Local Food Systems: How sustainable are the business models for local food chains?

Mobile units for processing fruit and vegetables on-site may play an important role in food supply in 2035. The EU's FOX project investigated the form that such local food chains might take. To this end, Fraunhofer ISI developed future scenarios that could be used to test the viability of business models for regional food processing and distribution.

In the FOX project (food processing in a box), 25 project partners from Germany, the Netherlands, Spain, France, Belgium, Poland and the Czech Republic researched innovative food technologies for use on-site: Using flexible, mobile units, farmers and small and medium-sized enterprises can, for example, juice and carefully preserve fruit and vegetables in atmospheres with low oxygen content or dry them at low temperatures. Another piece of technology available is the selection and packaging of surpluses.

But how do these technologies fit into the changing world? To find out, the Fraunhofer Institute for Systems and Innovation Research ISI developed scenarios for the food sector in 2035 as part of the FOX project and analyzed how resilient business models are to different futures. The scenarios reveal three possible sustainable futures:

- In the first scenario, policymakers ensure sustainability through strict regulations and by producing food on state-owned farmland. Although sustainability and fair trade are important to consumers, price and quality are the deciding factor for their purchases.
- By contrast, in the second scenario, society is the driving force behind the changes: citizens are willing to pay higher prices for sustainable, fairly traded and regional food. The land belongs to individual farmers, and biodiversity is high.
- The third scenario depicts a competitive environment in which commercial power is strong. It is characterized by growth, progress, competitive pricing, monocultures and loss of biodiversity. Sustainability is important, but companies only apply it to further their own interests in order to be able to continue producing and operating in the future.

This formed the basis for Fraunhofer ISI to research the influence of the scenarios on the business models of FOX technologies in a foresight process. Project manager Dr. Björn Moller gives the following summary: "It is evident across all the scenarios and models that the mobile units for processing food will continue to have potential in the future. However, the users of these technologies – whether they are farmers, agricultural cooperatives or businesses – will need to overcome challenges such as regulation, the pressures of competitive pricing and changing demands. Most importantly, our illustration of potential issues shows companies where they may need to adapt their business in order to be robust for the future."

Opportunities for local communities, and challenges due to pressure on prices

The scenario in which policymakers are primarily responsible for food production has positive implications for all three technologies due to the legislative ban on food waste. A negative effect, however, is that people consider price more important than sustainability, as new technologies can be more expensive than tried-and-tested ones. Similarly, regulations and decision-making processes can make it difficult to establish new technologies, which is why it is important to take any concerns seriously and address them early on.

For the method of drying fruits and vegetables at low temperatures, in particular, the high energy consumption may become an issue due to strict government rules. This is where it is very important for companies to keep an eye on their carbon footprint and reduce energy consumption as much as possible in order to stay in business.

By far the greatest positive impact of the scenario in which society drives sustainability is the strengthening of local production: Individuals become actors and have direct contact with farmers, local products are preferred for reasons of sustainability, and the short distances mean that there is less food spoilage.

The downside could be that there is little interest in "premium products" and that there are public health concerns specifically with regard to the technology for processing surpluses. In this context, food producers must actively work with local consumers to understand and meet their expectations for high-quality, healthy products. The effort involved is offset by the fact that customers are prepared to pay more and to commit themselves in the long term.

The scenario in which industry is strong is the most challenging for all the technologies, especially in view of the weaker role of farmers compared to retailers and due to the high pressure on prices. However, greater consumption combined with much interest in new products, and diversification through online platforms offer new opportunities.

Among other things, the mobile unit for juicing at low oxygen levels and careful preserving can open up new sources of income for farmers by making supply chains more efficient or making use of existing more efficient supply chains, as well as benefiting from the opportunities offered by increasing e-commerce and also by recycling surpluses.

FOX project coordinator Dr. Kerstin Pasch of the German Institute of Food Technologies (Deutsches Institut für Lebensmitteltechnik e. V.) sees the added value of Fraunhofer ISI's foresight process primarily as being that "the systematic and structured approach made it possible to map different assessments for the future potential of the technologies and to identify new perspectives and possible solutions".

The detailed description of the scenarios and the recommendations for business models based on them are available in the recently published brochure "Local Food Systems – Recipes for future proof business models". On September 26, 2023, Fraunhofer ISI together with all the project partners will present the results of the Fox Project at a closing conference in Brussels.

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