How are legume crops valued in Europe? Insights from the analysis of several Value Chains case studies in the H2020 LegValue Project.

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1 Introduction

Currently, the EU agro industry is characterized by a self-sufficiency in cereals and a massive import of soybean, as a result of several self-reinforcement mechanisms that lock in this system (Meynard *et al.* 2013, Magrini *et al.*, 2015), which have relevant consequences in terms of costs and environmental impact. While scientific knowledge on legumes has been until now concentrated on a small number of species and crop management strategies, H2020 LegValue project aims to provide knowledge on a large range of legume species and cropping systems, together with their expected performances, thus offering great potential for locally-adapted crops for the very wide variety of agricultural conditions in Europe.

The introduction of a legume species in the crop sequence by farmers is highly dependent on the other actors of the chain (Meynard *et al.*, 2013; Magrini *et al.*, 2016), either upstream (such as breeders who offer adapted cultivars) or downstream (such as feed or food industry, which can valorise the harvested products). The organisational design of supply chains also determines the way added value is shared (Fares *et al.* 2012). The institutional framework (collective rules, norms and standards) has also a strong influence in the innovation capacity of legume sector actors to create new value sources (coming from process or product innovations).

Thus, to increase the cultivation of legumes, new outlets with higher added value based on these crops need to be identified. There is also a need to better share the added value in the legume supply chains and to promote institutional changes to optimise Europe's access to supplies of plant protein based on legumes and to foster innovations in legume value chains. For this, a prior diagnosis of existing legume-based value chains is essential. It helps not only to point out the main bottlenecks encountered by stakeholders dealing with legumes but also some levers to focus on for legume-based value chains development.

2 Materials and Methods

The value chain analysis is built on 27 case studies managed by LegValue partners. Each case study represents a legume-based value chain. The case studies cover the ten countries participating to the project (France, UK, Italy, Portugal, The Netherlands, Denmark, Switzerland, Lithuania, Latvia, Germany) and 8 legume species (pea, faba bean, soybean, chickpea, lentil, alfalfa, lupin, and mix of species).

To collect data on these case studies, a qualitative survey on stakeholders along the value chains has been conducted from January to September 2018. 127 interviews have been realized with 9 different stakeholders' types (farmers, collectors, processors, technical advisors, input suppliers, traders, end user processors, end user retailers, seed producers).

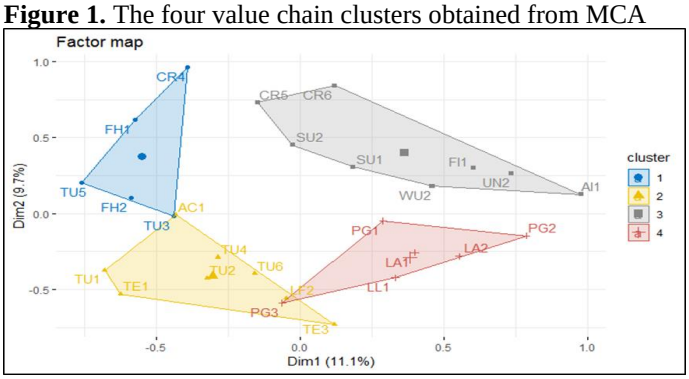
For the value chain analysis, the collected data were analysed through a multiple correspondence analysis (MCA) on 30 qualitative variables to get a typology of value chains. Indeed, it provides a general overview of our case studies sample as well as a comparative analysis of the associated value chains. Moreover, the data were cross analysed to characterize behaviours, strategies and perceptions of stakeholders in each type of value chain. This is to help to understand the main differences between the different value chain types.

3 Results

Our value chain analysis produces three main results.

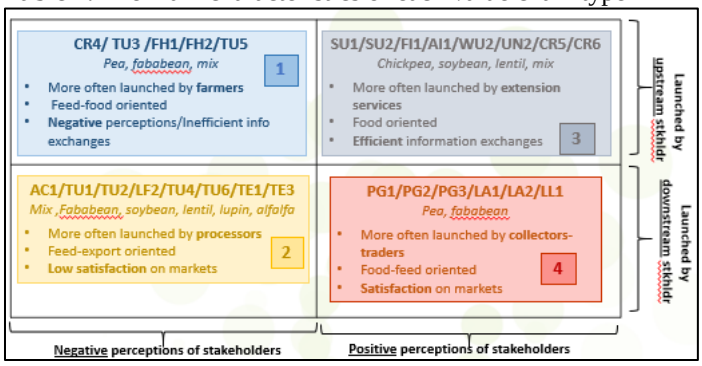
- The MCA classifies 27 cases studies into 4 clusters (Figure 1), each cluster constituted by cases studies with similarities between them. Thus, each cluster corresponds to a value chain type with well-identified general characteristics.

