

AN IMAGE OF THE SEINE RIVER BASIN IN 2050: WHAT IF AGROECOLOGY COMES TRUE?



Xavier **POUX**
June 2016

TYFA
CASE
STUDY
SCENARIO

**SEINE
RIVER
BASIN**

This document...

This document takes place in the wider project TYFA.

It is a piece of a future study approach in progress, consisting in:

- a series of regional images of what could be agroecology in contrasted contexts. This case is one of them, the other cases being
 - the Plovdiv Region (Bulgaria)
 - the Dartmoor National Park (UK)
 - la Vera area (Spain)
- a macro scenario, describing the European consequences of the development of agroecology at this scale¹. This scenario is not formalised yet.

TYFA has been financially supported by



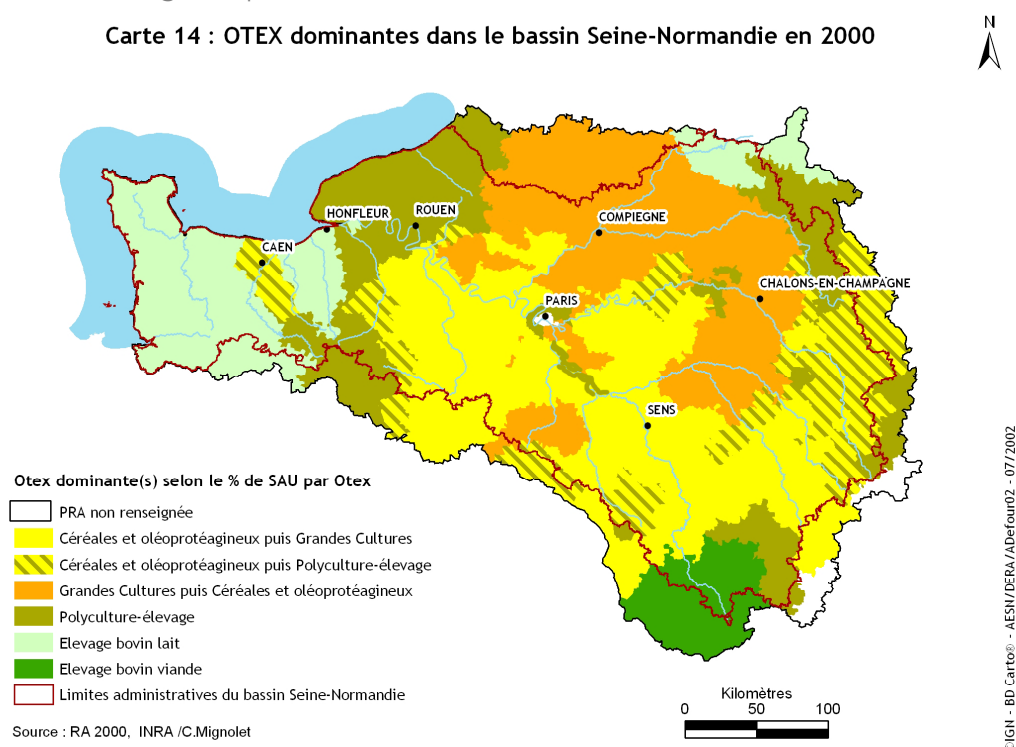
Fondation Charles Léopold Mayer
pour le Progrès de l'Homme

¹ For a methodological approach of this scenario, see...

General presentation of the area

The Seine river basin (SRB) is a large area. Its UAA covers nearly 7 M ha, 20% of France but 1/3 of cereals, showing the specialisation of the area.

Carte 14 : OTEX dominantes dans le bassin Seine-Normandie en 2000



Although it is a very large area, it can be considered as a consistent geographical unit because of its socio-economic organisation on the agricultural stand, all the more if the livestock area of Normandy, in the West (light green on the map), is excluded as it is outside the watershed boundaries.

