

Pisciculture in the Belgian Congo

Sustainable Development *Avant la Lettre?*

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65

After the Second World War, an ambitious fish farming project was set up in the Congo by the Belgian colonial government on the basis of scientific reports indicating the state of fish resources. The aim was to feed the indigenous population, especially in rural areas considered to be the poorest, and to make economic production profitable, which could contribute to the well-being of the Congolese workers. By placing this project in the long history of sustainability, this article presents the main economic and socio-environmental issues regarding food and the use of fish resources that drove this project, as well as the measures put in place by the authorities associated with the experts to respond to them. The last part provides and discusses arguments that allow for the evaluation of the extent to which the fish farming project met the conditions of interconnected economic, social and environmental sustainability, as defined by the concept of sustainable development.

Na de Tweede Wereldoorlog ontwikkelde de Belgische koloniale overheid in Congo een ambitieus viskweekproject op basis van wetenschappelijke rapporten over het welzijn van de visbestanden. Het doel was de lokale bevolking van met name de arme plattelandsgebieden te voeden, de economie rendabel te maken en het welzijn van de Congolese arbeiders te verhogen. Door dit project in de lange geschiedenis van duurzaamheid te plaatsen, presenteert dit artikel de belangrijkste economische, sociale en ecologische problemen die aan de basis van dit project lagen en de maatregelen die experts en autoriteiten hiervoor voorstelden en namen. In de laatste paragraaf wordt beoordeeld in welke mate het viskweekproject voldeed aan het ideaal van duurzame ontwikkeling, waarbinnen economische, sociale en ecologische dimensies van duurzaamheid als onderling samenhangend worden gedefinieerd.

Introduction

There are currently many fish farming projects around the world dedicated to improving food security, especially among rural populations in the Global South, and to perpetuate certain species which are becoming vulnerable due to overfishing and unfavourable environmental conditions. Nearly half of the fish consumed by humans come from aquaculture, which represents a significant resource for meeting the United Nations' Sustainable Development Goals.¹ Fish ponds are often the basis of a circular economy in which fish farming can feed families and local communities and provide remunerative surpluses, fighting poverty by creating income-generating activities and permanent 'green' jobs that can produce goods or provide services that benefit the environment. Properly applied, this thousand-year-old farming method also offers a valuable tool for maintaining or restoring the biodiversity of certain natural environments.² On the other hand, aquaculture principles aligned with conservation biology suggest that if they are not correctly situated or do not correctly apply certain physical, chemical and biological processes, such ponds can themselves become potential sources of environmental alteration capable of deteriorating water quality and negatively impacting adjacent ecosystems.³

During the Belgian colonisation of Congo, which is the focus of this article, an ambitious enclosed-water (pond-based) pisciculture development programme was implemented by colonial authorities following the end of the Second World War. This global conflict had worsened the food situation of the Congolese population, in particular in rural areas. The colonial pisciculture project was set up to respond to three vital and interconnected challenges. First, the authorities wanted to feed the Congolese industrial workers and

1 FAO, 'The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation', <https://www.fao.org/3/cc0461en/online/sofia/2022/action-deliver-global-goals.html> (accessed 7 November 2022).

2 See in particular Colin Nash, *The History of Aquaculture* (Wiley 2011); Malcolm Beveridge and David Little, 'The History of Aquaculture in Traditional Societies', in: Barry Costa-Pierce (ed.), *Ecological Aquaculture: The Evolution of the Blue Revolution* (Wiley 2002) 3-29; David Grigg, *The Agricultural Systems of the World* (Cambridge University Press 1974); Akke J. van der Zijpp et al., *Fishponds in Farming Systems* (Wageningen Academic Publishers 2007). DOI: <https://doi.org/10.3920/978-90-8686-596-3>; Peter Edwards,

David Little and Harvey Demaine (eds.), *Rural Aquaculture* (CABI 2002).

3 Such conditions can include inadequate water temperatures, too high a density of species, a poor combination of species, unsuitable feed, waste, the use of biocides/pesticides, etc. See David Teichert-Coddington, Thomas Popma and Leonard Lovshin, 'Attributes of Tropical Pond-Cultured Fish', in: Hillary Egna and Claude Boyd (eds.), *Dynamics of Pond Aquaculture* (Routledge 1997) 183-198; Nathalie Le François et al., *Finfish Aquaculture: Species Selection for Diversification* (CABI 2009).

rural inhabitants – groups suffering from serious protein deficiency – quickly and at low cost. The second challenge concerned the protection of fisheries depleted by open-water fishing on rivers and lakes. And above all, the Belgian colonial authorities aimed to streamline and ensure the rentability of a promising, low-cost economic activity that could contribute to the local workers' health.