Figure 1. The four value chain clusters obtained from MCA



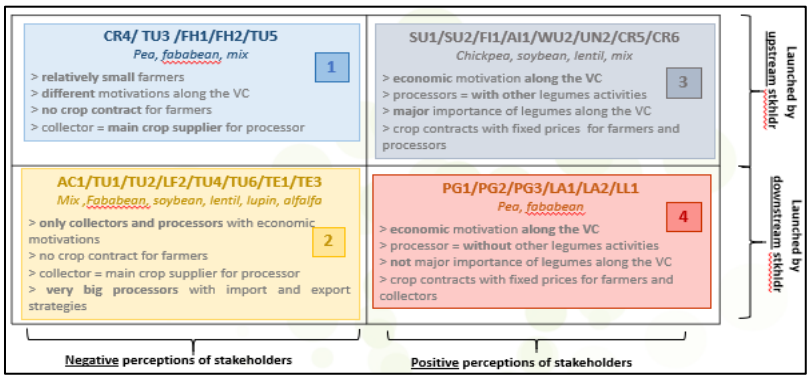
- Each value chain type is characterized by the stakeholder type who launched the value chain, the main outlet (feed or food) in the value chain and the general perceptions of the stakeholders on the general context of legumes business (Table 1). Thus, the first value chain type deals with pea and faba bean and it has been more often launched by farmers. Stakeholders are food or feed oriented, and they have negative perceptions on the legumes business context. The second value chain type has been more often launched by processors with no distinction of the treated legume species. Stakeholders have also negative perceptions on the legumes business context and are more often feed oriented. The third value chain type dealing with pulses and soybean has been more often launched by extension services. Stakeholders are exclusively food oriented and have positive perceptions on the legumes business context. The fourth and last value chain type dealing with pea and faba bean has been more often launched by collectors and traders. Stakeholders are food or feed oriented and have positive perceptions on legumes business context.

Table 1. The main characteristics of each value chain type



- The main differences between the four value chain types are based on specific practices, strategies or perceptions of their respective stakeholders mainly about their practices on contract, their motivations for dealing with legumes and theirs links with each other (Table 2).

Table 2. Some practices/strategies/perceptions of stakeholders



Thus, in the first value chain type farmers are relatively small. Motivations for dealing with legumes are different along the value chain: agronomic motivation for farmers, alimentary motivation for processors, economic motivation for collectors). And farmers are not involved in crop contracts with processors, as collectors are the main crop suppliers for these latter. In the second value chain type, stakeholders' motivations are also different: only processors and collectors have economic motivations for dealing with

legumes, the farmers have agronomic ones. The processors are very export oriented and work mainly with collectors for their legumes provisioning. In the third value chain type, economic motivations are shared by all stakeholders. The processors are strongly involved in the value chain and work directly with farms for their provisioning through crop contracts. And in the last value chain type, all stakeholders have also economic motivations for dealing legumes and farmers work closely with collectors through crop contracts. Contrary to processors in the third value chain type, those in the last one are not very strongly involved in legumes activities.

4 Discussion and Conclusions

Four distinct ways to value legumes in Europe have been identified by our case studies analysis. Among these four ways, two are opposite. These are associated to the first value chain type and the fourth one, both dealing with pea and faba bean considered as the main legume species. Because in the first value chain type stakeholders have negative perceptions on legumes business and in the fourth one, stakeholders have positive perceptions on legumes business, it can be suggested that the fourth value chain type is a success model for pea or faba bean value chain. Another stimulating result is that the other value chain type whose stakeholders have positives perceptions is the third one which is food oriented, launched by extension services and on pulses and soybean. By illustrating the current interest on legumes for food, it can be considered as the second success model for legumes value chain, and particularly for pulses and soybean for food. Some key success for legume-based value chains have been highlighted: 1/an economic development project shared along the value chain, 2/ a strong involvement of farmers in the legumes valuation along the value chain (by contractualisation), 3/ the same importance given to downstream markets and upstream markets at the value chain level. Thus, better economic performances of the legume-based value chains would enhance the use of legumes in crop diversification.

Acknowledegments

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