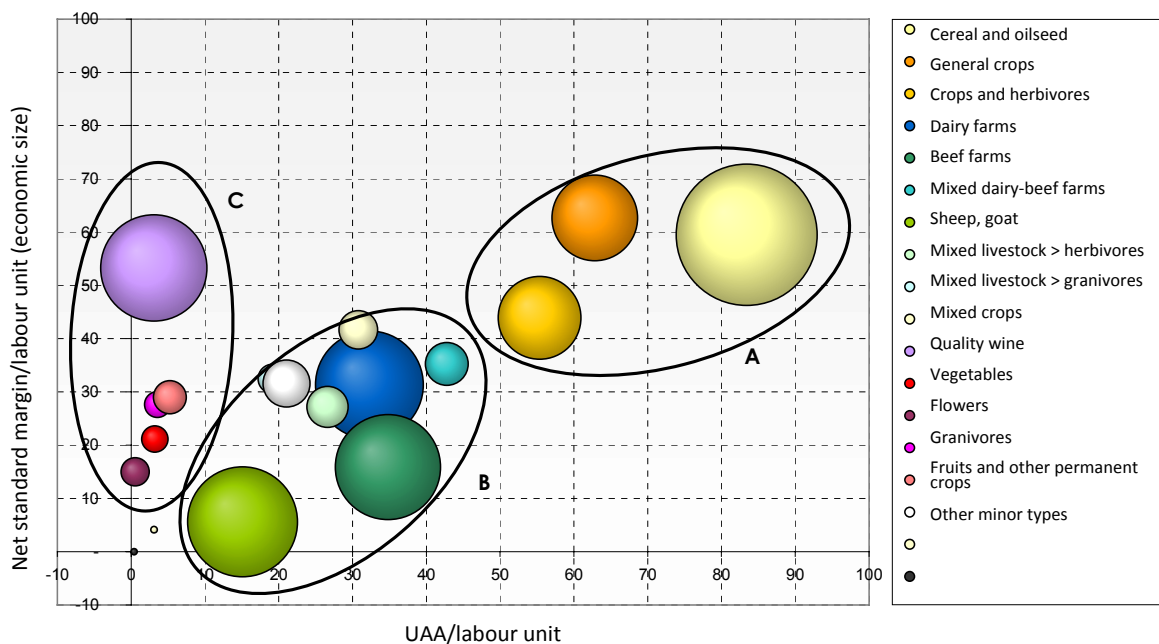
Indeed, its recent history tells the change from mixed farms oriented towards grain and sugar, but also dairy cheese farms exporting on medium scale to a specialised globalised grain region for feed. The soil and climate conditions are particularly convenient for the mechanisation and chemical revolution of agriculture. Yields are high (e.g. wheat 7-8 t/ha).

From an agroecology perspective, it clearly illustrates the "bad case", while at the same time it is a region that has fully engaged in the huge use of inputs and, through its exports, it is a dominant agrarian region influencing the feed sector across Europe. It is an upstream actor in the European food chain as it is the main exporting area of feed to the rest Europe.

A rapid portrait of the present situation: farming and food systems

Farm structure and dynamic

The below figure (dating 2000, to be updated, but findings are still valid) illustrates the general techno economic structure of farms:



Economic size x labour and land intensity x farm type (2000 data)

Each circle area is proportionate to the number of farm in each type; the x axis shows the physical size of the farm and the labour intensity (UAA/LU); the y axis shows the economic standard size (Net standard margin/LU).

