An infographic synopsis of Luxembourg's Food System

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Infographic: Sophie Margue

Local or regional food systems are complex networks of food production, distribution and consumption, embedded in interwoven relations between levels, spheres, sectors and actors, as well as the resulting interdependencies of the global food system — often referred to as "foodscapes".

Describing a foodscape whose *actors* and *actions* form a non-unified whole is problematic, but a visual depiction may unravel its complexity. This research has been undertaken by the Sustainable Food Practices team at the University of Luxembourg. As a snapshot in time, such a depiction seems static and limited to a specific space, while food systems are in constant flux and transition through intended and unintended actions by their actors. Additional interactive and dynamic infographics of Luxembourg's food system are forthcoming on https://food.uni.lu, using pop-up windows to show contextual information and links to actors' relevant websites etc.

While many approaches address food from a systemic point of view, they rarely qualify or empirically document the food system. The challenge of creating such an *empirically qualified, descriptive* infographic is how to represent actors and their multiple activities. Through empirical research we have mapped all the broad actor groups and documented specific examples of their activities, showing the *diversity* of the actor groups within Luxembourg's food system. An *analytical* version of the infographic representing *relations between actors, drivers, gaps, lock-ins, leverage-effects, as well as externalities* of the food system, is in the making.

Not just a food supply chain

We detach ourselves from the common vision of a food supply *chain,* as it suggests linearity instead of complexity through feedback loops. The too often cited 'farm-to-fork' supply chain can instead be seen as a circular economy ensemble, including the reuse of waste and featuring pre-farm actors and interventions, actively taking part in a *broader* food *system* within which constant interactions and negotiations occur. This holistic approach is necessary because a linear approach fails to explain how food comes to our plates: it includes only the actors connected within direct food supply through actions of input-supply, farming, processing, manufacturing, trade, gastronomy, consumption and waste treatment. This popular approach overlooks influential actors in the broader food system: 'governance & regulation'; 'education & awareness-raising'; 'media'; 'research'; 'business interests & professional corporations'; 'marketing & advertising'; 'finance'; 'investing & insurance'; 'non-profit, voluntary & community groups'; 'operational services'; 'individual citizens'. Yet these actors are crucial in transforming structures and processes that shape the larger ecological, economic, sociocultural and political context in which food systems exist and evolve, including the *food supply circuit as an integral part* of the food system.

A food supply circuit at the centre of the food system (light green)

At the centre of the food system, the food supply circuit consists of the natural, social and cultural resources at our disposal to ultimately nourish people. Luxembourg's farms specialise predominantly in livestock grazing, while other production types are underdeveloped (see box). Fed by agricultural inputs, knowledge and equipment, different farm types produce raw agricultural products, either ready-to-be-consumed, and packed and distributed (e.g. via wholesalers or direct sale to consumers), or entering the processing stage. 'Primary food processing' operations convert agricultural raw materials into food commodities (e.g. milling or slaughtering). 'Manufacturing' operations combine and change the properties of different ingredients (both primary processed and raw products) to obtain more complex food products (e.g. baked goods). Processed foods tend to be distributed via wholesalers, who redistribute smaller quantities to retail and gastronomy. Smaller manufacturers may choose to avoid wholesalers and use direct marketing (e.g. via online-shops or farmers' markets). 'Retail' can range from general to specialist retailers, from small specialist shops to large hypermarkets, from personal on-farm sales to vending machines, or from profit-orientated supermarket chains to sustainability-driven shops. However, a considerable proportion of food is consumed via 'gastronomy', in eateries (e.g. restaurants, take-aways, cafés etc.) or in food services (e.g. canteens in

LUXEMBOURG'S FOOD SYSTEM

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EDUCATION, TRAINING & AWARENESS RAISING

Action-based citizen science & research

Private & public consumer programmes

Awareness raising programmes

Educational programmes for children & adolescents

Continued vocational training for adults

Recreational classes

OPERATIONAL SERVICES

Primary & secondary health care and wellbeing

Human resources

Technology services

NATURAL ENVIRONMENT

Climate & weather

Water resources

Natural fauna & flora, biodiversity

Land and soil

PRE-FARMING INPUT SUPPLY

Machinery, equipment & technology

Feed

Agricultural know-how & knowledge

Infrastructure

Credit

Seeds & planting materials

Fertilizer & pesticides

WASTE

Waste re-entering the circuit

Final waste deposit

INDIVIDUAL CITIZENS

Breastfeeding

Use of social media

Civil society commitment

Grocery shopping

Cooking & eating

Growing food

GASTRONOMY

Eateries

Food Services

INDIVIDUAL CITIZENS

Live & transmit values

Socialising children

Enacting cultural identity, social bonds & distinctions

MARKETING & ADVERTISING

Consumer research

Advertising in media

Direct marketing

Sponsorship of events

MEDIA

Professional, mass & new media

sustainable food practices

BUSINESS INTERESTS & PROFESSIONAL CORPORATIONS

Unions

Economic interest & lobbying groups

Professional chambers & membership bodies

Professional associations & federations

FARMING

Mixed livestock and / or cropping

Granivores (Pigs, chicken)

Grazing livestock (Cattle for milk or meat)

