LOCAL COOPERATIVES´ CONTRIBUTION TO REALISING A GREEN ECONOMY IN NATURE PARKS IN LUXEMBOURG

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ABSTRACT

This paper investigates the role of local cooperatives in promoting a green economy in nature parks in Luxembourg. Relying on a rich dataset of mainly farmers' cooperatives, the study evaluates the socio-economic, ecological and governance outcomes of local cooperative production practices in two nature parks. Results indicate that local cooperatives modify traditional agricultural strategies to promote production systems that respect natural environmental processes and improve local competitive advantage. Their actions promote an inter-community network for conserving land and aquatic biodiversity, even though transitioning to organic production remains challenging for the cooperatives. The paper concludes that the adoption of organic production would distinguish nature parks from other biodiversity-rich local areas. As such, continuous and comprehensive policy actions from nature park authorities, such as dedicated training courses and financial incentives, are required to increase the adoption of organic production.

Key words: biodiversity protection, regional branding, intercommunal cooperation, organic agriculture

INTRODUCTION

A crucial aspect of the notion of a green economy is its stance on improving well-being and social equity while significantly reducing environmental risks and ecological scarcities (UNEP, 2011; Mastini et al., 2021; Aldieri & Vinci, 2018). More recently, the concept has been developed to explore various financial and risk management policies (Bem et al., 2022; Rusydiana & Bahri, 2022), including technological innovations in urban transport, energy and buildings (Baravikova, 2020; Affolderbach, 2017). However, a green economy is not limited to technological and organisational challenges that demand impressive financial stability and expertise (Schulz & Bailey, 2014). It is much more about the socio-ecological difficulties, caused by the Anthropocene, and the institutions seeking solutions (Hidle, 2019; Adams, 2017). Accordingly, its approaches have to address projects beyond the financial and technology spheres, given that these will provide a robust platform for understanding the sustainability transition within different contexts (Schulz & Bailey, 2014; Affolderbach, 2017). These claims raise questions about how the green economy concept works in non-technological or non-financial sectors such as protected areas, particularly nature parks. In light of this, the study aims to explain how local cooperatives' production strategies influence well-being and reduce biodiversity loss in Luxembourg's nature parks.

Local cooperatives in Western Europe have developed exponentially, playing an essential role in improving sustainability via multiple objectives and diverse roles (Luo et al., 2020; Castilla-Polo & Sánchez-Hernández, 2020). These autonomous associations of persons (ICA, 2007) are an essential paradigm for sustainable development (Gertler, 2004), especially in the agricultural sector, and are strengthening local communities by creating resilient socioeconomic and ecological business models (Bretos & Marcuello, 2017). Consequently, these are structures for developing sustainable food production systems in rural areas (Dower & Gaddis, 2021; Wilder, 2019; Pejnovic et al., 2017), with a non-negotiable role in the collective adoption of environmentally friendly practices (Candamir, 2021) and farming technologies (Abebaw & Haile, 2013). Cooperatives can help local areas improve their economic performance in product processing and marketing (Liu et al., 2019). Again, they can significantly impact local employment (Michalek et al., 2018), increase income and reduce poverty in remote areas (Ofori et al., 2019).

In Luxembourg, local cooperatives, mainly in the agricultural sector, have a long history and tradition, dating as far back as 1875. Today, although these cooperatives are gaining ground as vehicles of change to promote a sustainable society, research about their

actions in protected areas, especially in nature parks, is lacking.

To address this, this study examines the ecological, socio-economic and governance outcomes of local cooperative production strategies in Luxembourg's nature parks to examine their potential as indicators for the green economy. Addressing this question is vital if nature park authorities are to enhance environmentally and socially responsible production in park areas.

STUDY AREA AND METHODS

Luxembourg is a small country hosting three nature parks in 'rurban' areas, where agriculture is the main activity. Approaches for agricultural production in these parks are disharmonious and conflicting and can have irreversible consequences, leading to a decline in local biodiversity. The principal challenge for Luxembourg's nature parks is to balance the dual-objective of conserving and maintaining local ecological resources while ensuring the development of rural agricultural strategies. Consequently, nature park authorities have to ensure that agricultural activities protect, restore and preserve the natural and cultural heritage, as well as guarantee a secured socio-economic and cultural development for the inhabitants in park areas. To achieve this, sustainable agricultural production activities are needed to reduce the harmful impacts on or maintain important local ecosystems. Local cooperatives are increasingly becoming known for promoting such activities in park areas, making them compelling cases for this study. A joint aspiration among cooperatives in these areas is to build a more inclusive and sustainable society through local production processes. Nature parks are, therefore, essential platforms to help promote cooperative projects that do not damage local ecosystems. This study's investigation focused on two nature parks, Upper Sûre (Öewersauer) and Our (Figure 1), and the cooperatives Ourdaller and Vum Séi.