The figure shows:

- Types A: crop oriented. The largest farms, making profit on large UAA. Heavily mechanised in general, highly subsidised. Two main strategies in this group:
 - a) Cereal specialisation (light yellow) on largest UAA. Labour simplification, economies of scale and relatively limited net margin/ha
 - b) Specialisation in high profit crops (sugar beet, potatoes), when possible (orange). More labour and equipment demanding, but more profitable as well.
 - c) Strong yellow shows cereals farms with remaining livestock.
- Types B: livestock. Less profitable generally speaking.
 - a) Dairy farms (dark blue): labour intensive and relatively profitable.
 - b) Beef farms (dark green): a bit larger, but much less profitable
 - c) Mixed livestock, sheep/goats (light green): small farms. Highly declining.
- Types C: high added value crops: wine (Champagne and other famous vineyards), vegetables

This types A represent the easiest option for farmers. When possible, the strategy is to increase the farm size, giving up with livestock. Within type B, the main strategy is also to increase the size of dairy farms; beef and sheep farms are considerably declining.

The following figure shows the trend, from the 1970's:

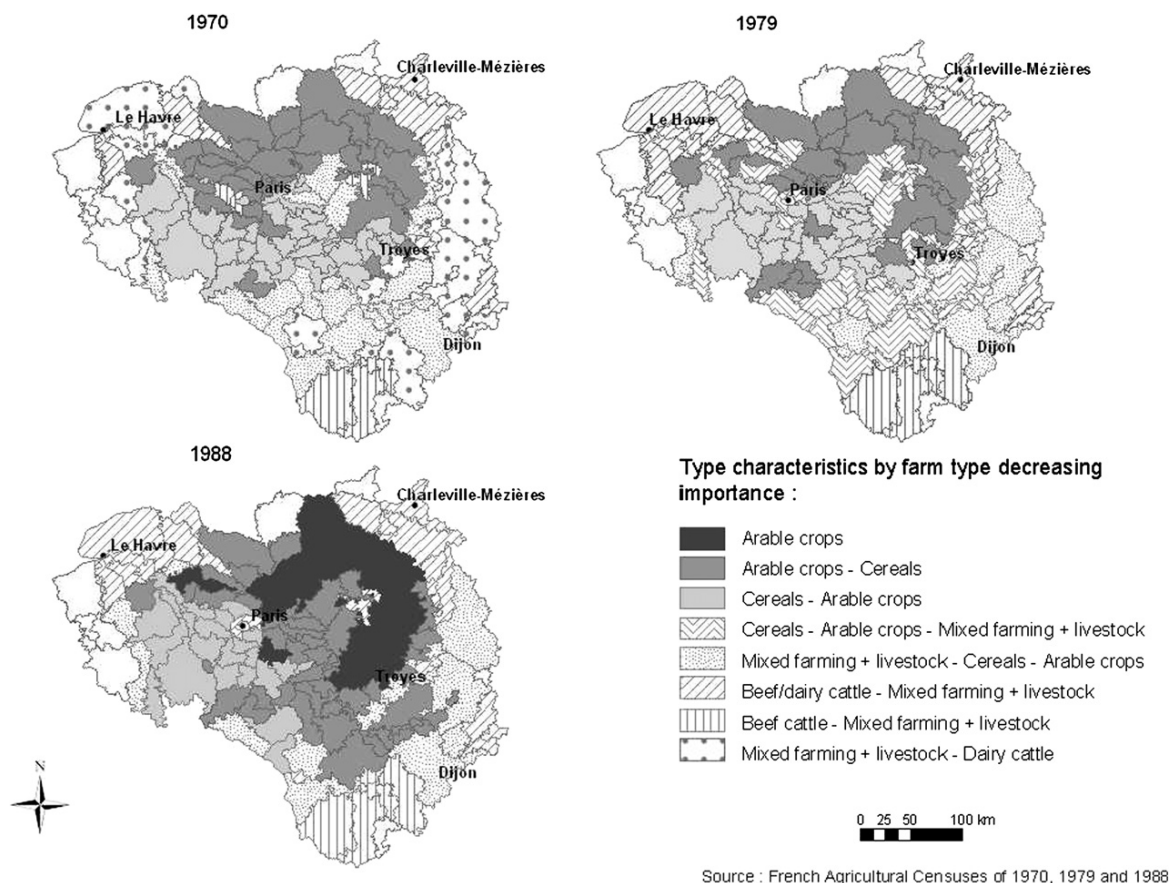


Fig. 3. Typology of the agricultural districts according to the dominant farm types combinations in 1970, 1979 and 1988.

