’ or simply ‘sustainable’.

> ‘We do agroecology without naming it.’ (Cooperative)

> ‘We’re trying to use positive images to raise agro-ecological issues. … We’re putting more emphasis on trees, bats and bees.’ (Industrialist)

The use of the term agroecology by public authorities is still recent (the law on agricultural modernisation referred to it as early as 2014). The rise of environmental issues has led most sectors to consider experimenting with more sustainable approaches. Most of our cases had been in gestation for several years before 2014 and used this new public impetus to consolidate their initiative (for example, the ‘Bien cultivés’ value chain launched on the market in 2020 but conceived of in the late 1990s, and the ‘Demain la Terre‘ association was created in 2004). For a few others, the 2014 law served as a trigger for launching an initiative (for example, the SAI approach for peas by Roquette in 2017, PADV in 2018).

In all cases, the public impetus made it possible to consolidate and strengthen the direction of change, and these observations call for continued efforts to communicate the term ‘agroecology’ in order to support and strengthen the sectors in this positioning.

3. Conclusion and outlook

We propose looking back at some of the main findings.

First, agroecology provides an overall framework within which a diversity of approaches can be positioned. These approaches are all areas for experimenting with change, from which diverse practices are consolidated through learning and spread. It would be simplistic to confine the term 'agroecology' to a few targeted practices, as this would not allow each sector to choose its anchor point, from which the construction of an agroecological transformative path can begin, depending on its initial experience, objectives and constraints. For all of these, public authorities need to communicate more about agroecology to support the process of adopting and applying the main principles of agroecology and thus help the sectors build their own transition path.

Ultimately, the diversity of approaches observed in this transition process should not be seen as a hindrance or a source of confusion but as a form of sectoral resilience in the ability to experiment and envisage different paths towards agroecology. If public action is to be taken to support them, it is important that these initiatives are able to objectify their collective work and provide concrete evidence of the actions they are taking. This is particularly important with regard to the learnings and diffusion, so that they can be properly described as niche-innovations. Indeed, a niche-innovation is first of all a space for experimentation where learnings can take place and consolidate to progress and spread throughout the sector, rather than simply being a niche market.

The fact that the principle of the coconstruction of knowledge is strongly emphasised in the cases studied reveals the importance of collective learning between upstream and downstream sectors. Indicators linked to the mechanisms that enable this coconstruction can form part of the metrics for assessing the status of niche innovations. The principles of agroecology seek to encourage locally adapted, coconstructed approaches combined with the promotion of responsible, inclusive governance, which is not restricted solely to downstream management but involves genuine upstream–downstream collaboration. Agroecology is not just about production techniques; it is also about building new social values, which are transformed all the more strongly by the increased social interaction between the operators in the process of redesigning practices. It is regrettable that the learning opportunities advanced by these initiatives and those associated with schemes supported by French public authorities, such as GIEEs and Dephy farms, seem not to be strengthened by initiatives studied. Although these schemes were mentioned in a few cases, they were not the majority.

It should be noted that access to the technical specifications on which these initiatives rely was sometimes very difficult to obtain during the course of the study. It was therefore not always possible to assess the strengths of agroecological dimensions from production practices beyond their declaration. One way forward would be to set up shared expertise workshops between such initiatives and researchers from different disciplines to help establish a progress path and provide complementary perspectives to advisory systems.

Finally, all of the cases studied show that the market shares of these approaches remain very limited. These sectors all stated that getting more market shares is difficult, especially in an inflationary context that limits consumers' purchasing power for higher-quality products, which are generally associated with a price premium. The transition to agroecology therefore calls into question consumers' purchasing power and preferences, their ability to understand the impacts of the initiatives on the market and their willingness to support these initiatives. These observations may prompt public authorities to consider ways of making these agroecology initiatives more visible beyond public certifications in order to further the purposes of these initiatives and strengthen their legitimacy.

In particular, we observed on several occasions that these sectors have unequal resources and means of action within their interbranch organisations, particularly in terms of communication about agroecology and related practices. This observation calls for greater sharing of knowledge and experience between

sectors to cross-fertilise expertise between production areas. How can practices developed in one production chain be shared with another production chain? How can these approaches promote a systemic vision of the farm and the region through their charter or specifications to go beyond the production they market? How can synergies be promoted between these value chain initiatives and between sectors? What role should interbranch organisations play in these interactions between niches? If this dialogue between the public quality signs within the National Institute of Origin and Quality is permitted, how can it be promoted between other initiatives? How can we better assess the impacts of these initiatives on local areas? These are some of the questions that remain to be answered.

Ethics

The authors declare that the experiments were carried out in compliance with the applicable national regulations.

Declaration on the availability of data and models

The data supporting the results presented in this article are available on request from the author of the article.

Declaration on Generative Artificial Intelligence and Artificial Intelligence Assisted Technologies in the Drafting Process.

The authors used artificial intelligence technology (DeepLPro) in the translation of the article from French to English.

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All : Conceptualisation and initial methodology. **MBM**: Initial drafting. **All:** Investigation, Formal Analysis, Review and Editing. **MBM, VLP, CS:** Final revision and editing. **MBM, VSG, CD:** Supervision, acquisition of funds**.** All authors have read and approved the final manuscript.

Declaration of interest

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