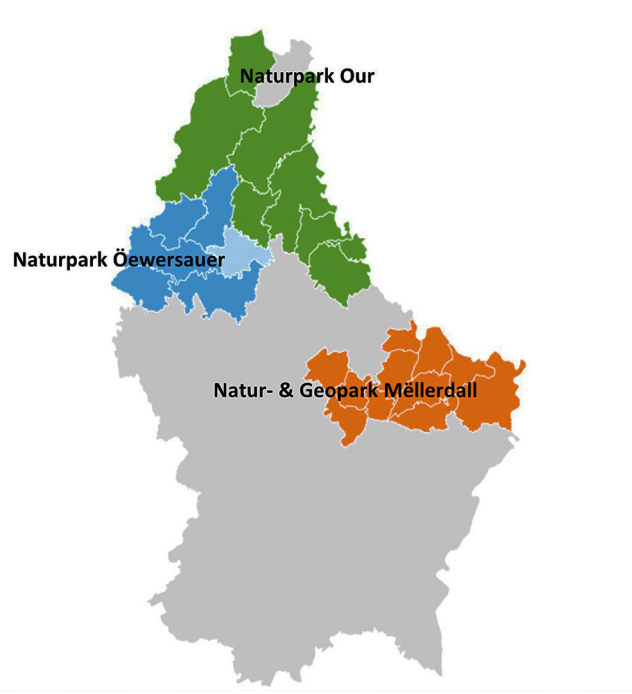

Figure 1. Nature parks in Luxembourg (Source: adapted from Naturpark.lu

The Upper Sûre Nature Park was created in 1989 encompassing five municipalities in the north-west of Luxembourg near the Belgian border, and covers approximately 183 km2, of which 50% is forested and 42% agricultural land (Upper Sûre Nature Park, 2014). It was intended to bring together different actors to discuss bottom-up development and improve regional value. The Vum Séi cooperative is located in this park.
Founded in 2005, the Our Nature Park covers 306 km2 with 21,000 inhabitants and eight municipalities. The park is part of the Ardennes located at a cross-border point between Belgium, Germany and Luxembourg, with numerous protected plants and bird species, such as the Little Owl (*Athene noctua*), various bats (*Antrozous*) and the European Otter (*Lutra lutra*) (Feyeh, 2016). Here, local cooperatives use the Ourdaller brand to reconcile nature conservation and the region's economic development.

Data collection

Exploratory field studies: These were conducted to observe the different strategies of local cooperatives in Luxembourg's nature parks and relate these to the concept of a green economy and sustainable development. As a tool for in-situ research, non-participant observation provided a much deeper understanding of the empirical context of the study (Yeung, 2003), including understanding the different production approaches practised by stakeholders of small and medium-sized cooperatives in park areas. Visits to seven firms owned by local cooperatives took place between June and July 2018 to meet and talk with stakeholders about their views on greening the economy of the nature parks through sustainable production. Notes were taken during this process by the researcher.
The selection of places visited was led by the study objectives and concepts. Because it was imperative to understand the different patterns and processes of green activities in park areas, the empirical fieldwork focused on local production units to appreciate regional production systems. A trip to a regional supermarket created for marketing park products was also crucial in

understanding the views of local consumers vis-à-vis local cooperatives and regional products. More generally, the different areas visited were mainly activity-oriented. Being in the field not only provided reliable data through direct observations and experiential recording, but was also crucial for identifying relevant stakeholders for interviews.

Interviews: Thirteen interviews with public and private individuals were conducted from November 2018 to May 2019, including seven representatives of local cooperatives (farmers/producers) and six other stakeholders interested in nature park activities (two private individuals, three nature park authority staff and one researcher). Apart from four in-person interviews, the rest were conducted by phone and lasted about thirty minutes in French or English. Three main criteria influenced the selection of interview participants: firstly, cooperative actors involved in local production in the nature parks chosen for their practical or theoretical knowledge about the sustainable production patterns in these areas; secondly, policy experts who are regularly involved in directing the administrative and development activities of the nature parks; and thirdly, ordinary citizens in park areas whose views were important in relating local cooperatives with the regional economy.