Food chain: industry and commodities, not linked to the population

Despite the presence of Paris and urbanised area — that could provide a huge local market — the agriculture of the basin is mainly export oriented. Urban people living in the SRB may eat cereals or any food stuff product coming from anywhere.

As for grains and oilseeds, the main market outlets are raw products exported through Rouen and le Havre harbours, mainly towards Europe. Share of wheat for the bread industry seems to be expanding, but this share should be quantified. The chain is strongly organised from upstream (farm advice, choice of varieties and fertilisers applications) to downstream (silos and market boards).

As for oilseeds, the share between similar export patterns and rising oil for agrofuel should be quantified. But nevertheless, the logic remains industrial.

The most "territory based" productions are potatoes, sugar beets and dehydrated alfalfa, as for the location of plants strongly influences the geography of production. Economic investments are heavy, making those productions somehow fragile. Products of these industries are exported at EU level.

In this context, most UAA is under industry logic management. Short supply chains are mostly developed for vegetables, some meat and dairy local producers. But they represent a very small share of UAA.

An alternative agroecological image of the Seine basin in 2050²

The Seine basin in 2050: contributing to diverse long food chains

The AE image of the Seine basin does not mean an area entirely devoted to feeding the numerous populations of Paris and other surrounding cities. While this function is considerably developed when compared to 2016, AE at the European scale (still) relies on food flows within and outside Europe. In the case of the Seine river basin, cereals are still exported, but their main destination is now North Africa and Middle East and for human consumption. These flows are necessary in order to ensure a food balance for a still growing population in a strategic region for Europe, all the more that Climate change is altering its production capacity.

However, the position of the SRB has a whole has considerably changed. Firstly, the overall cereal production has considerably decreased with the abandoning of synthetic fertilisers and pesticides on the one hand and the decrease of cereals in the crop rotations. The exporting capacity outside Europe is only possible due to the considerable drop in cereals export towards Europe. This intra-EU market has been reduced with the parallel drop in animal production, and notably from indoor pig and poultry systems. The SRB has given up its role of grain provider for feed for the rest of Europe.

However, as a result of a combination of agronomic reasons (the need to close fertility) and of sociology (demand for ecosystemic services and to a lesser extent for local food systems), grass-based livestock production increases in the basin, competing in some way some "traditional" livestock producers of Normandy. Fruits and vegetables also increase their area, although the economic rationale behind is linked to local markets in a clearer way than for livestock.

As whole, the SRB's agriculture remains a productive one, integrated in commodity flows for "surplus" cereals and mainly in processing industries for the bulk of its production.

On a more qualitative level, rural tourism is boosting, thanks to more attractive landscapes — not to mention the increasing price of planes and all kind of transportation for remote tourism. But touristic operators are not mainly farmers, who are occupied enough with their farming activities and who earn enough money through the sale of their product.

The SRB farming systems: adapting to strong technical changes while keeping some key structural features

In 2050, the SRB farmers have kept their overall farm structure unchanged, despite the radical change due to the abandoning of pesticides. Some would have thought that in such a locked-in system, as it was in 2016, it was impossible that most farms would not bankrupt. Some of them did, but the development of organic farming on large farms showed the way. On farm level, the difficult change has been more psychological and organisational than truly technical. As a whole, the size of farms and their level of equipment remain the same and large farms still dominate land-use.

One of the most difficult issue has been the acceptance of a minimal share of permanent landscape features in every farm (the former ecological focus area, but result oriented), that was seen as a diversion from the feeding mission of farm. However, in a territorial context where water protection and the provision of natural risk prevention services against floods and soil erosion are key issues, the pressure for "landscape measures" was strong. Land sharing and land sparing are converging at the end.