Field crops

Horticulture

Permanent crops

NON-PROFIT, VOLUNTARY & COMMUNITY GROUPS

Political lobbies

Advocacy groups, organisations & NGOs

Public interest organisations

Social Movements & Grassroots organisations

PROCESSING

Machinery, Equipment, technology & ingredient supply

Secondary Food Processing

Primary Food Processing

RETAIL

Specialist retailers

General retailers

RESEARCH

Other public & private research institutions

Self-employed researchers

Libraries, archives & knowledge centres

Universities, centres of excellence, academic research

WHOLESALE

General food wholesalers

Exporters

Specialist food wholesalers

GOVERNANCE & REGULATIONS

Natural resources service providers

EU Governance

Monitoring

Justice

Governmental departments & national agencies

National political Governance

FINANCING, INVESTMENT & INSURANCE

Trusts, foundations & funding bodies

Investors & catalysts

Banks (credit granting, funding)

Insurance agents & agencies

National and international stock & trade markets

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residential homes, hospitals and educational facilities, event catering etc.).

The different operational steps within the food circuit are supported by logistical services, transport, storage and packaging etc. – represented as warehouses and lorries transporting various packaged goods at all stages of the food supply circuit. Waste is generated at every stage of the food supply circuit and within the broader food system, represented here in a simplified overview by the parked lorries in front of recycling centres. From the perspective of circular economy, efforts have to be made to increase the amount of waste that re-enters the circle through, among other things, recycling, upcycling and composting.

Actors of the broader food system (beige background)

As part of a larger food *system,* the food supply circuit is fed, shaped and transformed by structures and processes from various levels and domains. By structures we mean the public and private sector institutions, organisations, corporations etc. that set and implement policy and legislation, deliver financial, technological and other services, provide education and media programs, pursue social, political or environmental goals and represent various societal or professional interests. Processes embrace the laws, regulations, policies, agreements, societal and cultural norms, as well as all formal and informal practices that, in turn, determine the way in which structures operate.

Actors within 'non-profit, voluntary & community groups' or 'governance & regulations' are particularly difficult to define because of their multiple activities. For example, an NGO can provide education, perform lobbying activities, offer grant funding and undertake research. 'Private and public consumer programmes' (e.g. campaigns around nutrition or food waste) may be undertaken by any of the actors with the intention of increasing food literacy.

'Operational services' include actors providing technological, human resources or health services for other food system actors. 'Media' refers to both professional and lay actors creating and disseminating opinions, art, analyses etc. in mass and new media. As the biggest (albeit most diversified) actor group, 'citizens' have a key sociocultural role in the system by transmitting values of conviviality, waste avoidance, sustainability, pleasure, taste, social bonds; talking to each other about trends, worries, experiences, preferences; enacting cultural identity and distinction; socialising children into their reference group etc.

The vulnerability context of food systems

Food systems are embedded in a larger context of vulnerability made up of shocks, critical trends and aspects of seasonality from various domains (ecological, economic, sociocultural, political, sanitary etc.) and originating on more global levels, yet impacting microlevels. Actors in the food system often lack resilience against these external influences, due to a limited ability to *directly* influence and act upon them, and a reduced ability to cope with them – especially in the short-term. Examples are changes in microclimate, weather hazards, pandemics, pest migration; political and economic trends, especially trade agreements (shaped by the World Bank, the International Monetary Fund, the World Trade Organisation, the United Nations and its various food-relevant sub-organisations etc.); and powerful private multinational actors in agro-industry – all augmenting the dependencies between local and global food systems.

While these actors are of paramount importance to global food systems, we do not depict them here, as the focus is on actors *directly* shaping Luxembourg's food system. We have only mentioned the broader international food-related policies that have a direct national impact, specifically the main EU polices on food (Common Agricultural Policy – CAP; Common Fisheries Policy, EU Food Safety; General Food Law).

In a nutshell

Our unbiased approach identifies the diversity of actors in Luxembourg's food system, depicts the complexity of the system and describes what forms the foodscape – without judging what makes a 'good' food system. Future updates will include analysing the actors and the scope of their power, their relationships, pressure points and barriers, but also the opportunities and innovations that thrive in the food system. ◆

1 Stephen R. Gliessman, *Agroecology: The Ecology of Sustainable Food Systems*, Boca Raton, CRC Press/Taylor and Francis Group, 2015[3].

2 Bent Egberg Mikkelsen, "Images of foodscapes: Introduction to foodscape studies and their application in the study of healthy eating out-of-home environments", in: *Perspectives in Public Health,* vol. 131, nr. 5, 2011, p. 209-216.

3 Ian Scoones, *Sustainable Livelihoods and Rural Development,* Fernwood Publishing/Practical Action Publishing, Rugby, 2015.

4 *Ibid.*

5 Service d'économie rurale, 2019.

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Luxembourg's farm types 2019[5]

Two-thirds of Luxembourg's 1,872 farms are specialised in grazing livestock (of which 43% specialise in dairy, 28% in rearing and fattening cattle, 7% in dairy, rearing and fattening combined, followed by various combinations of cattle, goat and sheep husbandry). The second-largest category of farms (272 farms, i.e. 14%) specialise in permanent crops, of which over 90% are quality vines. In third place are farms specialised in field crops (9%), followed by farms with mixed crop-livestock production (5%). Only 38 farms (2%) specialise in horticulture, which explains Luxembourg's low self-sufficiency in vegetable production (less than 1%). Other farms specialise in granivores (1.7%), mixed livestock (1.5%) and mixed crops (0.5%).