Information from the interviews was recorded using an audio sound recording device. The MAXQDA software for qualitative data analysis was used to logically code and organise the transcribed files into different themes and categories for topical and normative analysis.
Document analysis: Secondary information from peer and grey literature provided a framework to understand and establish meanings and relationships between nature parks, the green economy and local cooperatives, and was essential in adjusting the research path, alongside preparing questions for the expert interviews. Peer-reviewed literature centred around local cooperatives, green economy and sustainable development, including protected areas and nature parks. Content from various administrative policy and project files, public and local authorities, flyers, maps, seminars and conference papers, reports, and other applicable internet sites about parks in Luxembourg were valuable in analysing the production strategies of local cooperatives.

RESULTS AND DISCUSSION

Information gathered from the experimental observation characterised local cooperatives in parks in Luxembourg as platforms to valorise local resources and potentials through innovative crop cultivation and processing projects. As described in the interviews, the activities carried out by these cooperatives have inevitable socio-economic and environmental consequences and have opened up new paths for sustainable governance of the park areas. Operating within many sectors, the Ourdaller and the Vum Séi are the two most prominent agricultural cooperatives relative to all existing cooperatives in the study areas. They primarily engage in sustainable production practices and are major players in building local sustainability. These cooperatives have diverse functions, with a common characteristic of value-added, quality production, rural employment, ecological restoration, regional marketing of local goods, and improving local competitiveness (Table 1).

Cooperatives' environmental actions

Participants agreed that cooperatives are mainly agricultural and that through their production activities, they promote environmental awareness on the need to protect local land and drinking water resources. This is why most of the products from these cooperatives are produced according to the ecological regulations laid out by the nature park authorities. In this regard, the raw materials used for local products are cultivated with little or no chemical fertilisers and/or pesticides in a

Table 1. Cooperatives' role in greening nature parks in Luxembourg

Ourdaller and the Vum Séi cooperatives		
Environmental (Ecological awareness)	**Socio-economic** (Value creation and product marketing)	**Governance** (Cooperation)
Community responsibility for sustainable use of land and aquatic resources	Creating new and quality products	Intercommunity network for resource management
Environmental knowledge sharing	Increasing access to market and marketing power	Participation of local citizens in parks' objectives
Reducing pesticides	Improving employment	
Promoting an organic farming network	Promoting regional branding	
	Agricultural innovation and economies of scale	

Table 2. Local cooperatives and their products

	Local cooperatives	Sustainable products
Upper Sûre Park	Bléi Vum Séi, Tei Vum Séi Speltz Vum Séi , Véi Vum Séi Duch Vum Séi, Käre Vum Séi	Medicinal and aromatic toiletries, confectionary, medicinal and aromatic tea, cereals, biscuits, beer, sausages and other meat products, , grains (wheat, spelt and rye), cloth and fabrics, and pillow fillings
Our Nature Park	**OURDALLER** (BEO, BEOLA, BEOGRAN)	Vegetable oil, honey, beer, grains and cereals

traceable and transparent manner, and crafted by hand to achieve the highest possible quality. Animals are also reared extensively using environmentally sound practices on limited parcels of land. It was also observed that local cooperatives promote education for a green economy. They often organise awareness campaigns for local school children about the importance of ecosystem services in park areas. These exercises emphasise the importance of sustainable production to conserve aquatic and terrestrial biodiversity.

Socio-economic strength of local cooperatives

Participants acknowledged a lack of quantitative socio-economic data to show how cooperatives are contributing to improving the economy and the environment of park areas. However, many of them noted that it is evident that the initiatives of these cooperatives have enhanced the economic value and improved the branding value of local products. This has projected the image of park products within the local economy and has helped engage young people in nature park activities through local employment. Cooperatives have become regional symbols in the Upper Sûre and Our parks through the 'Vum Sei' and 'Ouedaller' labels. When participants discussed the role of local cooperatives in promoting green economic activities in these parks, they also reflected that local and regional citizens are now more aware of a new form of economic activity since the cooperatives were created. For them, cooperatives have opened up new regional markets for Vum Sei and Ourdaller products (Table 2). They have created new demand for sustainable local products in the form of artisanal food and non-food products using medicinal and aromatic plants. Consequently, through these regional brands, local inhabitants are more conscious that they belong to an ecological region.