² The following pages are written in the present tense in order to make the reader be in the future.

The farm orientation depends on two factors: the agronomic potential and the peri-urban location. The latter mostly influence the farm structure as the presence of roads, allotments and logistical facilities make difficult the management of large mechanised farms, might they be organic. Small farms are much more adapted in this context. These two factors combined lead to three main types of farms:

1- **Large farms in openfields dry plateaus**, formally developing towards simplified crop systems in which wheat was dominating, now adopt mixed farming in which cereal production remains a core activity. They combine long term rotations and relatively large livestock activities oriented towards meat (less demanding in terms of work than dairy). While grazing is increasing for young animals (heifers), most animals are kept near the farm settlement and spend night in buildings in order to collect manure. Large barns and sheepfolds are back, built according to animal welfare and labour organisation rules. With the disappearing of large outdoor pig and poultry factory, the remote farms of the area develop production in these sectors using animal-friendly conditions, with interesting economic return. Crop rotations combine temporary grassland, alfalfa for the feeding of fattened animals and a diversity of cereals and oilcrops. Permanent grassland is found in most humid areas (nearby rivers and streams), used for cows and beef. Sheep make use of dry land and the poorest areas of chalky soils on plateaus are turned back into rangeland for sheep. Fertility is managed through a combination of nitrogen fixation by legumes and transfer from permanent grassland/rangeland (saltus) to cultivated fields (ager). Although some forms of collective management of fertility transfer take place in some areas, most farmers prefer to have the complete mastery of this critical production factor. In some areas, plantation of hedges is made for fertility management at landscape's scale (prevention of erosion).

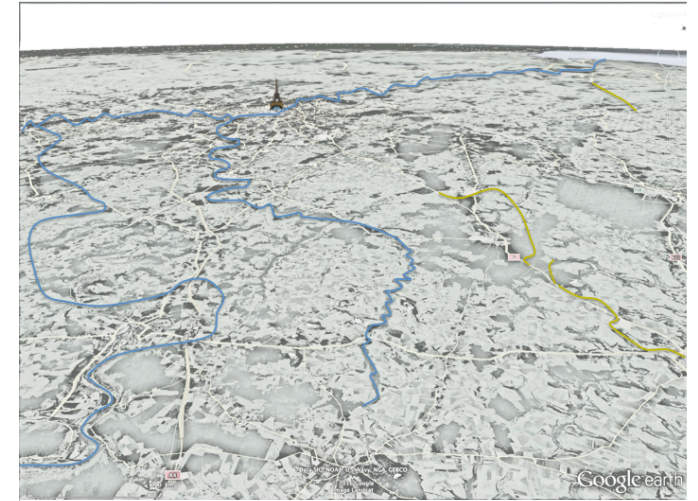
2- **Large livestock farms in more humid and bocage landscape**. The main orientation of those farms is livestock, combining dairy and beef production. The technical rationale is to maximise the use of grass and, relatively speaking, the mechanisation costs (unlike the openfields farms that are maximising the use of their costly equipment). The share of permanent grassland is high and animal rearing also mobilises agroforestry, which byproduct is valued for local energy supply. The importance of grassland allows the rearing of animals outdoors (less need of manure transfer). In a context where concentrates for animals are expensive, due to overall scarcity on cereals when compared to the previous system, productive forage such as legumes and forage turnips/beets are cultivated.

3- **Small-medium farms nearby cities (peri-urban agriculture)**. As said above, these farms depend more on their territorial context than on soil conditions. They are strongly diversified and run farming activities adapted to small fields. Horticulture, orchards, vegetable crops and small breeding are logically developing in these areas, led by specialised full-time or part-time farmers, depending on the history and size of accessible land. Fertility management relies partly on small breeding, but this is not enough to cover all the needs. Urban manure and organic recycling the one hand and longer fertility transfers from livestock specialised farms are necessary for closing the cycles.

