Opportunities for growth and development of carp aquaculture in Europe

NATIONAL MARINE FISHERIES RESEARCH INSTITUTE

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Introduction

Carp pond aquaculture is one of the oldest and most distinctive forms of aquaculture in Europe. Traditional carp ponds are not only production units, but also multifunctional landscape elements that combine food production with water retention, biodiversity support, cultural heritage and rural employment. In many European regions, especially in Central and Eastern Europe, carp ponds are part of long-established socio-ecological systems linked with wetlands, local traditions and regional economies. Despite these benefits, European carp aquaculture has experienced a long-term decline in production in many countries since its historical peak in the late twentieth century. This decline reflects economic, environmental, regulatory and market-related pressures, including water scarcity, climate risks, predation, administrative burdens, limited profitability and changing consumer preferences. At the same time, the wider ecosystem services provided by carp ponds remain insufficiently recognised in policy, markets and public communication. Carp pond aquaculture therefore requires a new development perspective: not only as a traditional fish production sector, but as a nature-based food production system contributing to food security, climate adaptation, biodiversity conservation and rural development.



Fig. 1 Earthen ponds used for carp production are an important element in maintaining biodiversity, including waterbird habitats. However, preserving these ecological functions requires maintaining the productive function of pond aquaculture.
Photo courtesy of Polski Karp – Producers' Organisation.

Objective

The objective of this study was to identify the main opportunities for growth and development of carp pond aquaculture in Europe. The analysis focused on the potential to rebuild production, improve productivity and strengthen the economic viability of the sector while maintaining the pond-based character of production. Particular attention was given to four dimensions: production potential, ecosystem services, stakeholder perceptions and policy instruments. The broader aim was to support a shift in the perception of carp aquaculture – from a traditional low-output sector under pressure towards a multifunctional aquaculture model delivering both marketable products and public environmental benefits.

Methods

The analysis combined three complementary sources of evidence. First, long-term FAO production data from 1950–2022 were used to assess historical trends in European carp production and estimate the scale of potential production recovery. Second, typical farm case studies were used to examine the economic and technical characteristics of carp pond aquaculture at different scales, including small, medium and large farms. Third, results from a 2024 stakeholder survey among 93 sector stakeholders were incorporated. The survey provided insights into perceived opportunities, barriers, environmental benefits, policy needs and communication gaps. Together, these data sources enabled an integrated assessment of carp aquaculture as both a production sector and a provider of ecosystem services.