In 1949 the guidelines of the project led to the creation of the *Service de Pêche et de Pisciculture* (Fisheries and Pisciculture Service, SPP), as part of the *Plan Décennal pour le développement économique et social du Congo* (Ten-Year Plan for the Economic and Social Development of the Congo, 1949-1959). The service was led by the *Direction Générale de l'Agriculture* (General Directorate of Agriculture), and worked in close collaboration with the *Institut national pour l'étude agronomique du Congo belge* (National Institute for Agronomic Study in the Belgian Congo, INEAC), as well as some representatives from the realms of commerce, colonial agriculture and religious missions. While technical and scientific research centres investigated the conditions required for sustainable closed-water pisciculture, fingerlings were distributed to potential beneficiaries, such as industrial and agricultural companies and indigenous communities across the colony. A publicity campaign to generate indigenous communities' interest in creating ponds was set up to develop alimentary self-sufficiency. The campaign primarily targeted agricultural communities and inhabitants of the poorest and most deeply landlocked regions. It also focused on soil development and conservation.

The programme and its results were not presented as 'sustainable development' at the time, as the term and its definitions date from the 1980s, but the colonial government's ambitions nevertheless reflected a new rhetoric of both global and Congolese social transformation, particularly in rural areas, through economic and social programming intended to combat poverty and eliminate structural imbalances. In fact, this policy of development based on modernisation, supposed to be accepted and followed by all Congolese for the benefit of all, actually increased workloads by constraining and restructuring lands and natural resources using autocratic methods.⁴

This article seeks to re-insert the post-war Belgian Congo pisciculture project into the 'long history' of sustainability, as referred to in the introduction to this special issue.⁵ It is divided into three parts. The first part highlights the

4 See Idesbald Goddeeris, Amandine Lauro and Guy Vanthemsche (eds.), *Kolonial Congo. Een geschiedenis in vragen* (Polis 2020); Jean-Philippe Peemans, *Le Congo-Zaire au gré du xx^e siècle. Etat, économie, société, 1880-1990* (L'Harmattan 1997); Jean-Luc Vellut, 'Détresse matérielle et découverte de la misère dans les colonies belge d'Afrique centrale', in: Jean-Luc Vellut (ed.),

Congo. Ambitions et désenchantements, 1880-1960 (Karthala 2017) 215-246.

5 Peter van Dam, 'The Age of Interdependence. Varieties of Sustainability in the Low Countries during the Twentieth Century', *BMGN – LCHR* 137:4 (2022). DOI: <https://doi.org/10.18352/bmgn-lchr.11687>.

main economic and socio-environmental challenges the Belgian colony faced in terms of food supply and the use of natural resources at the time the project was launched. The second part presents the main measures implemented by the colonial government, with the help of scientists, in response to these challenges. The third part discusses the extent to which the colonial closed-water pisciculture project met the interlocking requirements of economic, social and environmental sustainability. The article also aims to make an original contribution to a promising field of research – the history of the acclimatisation and breeding of zoological species, ranching and, in particular, pisciculture in the context of imperial environmental administration in Africa.⁶

This article, in which the history of science, economic history, the history of agriculture and socio-environmental history meet, pays greater attention to rural life, resource industries and food supply issues, which remain understudied in the historiography of the Belgian Congo. It offers stimulating perspectives and complements earlier studies on the influence of environmental factors on colonial planning, particularly in the rural world, and, as a result, on the ecological disturbances that followed.⁷ Sources from the state archives (*Fonds AGRI* and *Plan Décennal*), scientific institutions (INEAC) and semi-public authorities (*Institut des Parcs Nationaux*, *Comité Spécial du Katanga*), as well as scientific publications (*Bulletin agricole du Congo Belge*) were used to analyse the evolution of the colonial pisciculture project and determine its relevance and limitations.

The challenges: feeding populations and safeguarding fish resources

During the interwar period, particularly during the socio-economic crisis of the 1930s, the large-scale development of mining activities, infrastructure and urban planning in the Belgian Congo were accompanied by the joint mobilisation of large-scale labour and agriculture surpluses for food supply

6 In particular Violette Pouillard, *Histoire des zoos par les animaux. Impérialisme, contrôle, conservation* (Champ Vallon 2019); Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Oxford University Press 2017); David Gordon, *Nachituti's Gift: Economy, Society, and Environment in Central Africa* (University of Wisconsin Press 2006); Samuël Coghe, 'A New Pastoral Frontier: Colonial Development, Environmental Knowledge, and the Introduction of Trypanotolerant Cattle in French Equatorial Africa, 1945-1960', *Environmental History* 27:4 (2022) 692-721. DOI: <https://doi.org/10.1086/721179>.