2050 : diverse landscapes in diverse contexts

The following figure suggests a spatial translation of the farming systems. It should be read with the following keys:

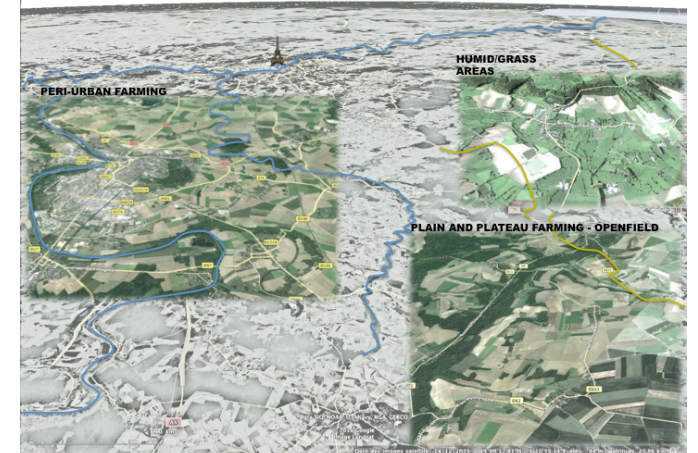
- The background represents the whole basin, seen from a plane facing south (using Google Earth tool). The Channel is thus on the right of the figure. The Eastern part of the basin (left) is truncated, but the whole types of territories are represented. Cities, rivers and main roads are represented in order to show the structure of the area. Paris and the Seine axe towards the Channel, in the background, are organising the whole territory. Relief is hardly a criteria in the basin, at this scale.



- Inside this background, zooms on three different territorial contexts are represented with darker colored views:
 - peri-urban farming (left)
 - humid/grass areas (top right)
 - plain and plateaus openfields (bottom right)

The way the territorial zooms are positioned in the image suggests their real position in the basin: peri-urban farming is close to Paris; humid/grass areas is situated in the Western part of the basin (thus close to the Channel, right); plain and plateaus is on the North (close to the observer) but could mostly be everywhere in the upstream part of the basin.

The smoothing effects in the margins of the views and the overlaying rivers and roads suggest the territorial continuity between the zooms and the background.



- Within each territorial zoom, are positioned different thumbnails showing the form of farming in 2050. Thumbnails and images which legend is written in italic (e.g. "*exporting by train*"; "*City market*"; "*Rural tourism*") shows logistical and/or economic functions associated with agriculture in the image



The marketing channels and the food chains: still supermarkets, but for the rest...

From a food chain perspective, the structuring social category of the AE image is the urban consumer, in the diversity of the concept. While his role in the happening of AE is crucial, in Paris and elsewhere in Europe, his claims is centrally based on the provision of services centered on his well being. The collective and "citizen" dimension of his engagement is generally low, although as a consumer and voter he is making his voice heard. This is translated in claims for abandoning pesticides for health reasons and, with a lesser pressure, to the provision of recreational peri-urban and rural landscapes.

This keeps the endpoint of the food chain globally unchanged on two aspects: the share of supply in supermarkets remains high; the deliver of processed food as well, as of urban citizens are not ready to spend too much time for the good cause of cooking local products.

Nevertheless, important changes have occurred in the SRB food chains.

