

# AVIBIO: a method to assess the sustainability of the organic poultry industry

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## Abstract

*The French organic poultry sector is facing new challenges relating to contexts at different scales: global, European, national and also due to the specificities of each production region. In order to evaluate what is required to meet the increasing demand for organic poultry, while moving towards sustainable production, a method to assess sustainability at the production chain scale was carried out. Four regions were studied: Bretagne and Rhône-Alpes for eggs, Pays de la Loire and Aquitaine for chickens.*

*A participative approach was undertaken in order to promote exchange between the various players who are involved directly or indirectly in the production chain (production organizations, farmers, professional unions, researchers, local authorities, etc.). Different stakeholders (98) were questioned about their opinions on the conditions of sustainable production. Afterwards the results of this first survey allowed a representative group (21) to draw up the main- and sub-objectives of sustainability (principles and criteria respectively).*

*For each sustainability component (economic, environmental and social), indicators were fixed based on criteria which refer to the principles corresponding to the stakeholders' representations of sustainable development. A scoring scale was attributed to each indicator: high scores corresponding to the objectives being met. Scores were added per criteria and principle for each component. For the four regions, the final evaluation highlighted five ways of improvement and serves as a decision-making tool for the different stakeholders: develop access to organic raw materials for poultry feed, improve technical aspects and logistics in the production chain, improve communication within and outside the production chain, increase organic poultry products in the collective restaurants and develop practices that enhance biodiversity.*

## 1. Introduction

Since the late 1980s, organic farming development in the European Union has been driven mainly by the increasing consumer demand and policy support, and since January 2009, by a new and unified European regulatory framework. According to Eurostat, France is currently the largest European organic chicken and egg producer, with more than 7 million organic chickens produced in 2010, and 2.3 million organic laying hens in production, representing respectively less than 1% and about 5% of the French chicken and egg production. French organic production, however, remains low. Therefore AVIBIO, a French research program, aimed to evaluate the requirements to meet the increasing demand for organic poultry, while moving towards sustainable production.

Sustainable development means a development which includes the "needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). It is a complex concept, dealing with several temporal and spatial scales, with contrasted governing bodies leading to intricate set of rules, stakeholder behaviours and involved processes struggling to reach a common goal (Kemp and Martens, 2007). However, for sustainability to be more than a rather general concept, tools are required to measure and assess progress and to define clear goals to be achieved. Indicators are a common denominator which can be used to measure progress towards sustainable development. Nevertheless, to our knowledge there are no tools available to evaluate the sustainability at the poultry production chain scale. Tools that do exist are at the farm scale (Bokkers

and de Boer, 2009) and do not systematically include the three dimensions of sustainable development. The present study proposes a method to assess the position of sustainability in the organic poultry production chain in 10 years' time. Because of the complexity of the system, a participative approach was undertaken, to promote discussion between the various stakeholders who are involved directly or indirectly in the production chain.

The four-step methodology used in this study was essentially based on Lazard et al. (2009) (EVAD project):

- First of all, a definition of the system was necessary: a classic supply chain analysis was performed, each player was identified for each region of production.
- Secondly, objectives of sustainable development for the organic poultry production industry had to be defined. This phase consisted in identifying the various composites of the sustainable development concept, for each dimension even if they were inter-related.
- To define sustainable development in an operational manor for the system studied, indicators were associated to each objective. Points were associated according to the indicator level.
- Finally, analysis of the results enabled areas of improvements to be identified.

## **2. Defining the system**

The system chosen to be studied was "the organic poultry production industry in a region". The relationship between the poultry industry and regions is specific in agriculture and it is important to take into account the "poultry production \* region" system (Bonaudo et al, 2010).

The regional scale of analysis was chosen because it allows the limits of space to be clearly defined, as this may impact on the behaviour of the sector (local and regional scale, European regulations on the origin of poultry feed, etc.). Four regions corresponding to the main production areas in France were studied: Bretagne and Rhône-Alpes for eggs, Pays de la Loire and Aquitaine for chickens.

All the stakeholders in a region throughout the production chain, carrying out complementary and interdependent activities to produce the finished product, were included. These players are directly or indirectly involved in the production chain, and located or not in the region. They were divided into four groups of stakeholders involved in: 1) hatching to distribution; 2) research, development and training; 3) professional and not-for-profit organization; 4) State and local authorities. The organization and role of each player was clearly identified and help identify the "target players" in the position to act on sustainability.

## **3. Defining sustainability objectives**

A participative approach was undertaken in order to share points of view and knowledge and to define together the sustainable organic poultry production industry. For each sustainability component (economic, environmental and social), several main- and sub-objectives of sustainability (principles and criteria, respectively) were defined. Following this, indicators were fixed based on criteria referring to the principles which correspond to the stakeholders' representations of sustainable development (Lazard et al., 2008). A scoring scale was attributed to each indicator: high scores corresponding to the objectives being met. For each component, scores were added per criteria and principle.