7 In particular Osumaka Likaka, *Rural Society and Cotton in Colonial Zaire* (University of Wisconsin Press 1997); Wemo Menge, *Le Transfert du Savoir Agricole au Congo-Zaire* (L'Harmattan 2001); Sven Van Melkebeke, *Dissimilar Coffee Frontiers: Mobilizing Labor and Land in the Lake Kivu Region, Congo and Rwanda (1918-1960/62)* (Brill 2020); Charlotte Vekemans and Yves Segers, 'Settler farming, agricultural colonisation and development in Katanga (Belgian Congo), 1910-1920', *Historia Agraria* 81 (2020) 195-226; Wemo Menge, *Le transfert du savoir agricole au Congo-Zaire* (L'Harmattan 2001).

purposes. The spectre of famine, epidemics and depopulation in some regions encouraged the colonial administration to manage human capital with a ‘full-belly’ policy.⁸ In Katanga in particular, where droughts and other natural catastrophes had caused food shortages and famines since the 1890s⁹, the *Union Minière du Haut-Katanga* (UMHK) established a social policy targeting family reunification through better housing and better food supply, to intensify work processes and stabilise the workforce.¹⁰ Company doctors looked for the best diets for their workers, as the earliest alimentary studies in Congo highlighted calorie and protein deficiencies, the latter from a lack of meat and fish. The situation was just as bad in rural areas.¹¹ Unemployment on the plantations was on the rise, and the constraints imposed by forced labour, based on a system of compulsory crops for the sake of productivity, overturned lifestyles and eating habits adapted to the natural environment.¹² Belgian officials thus deemed it necessary to oversee and manage a supposedly backward rural world where most Congolese people lived in a state of alimentary self-sufficiency far from the colonial economy, which sought to profit from the largest amount of land possible through agro-alimentary production for export. In addition, efforts during the First and especially the Second World War to feed the colony worsened the state of Congolese agriculture. Between 1938 and 1945, a weakened rural population was forced to meet domestic demand for food products driven by a doubling of salaried labour in the mining sector and an exploding urban population.

During this period, as efforts were made to diversify production to meet these domestic needs, Belgian scientists began to point at colonialism itself as the source of ecological imbalance, especially in terms of soil degradation and the exhaustion of natural resources linked to changing land use.¹³ This had resulted in a decline in local alimentary practices based on hunting, gathering and fishing. Furthermore, increased hunting of certain species was above all the result of rising demand from, among others,

8 Vellut, *Congo*, 221-225.

9 *Ibid.*, 154.