- Local food chains — direct marketing of raw products by producers and/or direct marketing of processed food — have considerably increased. The starting point was nearly 0 indeed and it may reach a 10-20% for vegetables, bread, animal products and fruits. The importance of these chains goes beyond their share expressed in % as their continuous growth shows the overall social demand towards food and farming. Consumers in this chain are a mix of wealthy urban people and of people reducing their paid employment's share.
- Regional food industries are more diversified than 30 years ago. They process products produced in the basin, but their supply area is not entirely in the SRB. Those industries respond for a growing demand for regional food, although the concept is sometimes fuzzy (chocolate biscuits are "regional" because most of the wheat comes from the region and because the factory is in the region). Nevertheless, compared to the previous period, those food industries undoubtedly are more local and promote some regional products. The development of fruits industries, after a long decline, illustrates this positioning. The same takes place for the meat and dairy sectors and the creation of new abattoirs in the SRB.
- Long food chains and industries are however still forming the majority of the system. As already said, wheat trade remains, though on a much lower scale than it used to be (the size of barges and ships have reduced under the pressure of environmental activists against Rouen and le Havre harbors that pushed for bigger and bigger boats, in contradiction with the good environmental management of the Seine estuary). However, while still being long, those chains have considerably changed in nature and in size of the processing units.
 - In nature, the animal feed sector industry has virtually disappeared in Europe while most feed is regionally produced in whole Europe; following the new productive map, meat and dairy industries have developed. Exported wines - Champagne, and Chablis - still are part of the landscape, with a heavy weigh in terms of return.
 - But striking changes also take place in the size of industrial units. Agroecology means at the same time diversification in supply basin and less regularity in production. Economies of scale are not paying any longer and industries adopt a flexible strategy for supply. Their area of supply is getting larger in order to be able to compensate a loss in one area.
- Coming back to the end-user, that is to say the retailing companies (supermarkets) and consumers, the diversification of food industries means diversified brands and products in the supermarkets shelves. The relations of power between buyers and sellers have changed.

The policy/social/economic arrangements making the image possible: a social pressure for radical change

The changes in farms and food chains evoked above could not come from the sector itself, due to its strong lock-in. In particular, the food industries and retailing steps were strongly opposed to any change that would alter their position in the value chain.

The case of SRB is interesting for the agroecology agenda from this perspective. In 2016, the sociological spectrum in the SRB towards agroecology was divided in three uneven shares: a growing green (mainly urban) minority was pushing for organic farming, the bulk of society was insensitive/sceptical to the AE project ("yes, but..."), while a (mainly rural or peri-urban) share was opposing it for socio-politic reasons (fear of expensive food and "green" image of organic farming). In this context, the French policy makers were not keen in making the system move towards any ambitious change. In a way, the overall social passivity had an active role in the continuation of the conventional development of agriculture and of the food system.

Between 2016 and 2050, the pressure has come from the two sides of the food chain:

- from consumers and medical authorities (cancers & congenital diseases and animal condition in livestock industries where the two main issues);
- from farmers associations that, after of long period of collective denial, questioned their own health. This professional demand expanded to a wider rural population.

Mediatization of medical and economic studies showing the costs of cheap food had had a political influence. Thus the activators of change have been the whistle blowers and engaged journalists that played on two strings altogether: (a) conventional farming is already dangerous (b) the alternative for organic farming has already proven that it is not a niche option. The strong increase in media reporting about those two issues ended by changing opinion across political parties. Given the weight of France in the agricultural European economy and given the weight of Paris and agglomeration in the French policy, changes taking place at this scale and at this particular place are of major relevance for the socio-political changes needed to make the image possible. The population of Paris and its agglomeration is not the only European one to influence policy making, but it had its role in a transformative agenda. It should be noted that such a political change has been possible because the demand was not only coming from urban, but also from an increasing share of farmers and rural citizens anxious about the impact of pesticides on their health. The political issue was not simply a diverging demand between rich urban people against poor rural ones.

Once the political change had been obtained, the technical consequences were not the most difficult to address, due to the experience acquired in advanced R&D programs and grassroot initiatives. The tricky issues were:

- The consequence of agroecology on consumers price. With regards to this, budgetary arbitration has been necessary in order to redirect the CAP budget towards farm income support in order to reduce the consumers costs and towards poorer consumers (food stamps).
- The socio-economic changes within the food chain. While in 2016 processors, retailers and dominant farmers were "imposing" the pesticide, saying there is no alternative, between 2016 and 2050 those powerful actors have had to reorganise the whole value chain.