Participants also mentioned that the creation of local cooperatives in park areas had reintroduced some traditional crops, such as industrial hemp (*Cannabis sativa*). This is a practice that disappeared from the region some fifty years ago. Today, local farmers cultivate hemp and process its seeds and leaves commercially. Buckwheat (*Fagopyrum esculentum*) is another recently introduced crop with a high nutritional value. There is a high local demand for it due to its importance in local beer production (Ourdaller beer).

The mustard plant (*Sinapis*) is different from other introduced crops in that it has traditionally been cultivated to maintain soil stability and enrich the humus layer. The plant's seed had no economic value and was not harvested or processed, but today, local farmers use mustard seeds to produce six different mustard products. Now, one of the main mustard

Hemp farm in the Our Nature Park © Norbert Eilenbecker

Locally processed mustard © Franklin Feyeh

products in Luxembourg's local markets originates from the Ourdaller cooperative in the Our Nature Park.

Governance aspects of local cooperatives

The study findings suggest that one of the greatest successes of the cooperatives in the Luxembourg parks is at the level of inter-communal cooperation, creating a platform for everyday decision-making among local producers from different parks. This is the new paradigm (Mose, 2007) in protected area governance (Borrini-Feyerabend et al., 2013) in which stakeholders are continuously brought together in decision-making processes using a common language (Qalyoubi, 2012). Together with regional and state actors, cooperatives are part of a synergy to decide on aspects related to nature conservation, park labels and the marketing of regional products. Through this participatory process, participants acknowledged that stakeholders could identify conflicts and solve potential problems related to sustainable production that might previously have been overlooked by a single actor.

Controversy relating to local production practices

Results from the study indicated that there is some controversy associated with sustainable production among local cooperative members because they have different understandings of the meaning of nature parks. This has led to three production practices: ecological or quality; organic; and conventional.

The results show that ecological techniques do not equate to organic production. However, the method eliminates the use of some conventional practices and maintains specific sustainability standards. This production system is mainly used by cooperatives wishing to obtain nature park product labels. Guided by a list of specifications (cahier de charge), the nature park authorities monitor the application of pesticides and other harmful sprays in the production chain.

On the other hand, a few local producers are engaged in organic production. Organic producers rely more on the self-regulatory processes of the natural ecosystems avoiding conventional chemical inputs. They emphasise environmental and social sustainability as central ethical values in the local production chain. As in the case of ecological production methods, organic production is guided by a specific follow-up and monitoring process by the park authorities to ensure better quality products and reduce environmental impacts. From personal observation, local producers are aware of the disadvantages of conventional production practices in nature park areas. The problem is combining the ethical values towards natural resource management with the economic goal of profit maximisation.

The field observations revealed that conventional producers in park areas follow the business-as-usual model, applying synthetic chemical fertilisers and pesticides in their agricultural practices. According to the participants in this category, nature parks hinder their businesses, given that producers could remain above the breakeven point even without park labels. There is not sufficient motivation to adopt new practices due to the cost. A laissez-faire situation seems to exist in this situation. A question that arose during field observation was who has the authority to control the cooperatives' production practices in Luxembourg's nature parks if each producer is free to choose the method that best suits their ambitions?

The role of the nature parks in enhancing cooperative strategies

The central goal of nature parks in Luxembourg is to promote sustainable regional development through human–nature interaction. Consequently, the nature park administration has a significant role in enhancing cooperative strategies. In the parks investigated, all-year -round agricultural advice along with water and biodiversity protection is provided by the park authorities through experienced agrarian consultants. Cooperatives are guided, upon request, on environmentally friendly production techniques such as direct drilling. Non-inversion tillage improves soil organic content and biochemical activities (Melero et al., 2009) and is beneficial for soil quality and biodiversity (Olesen & Jacobsen, 2002). Again, cooperatives are also encouraged by the nature park authorities to delay mowing until later in the growing season as this has been found to positively affect species richness and biodiversity (Chaudron et al., 2016).

At the same time, some farmers are given financial incentives to conserve drinking water sources through appropriate animal husbandry and reducing the use of pesticides and fertilisers. A form of biodiversity contract is being promoted in the Upper Sûre park to encourage farmers to protect specific plant and animal species, as well as constructing fences and bridges over and along water courses in farmed areas to prevent the direct access of livestock to these water sources.