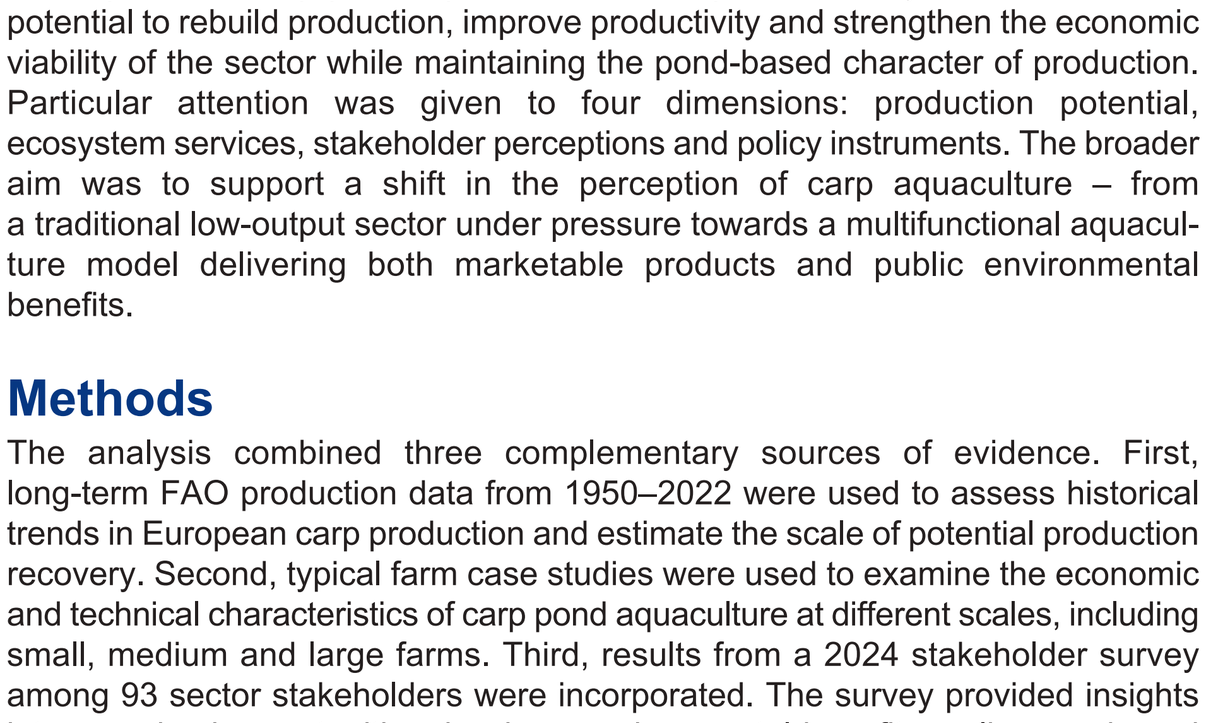


Fig. 2 Earthen ponds also play an important role in small-scale water retention, shaping local microclimates, CO_2 sequestration, regulation of water conditions, and landscape formation in areas naturally poor in lakes. *Photo: T. Kulikowski*

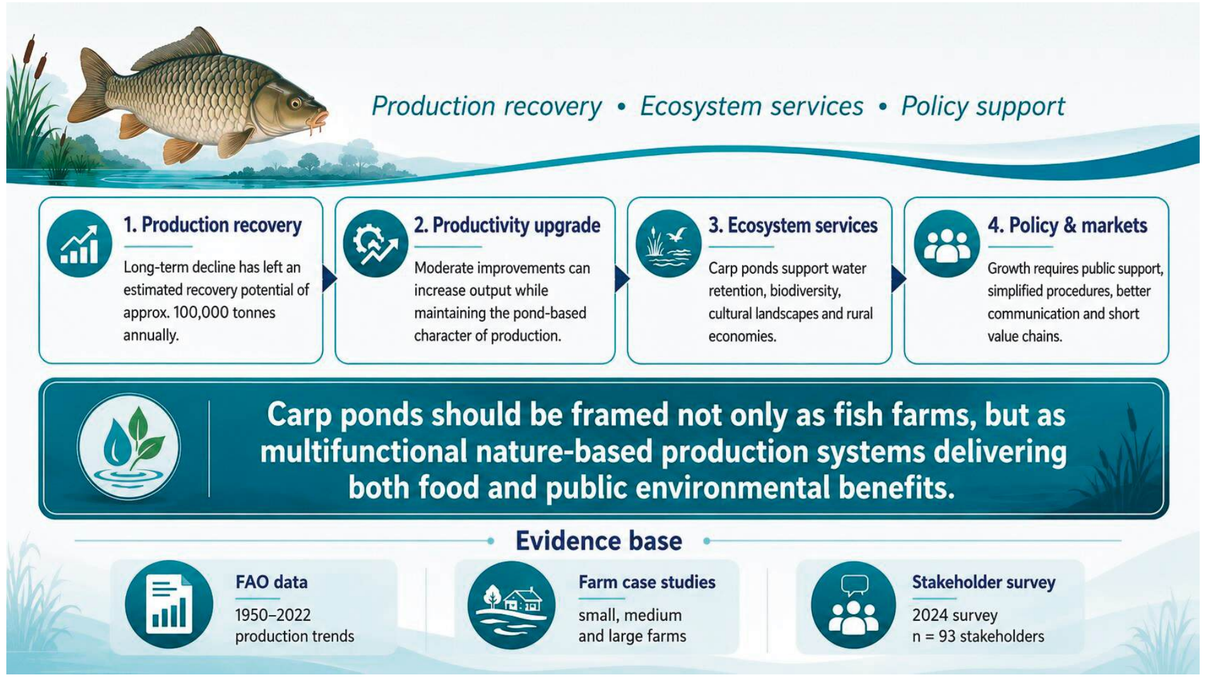


Fig. 3 Synthesis of key results and conclusions on the future development of European carp pond aquaculture.

Results

European carp production has declined substantially from its historical maximum. The estimated gap between historical annual peak production and current production levels is approximately 100,000 tonnes per year. This indicates significant recovery potential within the existing European carp aquaculture base, without the need for major spatial expansion.

