

Figure 1. Keizersrande Nature Farm. Circular production diagram. Source: Keizersrande Foundation keizersrande.nl. (create by the author)

FOOD CYCLES AND HYDROGEOLOGICAL RISK MITIGATION. THE KEZERSRANDE NATURAL FARM PROJECT

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Being at the base of the development of all societies, in so many different levels: food—its culture, production, diffusion, and consumption have a central role in shaping more resilient societies and habitats. This contribution, presenting the Dutch case study of the Nature Farm of Kezersrande, aims to highlight the possibility and the opportunity of exchange between different systems. The design of resilient food cycles is not limited to influencing our society and behaviour, but it also can shape our territories and our cities, in order to achieve both positive ecological results and a wider social integration. The presented project shows the possibility of exchange and integration between a resilient management of hydrogeological risk and a circular and sustainable food production system.

food cycles / resilient design / water-sensitive design / natural farming / river space



Figure 2. Flood plain along the Keizers and Stobbenwaarden and the Olsterwaard, north of the IJssel. Source: <https://beeldbank.rws.nl>, Rijkswaterstaat, Room for the River. Author: Ruben Smit.

“Food is the bridge. Food will be at the heart of the transition towards a regenerative future. It’s the field where natural systems literally meet human systems” states Driesehaar (2020), talking about a regenerative future and about natural farming system. Food and its cycle have a fundamental role in our society and in shaping our habitats. If we intend a sustainable system as described by Bill Mollison, as any system that during its lifetime is able to produce more energy than the amount it takes to maintain and establish it, then we understand the importance of closed cycles, also in the food production, consumption, distribution, and disposition chain. Resilient food cycles imply the opportunity to reshape not only our habits and cultural values, but also our environment, our cities, and the economic context, for achieving positive ecological results and a wider social integration. The contribution proposes a specific case study, to broaden the debate about food cycles towards a territorial scale, focusing on the relationship between food production and land management, with specific reference to the design of river banks and flood plains. Agriculture and livestock farming often negatively affect the risk of flooding rivers, however, in recent years several cases have been studied in which these activities have instead a positive impact. One of these cases, which is being operational for ten years, is here presented as a paradigmatic example. It shows how rural development, nature protection, agriculture, ecological improve-



Figure 3. Activities for the “Ruimte voor de Rivier” project on the southwest bank of the IJssel near Deventer. Source: Wikimedia Commons.

ment, economic aspects and recreation demand may sustainably be combined in a certain area.

The contribution aims, through the presentation of this case, to broaden the debate about creative food cycles and urban resilience, understood not only as resilience of the economic system, linked to the scarcity of food resources, but highlighting how food cycles can influence resilience in a territorial and ecosystemic scale and how they can become valid allies in the management of hydrogeological risk and river sides.

FOOD PRODUCTION AND RESILIENT STRATEGIES

Since 2000, scientific literature has seen the frequency of using the word resilience grow (Benè et al. 2017). Especially in the context of urban studies resilience is indicated as a goal to be achieved or a result to be pursued, the main development plans of the cities are being directed towards more resilient settlement. However, the diffusion of the term has been as wide as it is sometimes vague, and often risks becoming an empty slogan. Analysing the emergence of the use of the word, Chelleri identifies the will to broaden the spectrum of applications of urban resilience, no longer seen just as the ability to recover from natural disasters, but also

considering the evolution of the system itself through an adaptive and, therefore, evolutionary ability in the long term (Chelleri et al. 2015).

A useful tool to understand what we mean when we talk about a model of resilient city, or a resilient approach, and above all to be able to measure, at least according to some parameters, urban resilience, is the “City Resilience Index” published by Arup in 2014. This study suggests that the resilience of a city relates to four key dimensions: health and well-being, economy and society, infrastructure and environment, and leadership and strategy. A framework of 12 goals is then more specifically defined by 52 indicators. Analysing the framework developed by Arup, it is particularly interesting to note that food is a transversal indicator in different categories, connected with health and well-being, with agricultural production, with the infrastructural network and social aspects. Because of this transversality, food cycles have a central role in shaping more resilient societies and habitats.

Food production and the first human settlements have historically been linked to the presence of water; productive settlements, first agricultural and then industrial, have often been installed near waterways and rivers, essential as communication routes, sources of energy, for the provision of food and natural wealth. However, the close link between river dynamics and human activities has changed over the years, undergoing a progressive weakening, e. g. with channelisation, until a clear break occurred with the exploitation of water resources by industrial activity. The conflicting relationship between the natural dynamics of rivers and human activities is now exacerbated by the effects of climate change, which has favoured the shift of attention towards more adaptive design (Sendzimir et al. 2007). The proposed solutions often reside in the recovery of a synergy more linked to natural cycles, to the exchange between the different systems and to the creation of a more dynamic transition space related to climate conditions, temporality and seasonality (Berruti, Moccia 2016); the famous “water territories” mentioned by Dilip Da Cunha (2018) contrast with artificial geometries of old rigid river banks.