Through agri-environmental and biodiversity programmes, local cooperatives are encouraged to engage in organic production. Organic agriculture is particularly appropriate for nature parks because it is

less polluting and provides good habitat for wildlife (Grandi & Triantafyllidis, 2010). This is important, especially if cooperatives seek to improve consumer trust (Fiore et al., 2020; Mohammed & Lee, 2015) and position parks as instrumental for biodiversity conservation. Organic farming also offers a nature-based solution to restore the health of farmlands, given that it increases biodiversity, conserves traditional cultivars and breeds and achieves sustainability from a biophysical and socio-economic point of view (Keesstra et al., 2018). Therefore, it is essential to support the actions of institutions like the Institute for Organic Farming and Agriculture, Luxembourg, that are helping conventional farmers in park areas to convert to organic production.

Organic production is gaining ground among many local producers, given its comparative advantage in contributing to a less polluted environment (Pugliese, 2001) and supporting rural development (Caudle, 2006). Because Luxembourg has one of the highest per capita consumption rates of organic products in Europe (Helga et al., 2021), cooperatives can build on this to secure sustainable development in nature parks.

CONCLUSION

This study highlights the context of local cooperatives in promoting a green economy in nature parks in Luxembourg. From a conservation perspective, it shows how the production strategies implemented by some cooperatives and promoted by their location in nature parks are less harmful to biodiversity protection than those commonly implemented outside. At the same time, from a socio-economic viewpoint, innovative production practices are increasing the competitive advantages of park areas.

The discussion introduces a broader problem related to organic production, which is still not fully exploited in the parks in Luxembourg, even though much could be gained from such a transition. The nature park authorities can help to address this issue by redirecting the focus on local agricultural production to conservation and sustainable use of biodiversity. Ongoing actions by the authorities, such as dedicated training courses, supporting conversion to organic methods, promoting organic food chains, organic trade fairs, and financial incentives for certification programmes, could serve as a platform for increasing the uptake of organic agriculture.

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Franklin Feyeh is the founder of SustainParks. His research focuses on protected areas and the integration of conservation and development strategies in regional planning

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RESUMEN

Este trabajo investiga el papel de las cooperativas locales en la promoción de una economía verde en los parques naturales de Luxemburgo. Basándose en un rico conjunto de datos, principalmente de cooperativas de agricultores, el estudio evalúa los resultados socioeconómicos, ecológicos y de gobernanza de las prácticas de producción de las cooperativas locales en dos parques naturales. Los resultados indican que las cooperativas locales modifican las estrategias agrícolas tradicionales para promover sistemas de producción que respeten los procesos ambientales naturales y mejoren la ventaja competitiva local. Sus acciones promueven una red intercomunitaria para conservar la biodiversidad terrestre y acuática, aunque la transición a la producción ecológica sigue siendo un reto para las cooperativas. El documento concluye que la adopción de la producción ecológica distinguiría a los parques naturales de otras zonas locales ricas en biodiversidad. Por ello, es necesario que las autoridades de los parques naturales lleven a cabo acciones políticas continuas y exhaustivas, como cursos de formación específicos e incentivos financieros, para aumentar la adopción de la producción ecológica.

RÉSUMÉ

Cet article étudie le rôle des coopératives locales dans la promotion d'une économie verte dans les parcs naturels du Luxembourg. S'appuyant sur un riche ensemble de données concernant principalement les coopératives d'agriculteurs, l'étude évalue les résultats socio-économiques, écologiques et de gouvernance des pratiques de production des coopératives locales dans deux parcs naturels. Les résultats indiquent que les coopératives locales modifient les stratégies agricoles traditionnelles pour promouvoir des systèmes de production qui respectent les processus environnementaux naturels et améliorent l'avantage concurrentiel local. Leurs actions favorisent un réseau intercommunautaire pour la conservation de la biodiversité terrestre et aquatique, même si la transition vers la production biologique reste un défi pour les coopératives. L'article conclut que l'adoption de la production biologique distinguerait les parcs naturels des autres zones locales riches en biodiversité. À ce titre, des actions politiques continues et complètes de la part des autorités des parcs naturels, telles que des cours de formation spécialisés et des incitations financières, sont nécessaires pour accroître l'adoption de la production biologique.