Productivity can be improved while maintaining the pond-based and relatively extensive character of production. Moderate improvements, such as aeration, water quality monitoring, better feeding strategies, improved stocking practices and more precise farm management, could increase output without transforming carp pond aquaculture into a highly intensive system.

Carp ponds provide multiple ecosystem services that are not sufficiently reflected in market prices or public support mechanisms. These include water retention, flood mitigation, biodiversity support, habitat provision, nutrient cycling, cultural landscape maintenance and support for local rural economies.

The future growth of carp pond aquaculture depends not only on technical improvements, but also on better communication of environmental benefits, simplified administrative procedures, targeted public support, development of short supply chains, processing, direct sales and farm diversification. Overall, four main pathways for development can be identified: increasing productivity, integrating carp ponds into nature and climate policies, rewarding ecosystem services, and strengthening local value chains.

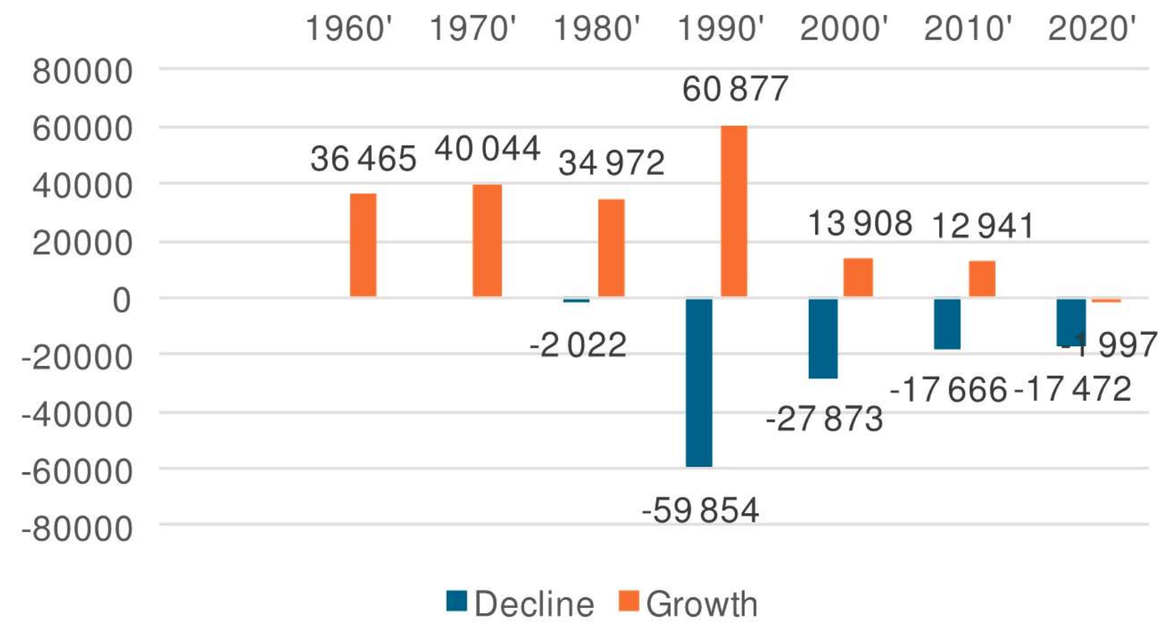


Fig. 4 Decadal changes in carp production in the European Union, highlighting the sector's unused production potential. *Source: FAO FishStatJ data.*

Conclusions

Carp pond aquaculture should be framed as a multifunctional nature-based production system rather than only as a traditional fish farming sector. Its value lies not only in carp production, but also in the environmental, cultural and socio-economic functions delivered by pond landscapes. The future development of the sector requires a balanced approach. Technological and management improvements are needed to increase productivity and profitability, but they should preserve the ecological character of pond systems. At the same time, policy instruments should better recognise and reward the public benefits generated by carp ponds, particularly in relation to biodiversity, water retention, climate adaptation and rural landscape management. A sustainable recovery of European carp aquaculture is possible if production-oriented measures are combined with environmental policy, public support, stakeholder engagement and better communication with consumers and society.

Full study and detailed results

The full study results are available in the European Commission report:

Assessment of the ecosystem services of bivalve mollusc farming and fish farming in ponds and wetlands, and challenges and opportunities in promoting the benefits.

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