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Reconsidering the Cereal Chain Organization for Food and Green Chemistry

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Cereals are vital resources for a large number of human activities. Their different applications have led to the structuring of multiple chains: food chains (milling, baking,...), feed industries, starch industry, and more recently biofuels. All those sectors mobilize a range of different economic actors who are seeking to maximize their economic performances by adjusting their business models to the ability to produce, to add value and to respond to consumer preferences. Such a sector-oriented optimisation leads to striving for maximal production of the main product of each chain without taking into account the opportunities for by-products. Accordingly, this may result in our societies on one hand to a conflict of interest between cereal sub-sectors (as for example between food and fuel) which in turn reinforce competition between these sectors. On the other hand, this may lead to waste streams and insufficient usage of potentially valuable co-products.

Moreover one should take into account population growth, food insecurity, increasing food related health issues, climate changes, pressure on fossil fuels, etc. A global solution is hard to reach, since one is dealing with balances between offers and demands by market prices. Such a balance is subjected to fluctuations inherent to agricultural production, which can cause highly significant price distortions and severe local problems. The alternative to this approach is to review the organization of the full cereal chain, from production to final end-uses, with the aim to both optimize each of these individual supply chains as well as maximize the output of the entire system, locally and globally.

Accordingly, a more holistic approach applied to the complexity of the full cereal system is required today. This paper will propose a combined local and global approach based on reverse engineering to reorganise cereal chains to better fulfil the different uses of cereal products.