A methodology for sustainability evaluation of food supply chains: Example of organic potato in Northern France

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Step 1: Reference scenario and alternative scenarios

Reference scenario	Short supply chain (SSC) scenario	Thermal haulm crushing (THC) scenario
Supply chain with wholesalers and conditioners	Short supply chain (Community Supporting Agriculture with distribution off the farm)	Supply chain with wholesalers and conditioner
Mechanical haulm crushing	Mechanical haulm crushing	Thermal haulm crushing

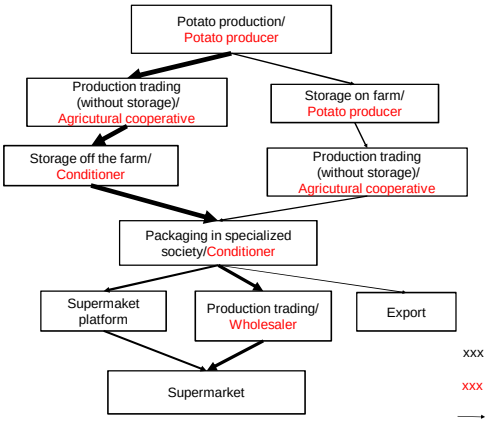
To assess the sustainability of different local food supply chains, a method was tested and developed. It should easily test the sensitivity of economic and environmental indicators to new technical choices. In this example 2 new scenarios were compared to the reference scenario, based on the most common agricultural practices and supply chain.

Step 2: Sector study diagram

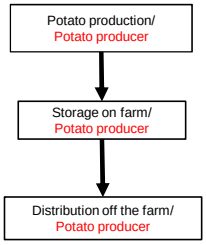
A sector study was conducted to identify all the economic activities encompassed by the value chain and to quantify the physical and monetary flows between each step.

The system boundaries were from cradle to selling location's gate (including storage and the distribution phase). Activity of the supermarket was not taken into account.

Sector diagram of the reference scenario



Sector diagram of the SSC scenario



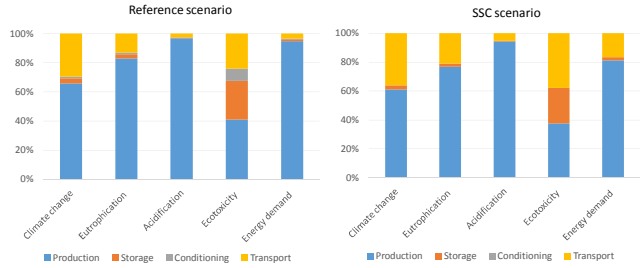
xxx Activity of the supply chain

xxx Stakeholder of the supply chain taken into account in this study

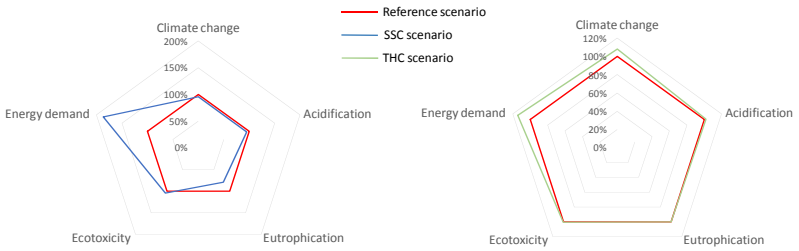
Economic or physical flow (arrow thickness proportionnal to flow size)

Step 3: Environmental assessment by LCA

First, production, storage and distribution (transport, packaging…) were separately assessed.

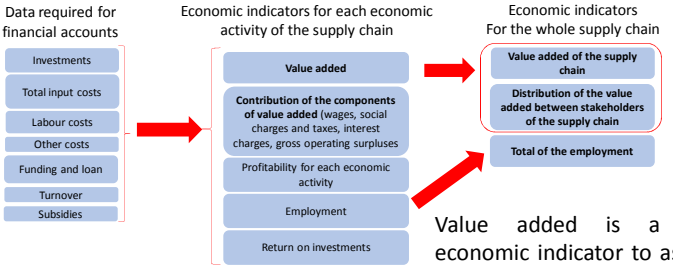


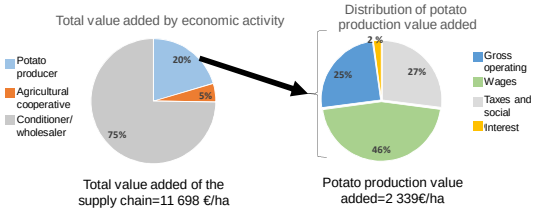
Secondly, comparison between reference scenario and alternative scenarios were performed to test new technical choices.



Step 4: Economic assessment by value added and financial accounts calculations

Economic assessment was based on the calculation of financial accounts for each economic activity along the supply chain (agricultural production, storage, packaging...). Financial accounts represent resources and workforce required for the production throughout the entire business life cycle. Financial accounts were calculated for a 10 year production cycle to consider yield and surface fluctuations and equipment renewal.





Economic indicator	Reference	SSC	THC
Total value added (€/ha)	11 698	30 420	11 689
Employment (h/ha)	152	672	157

Value added is a key economic indicator to assess a supply chain.
It represents the wealth created by the supply chain.

Conclusion

The scenario comparisons show the links between economic and environmental indicators for each activity of the supply chain. This method is reproducible for other food supply chains and can be easily used to assist the decision making process and the system optimization by quickly giving a wide overview of different scenarios.

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