### **3.1 An extensive survey**

From information obtained from the literature and from specialists, we drew up a list of principles and criteria. Different stakeholders (98) were questioned about their opinions on these conditions (Pottiez et al., 2011a). Each stakeholder had to select and prioritize 10 objectives (all components included) out of 15 proposed, and then 8 to 10 criteria per component (from 13 to 20 proposed). This process also enabled us to check that the different statements had been understood, and whether other ideas

needed to be added. The consultation took place during four meetings or by mail after the project had been explained over the phone. During the four meetings, the presentation of the results obtained provided an opportunity to discuss the choices made.

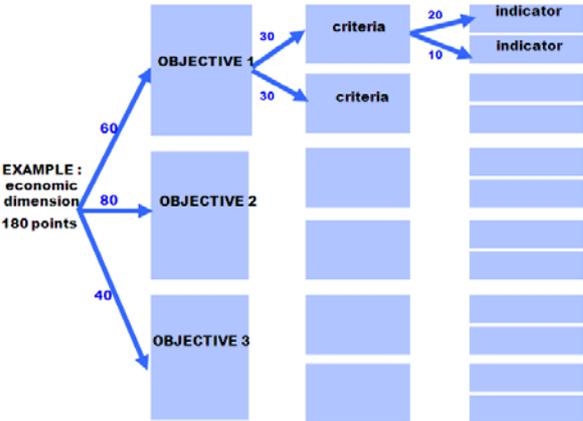
### 3.2 A decision-making group

The results of this first survey allowed a representative group of 21 stakeholders, to draw up the “definitive” principles and criteria of sustainability in 10 years’ time. This decision-making group included various players involved directly or indirectly in the production chain, in order to include various points of view. The principles established for each component (social, environmental and economic) are presented in Figure 1. The choice of statements and the number of points associated to each objective and criteria include a degree of subjectivity, but the consensus between players gives the final list its legitimacy.

Economic	Social	Environmental
Generate and safeguard income, and share added value between stakeholders (80)*	Meet citizens’ expectations (65)	Minimize the use of resources (66)
Guarantee supply and market access (60)	Ensure the sustainability of production tools (65)	Reduce pollution (66)
Enhance local employment (40)	Strengthen the local network (50)	Enhance biodiversity (48)

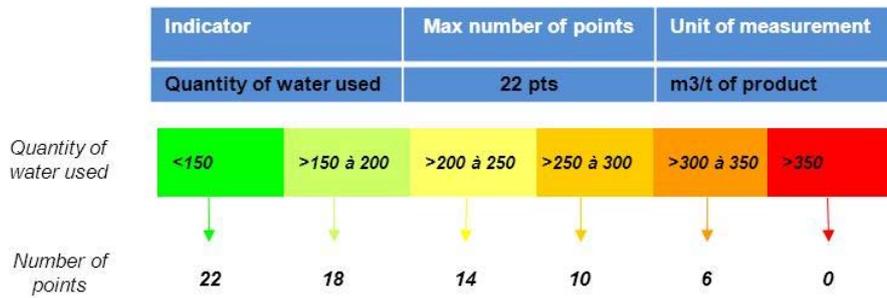
**Figure 1.** Principles retained for each sustainability component  
*In brackets, maximal score of each principle*

After the identification of the various objectives underlying the concept of sustainable development, the process of choosing indicators, their weighting and the sum of their scores enabled each region to be assessed (Boulanger, 2008) (Figure 2). A maximum of two indicators were linked to each criteria. Scores were calculated using the indicators, to assess to what degree each principle had been fulfilled. The maximal number of points for each component was fixed at 180. The maximal scores of each objective were fixed by the decision-making group according to their relative importance. This work required extensive discussion between players. The vote itself for each indicator and its weighting were less important, the deliberative process providing the legitimacy of the decision. This participative approach enabled each player to pass from personal interest to a common objective, considered fair for all.