THE KEIZERSRANDE NATURE FARM PROJECT

A famous project that combines the hard, defensive technology of the dykes with a more dynamic approach is the “Ruimte voor de Rivier” program, started in Holland in the 2007, implemented through 20-30 specific projects, and completed in 2018. The Dutch project wanted to give the river more space to be able to manage higher water levels, get through flooding safely, and improve the quality of the

surroundings (Fig.1). A successful project developed within this framework is the activity of Annette Harberink with the Nature Farm Keizersrande, a biodynamic farm that combines both nature preservation and agricultural production, based on a circular food production system. The Nature Farm is located in the floodplains near Deventer (Fig. 2); its valuable characteristic is the renewal of the cultural landscape, consisting of meadows, flood plains, fields, woods, together with intensive agricultural land (Berk 2010). The location and the concept are directly related to the strategic project on the river IJssel. DAAD Architects, in collaboration with Van Paridon X de Groot landscape architects, has drawn the project for Natuurderij Keizersrande, as a combination of sustainable farming, estate development, and environmental and water management.

The architects describe their project¹ as a mound, shifted on three different levels, that ensures flow into the floodplains at all water levels. While parts of the ground flow regularly, the farm needed to continue to operate and the building had to be always accessible; for this reason, a concrete retaining wall is located around the building and increases it in height up to three metres on the IJssel side. The farm activities have a direct connection to the management of the floodplains: intensive grazing of the cows in the area ensures that the grass remains short and during high water the IJssel river can easily burst its banks in the places where it is intended, and not in the city. After already ten years of activity, Keizersrande's main goal and success is to have created a closed cycle of breeding, food production, and resilient maintenance of the territory. The grains from arable farming and the grasses of the pasture lands are used as food for the cows and calves, which in turn provides fertilization of the area. It combines nature with farming, water management and recreation, while the cows of the farm help to keep the grass of the floodplain short which supports more balance in biodiversity (Fig. 3, 4).

The farm is currently active and it is supporting about 160 animals. Ox and young cattle graze in the lower areas, while, about 80 cows, that are usually milked, graze in the higher areas of the floodplains for most of the year. Only when there is high water level all the animals enter the barn. Cattle are housed in winter in a straw bed. The straw, mixed with manure, is the organic fertilizer for grain cultivation in the fields. Straw, as a remnant of that cereal crop, is stored, the grains crushed and used to feed the cattle. This way of farming, that allows the vegetation to remain low and the water to continue to flow, creates permanent meadows with space for flowering herbs, meadow birds and small animals. According to the Keizersrande Foundation, thanks to the open nature of the yard of the Nature Farm, the visi-

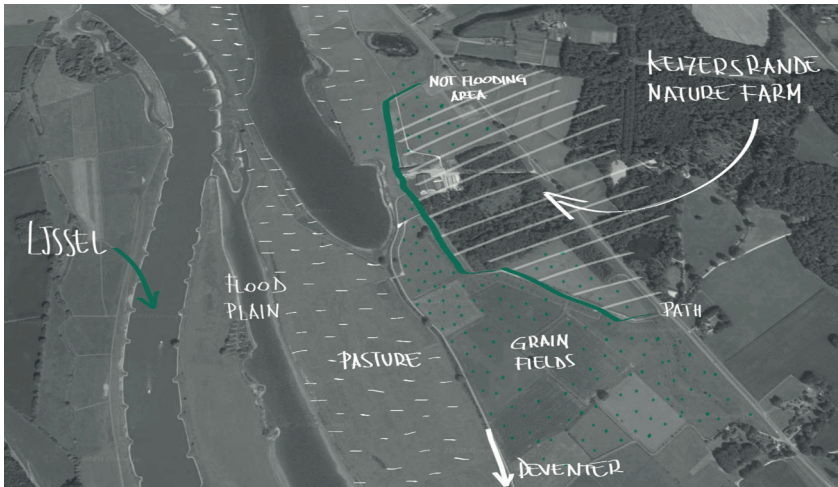


Figure 4. Context overview. Image by the author.

tor and consumers experience the entire food cycle. In the whole process, in fact, an important role is played by the involvement of visitors and by the educational activities carried out by the Keizersrande foundation, which is committed to offering didactic experiences related to the Keizersrande nature reserve and the floodplains, and which main topics are agriculture, nature, resource management water, landscape experience, sustainability, culture and history of the estate and the floodplain. The analysis of the entire project process includes its role as part of the “Room for the river” project: responding with a resilient approach to the need to maintain the dykes, achieving the important close production cycle, and developing teaching and information activities about the circular system. Thus, we are able to identify Keizersrande Nature Farm as a paradigmatic case of how Creative Food Cycles are active and could shape our society and habitats.

FOOTNOTES

- 1 The description of the architectural project is available on the DAAD Architects web site. Available at: <https://www.daad.nl/ontwerp/projecten/natuurderij-keizersrande-2/>

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