ENVIRONMENTAL CHALLENGES OF EUROPEAN FRESHWATER AQUACULTURE AND POSSIBLE ANSWERS TO BE GIVEN ON POLICY LEVEL

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The freshwater finfish aquaculture dominates production with a share of 85.4% by volume on global level, where the low food chain, herbivorous and omnivorous fish species contribute to the decisive part (67.3%) of aquaculture production. Cyprinid species give about 48% of the global aquaculture production, of which Common carp is the third most abundant species with 4,236.3 thousand tonnes in production. At the same time, the share of Cyprinid production is 7.2% in the EU, while all together only 20.6% of the aquaculture production comes from freshwater. Besides the low level of quantitative development of the EU aquaculture, which remaines under 2 % the most remarkable weakness of the EU aquaculture that the production is covering only the 15% of the domestic market needs. 85% of aquaculture products imported from developing countries is a major challenge for both sustainability and food security point of view. The freshwater aquaculture sector in the EU is dominated by two main families, Salmonids and Cyprinids. Their production represents 83% of the EU freshwater aquaculture production. The rearing of these two species groups show great regional differences. Nowadays carp farming is mostly located in the Central Eastern European (CEE) region. Although carp production operates both in different intensive and extensive (semi-intensive) systems the typical carp farming means a traditional, extensive production. It is based on the natural nutrient cycle typical of natural wetland ecosystems. It operates as an open ecological system, where natural and technological processes are built on each other inseparably. Thanks to the extensive and seasonal production method pond aquaculture has high economic resilience. The sector runs with low operational expenditures (OPEX), and it is free from fish meal dependency and xenobiotics use. The species produced in this system belongs to low food chain ones. The EU pond aquaculture ensures yearly 80,000 tonnes of carp production that is 26% of the total EU freshwater aquaculture production in volumes and 260,000,000 euro in value. Pond aquaculture operates in rural areas employing up to 13,000 people. Beyond the direct economic values, the traditional pond aquaculture has diverse and complex environmental benefits. The most important value of pond aquaculture is that it maintains 250,000 ha man-made wetlands in the EU. Pond farms highly contribute to preserve biodiversity maintaining the populations of more than 400 bird species, substantial part of the otter population in Europe, numerous wetland related plant and animal species with European significance. In the latest years more and more scientific information has become available on the positive interaction between freshwater finfish aquaculture and the environment including its complex ecosystem services, as well as on its role in climate change mitigation, despite the EU's underestimated support practice concerning freshwater aquaculture. Although the scientific evidences are increasing on the complex social, economic and environmental benefits of pond farming together with the international recognition of carp production in Europe the sector still faces many challenges. Most of them are directly related to climate change from the environmental point of view, such as decreasing renewable water resources and predictability of water regime, increasing water blooming, emerging new pathogens and new invasive competitor species. Overall, the declining environmental conditions cause decreasing non-specific immune status of farmed fish species. The impact of wildlife is a complex ecological issue, but the deteriorating status is also linked to climate change. The lessons learnt from traditional low trophic pond aquaculture could be better exploited in the

development of circular bio-based farming in the EU. Lower trophic freshwater finfish aquaculture should be an important component of freshwater blue bioeconomy, not only as an efficient and sustainable biomass-producing sector, but also due to its potential for waste minimization and its complex natural services. Together with this recognition more emphasis should be put on the development of freshwater aquaculture in the EU. This could be achieved through focused research and innovation activities for more sustainable, competitive and resilient production, implementing a consistent and complex policy on the basis of blue bioeconomy. However currently these are not visible enough neither in research policy and in the aquaculture strategic guidelines nor in the European aquaculture support schemes.