**Figure 2.** Relationship between objectives, criteria and indicators

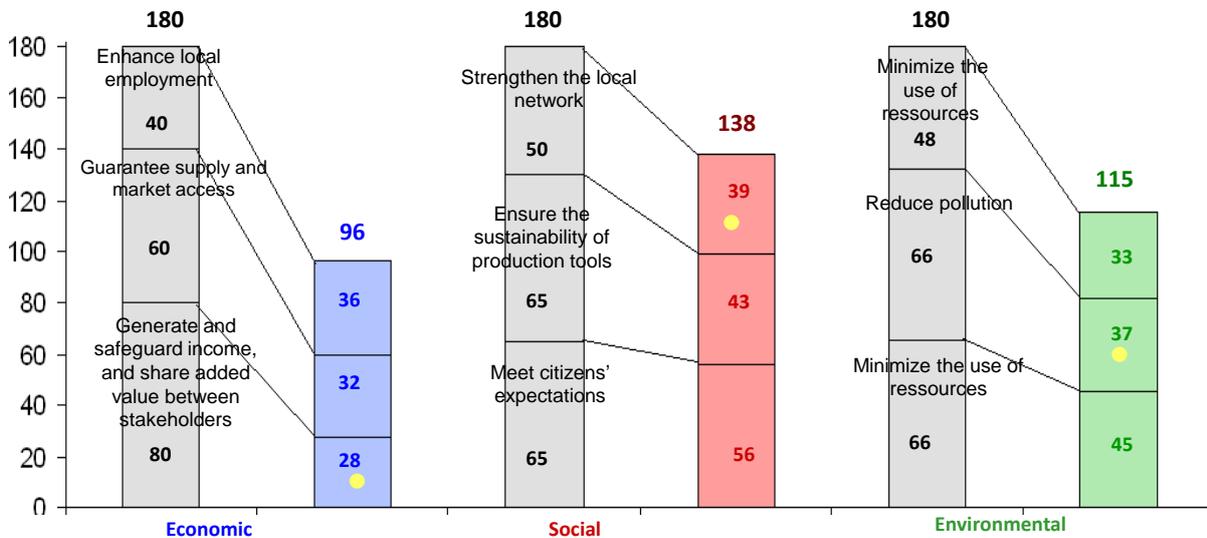
Indicators were defined according to surveys, a literature review, and specialists' opinions (Pottiez et al., 2011b). For the environmental component, the method of Life Cycle Analysis was used for several indicators (greenhouse gas emissions, use of water for example) (Seguin et al., 2011). Indicators could be qualitative (e.g.: players' opinion on their profit margin) or quantitative (e.g.: amount of water used) using different units. The results were converted into scores by constructing scales according to acceptability thresholds. For each component, the scores were then added together for each criteria and each principle. The scales were drawn up by the decision-making group with the objective of identifying improvements that could be achieved in ten years' time. The maximum number of points was allocated to the most sustainable level (e.g.: Figure 3). According to the indicator, different data relating to the organic poultry production of the studied regions, other production or other regions, or specialist statements, helped establish the scales.



**Figure 3.** Acceptability thresholds: an example with an environmental indicator (quantity of water used)

#### 4. Evaluation and ways of improvement

The results are presented by component and by principle (e.g.: Figure 4). The principle with the lowest level of achievement for each component was focused on, but keeping in mind that progress is possible at each level.



**Figure 4.** Sustainability evaluation of organic poultry production in Pays de la Loire (France)

*In grey: maximal scores; in colour: scores obtained; yellow dots: the principle with the lowest level of achievement*

For the four regions, the economic component was furthest from achieving the objectives. The income and the share of added value between stakeholders explained this result. The criterion "to produce in France to answer the demand for organic products" also had a low score due to a lack of competitiveness, in terms of production costs, being considered as unsatisfactory and to limited production of organic poultry products compared to the total national production. The local production

of raw materials to feed poultry appears to be a way to improve the situation in the Rhône-Alpes region.

According to the region, the score of the environmental component is either slightly higher or similar to the economic component. The criteria showing the lowest achievement differed according to the region: water consumption (Aquitaine, Rhône-Alpes) largely in connection with feed production (> 90%), biodiversity (Bretagne, Rhône-Alpes, Aquitaine) particularly in relation to the agro-ecological organization/layout of the outdoor run, and greenhouse gas emission and ammonia (Pays de la Loire). For this last point, the greenhouse gas emission is mainly connected to feed production (74%), whereas the acidification impact is divided equally between poultry (54%) and feed production (46%) (Seguin and al., 2011).

The social component presents the highest score. For Pays de la Loire and Bretagne, the criterion with the lowest achievement is connected to public policies considered insufficient for the introduction of organic poultry products in collective restaurants. For Aquitaine, it is the criterion relating to training (poultry farming, organic farming), and for Rhône-Alpes, the criterion relating to the respect for welfare comes out with the lowest score because of the long distances that animals are transported.

For the four regions, the final evaluation highlighted five ways of improvement and serves as a decision-making tool for the different stakeholders: 1) develop access to organic raw materials for poultry feed, 2) improve technical aspects and logistics in the production chain, 3) improve communication within and outside the production chain, 4) increase organic poultry products in the collective restaurants, and 5) develop practices that enhance biodiversity.

## 5. Conclusions

This work proposes a method to assess sustainability at the organic poultry production chain scale over the next 10 years. The participative approach adopted brought robustness to the tool, due to the consensus between players in the decision-making process (list of principles / criteria / indicators, scales, ways of improvements). However, difficulties to measure indicators due to lack of statistical data on organic farming represents one of the main limitations.

Finally, this tool can be used in various ways according to the players. For farmers and the poultry industry, this tool allows current practices to be assessed and then production strategies to be developed, for research and extension it enables research results to be viewed from a global perspective, and for state and local authorities, the tool can serve as a support to decision-making (strategic plan, orientations of public aid, regulations).

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