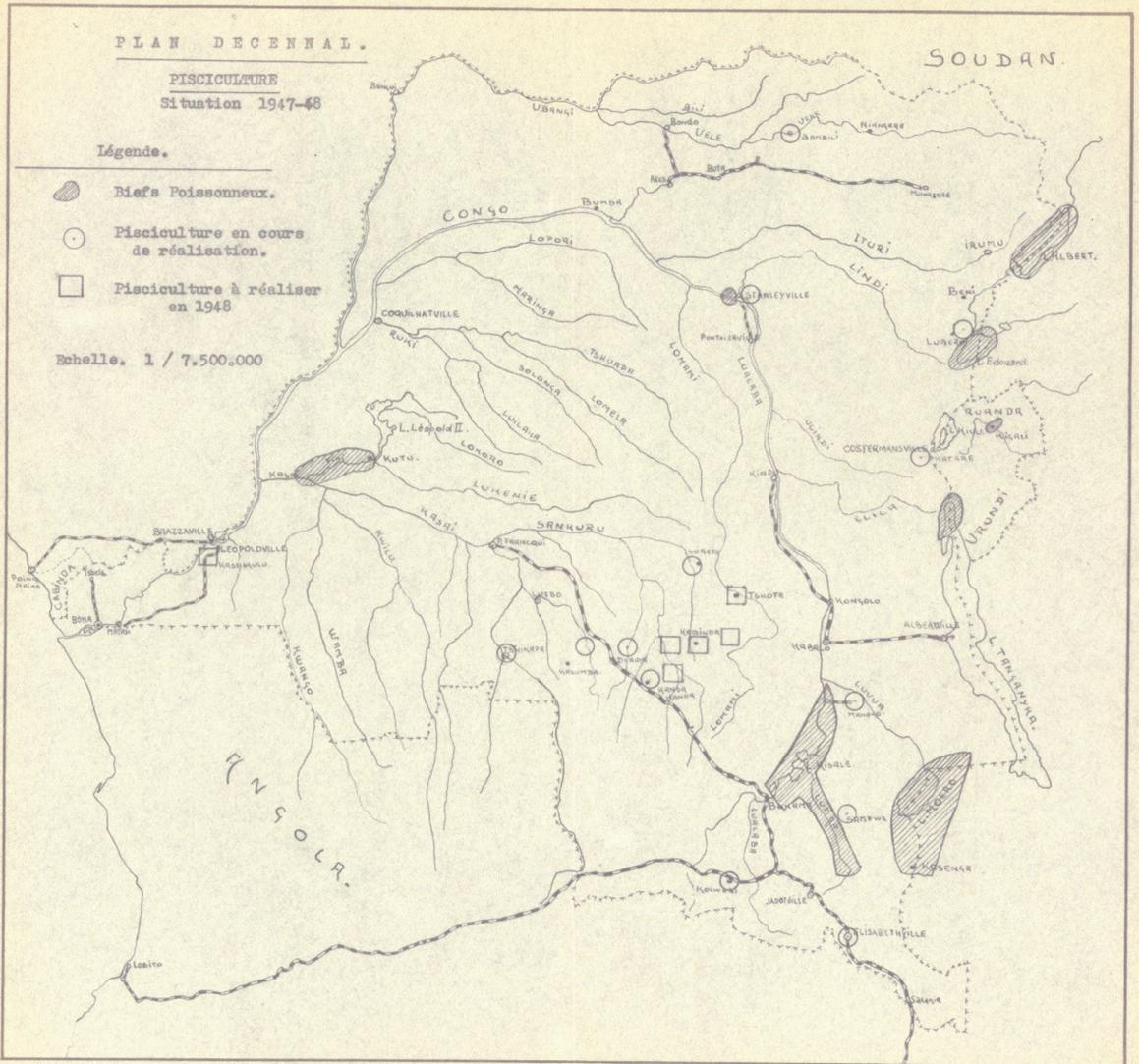
10 Peemans, *Le Congo-Zaire*, 37.

11 René Van Nitsen, *L'hygiène des travailleurs noirs dans les camps industriels du Haut-Katanga* (Brussels 1933); Giovanni-Battista Trolli and Edouard Bigwood, 'Problème de l'alimentation au Congo belge', in: *Rapport du 2e Congrès International de la Société Scientifique d'Hygiène Alimentaire, Paris, 25 octobre 1937* (Brussels [1937]).

12 The system was institutionalised by Emile Leplae, Director General of Agriculture at the Ministry of the Colonies and promotor of

European agriculture in Katanga, after his study trip to Indonesia, Uganda and Sudan (decree of 20 February 1917) to supply African troops engaged in the First World War's East Africa campaigns. See Bogumil Jewsiewicki, 'Histoire de l'agriculture africaine dans l'ancienne Province du Katanga (1919-1940)', *Likundoli série B-Archives et Documents* 3: 2-3 (1975) 65.

13 Patricia Van Schuylenbergh, *Faune sauvage et colonisation. Une histoire de destruction et de protection de la nature congolaise (1885-1960)* (Peter Lang 2020) 327-334, DOI: <https://doi.org/10.3726/b16159>.



▲
Map (1:7,500,000) designed in 1948 in preparation of the Ten-Year Plan for the Economic and Social Development of the Belgian Congo (1949-1959), showing the main fish farming sites under construction and those where projects could be carried out © Ministry of Foreign Office Brussels. AA, PD, Dossier Pisciculture, no. (1541) o8.01.

European companies, independent European and Asian merchants and indigenous cooperatives.¹⁴ Subsistence and small-scale commercial fishing had gradually been replaced by more aggressive, intensive practices, often illegal but above all beyond the control of the colonial authorities, who found themselves helpless in the face of the destruction of ‘fish capital’. From 1937 onwards, a hunting and fishing decree forbade certain supposedly destructive practices and managed freshwater fishing by listing authorised methods, durations and places.¹⁵ The main target were Congolese fishers who practised ‘fishing poaching [...] without considering the grave consequences of their looting’.¹⁶ The colony’s General Directorate of Agriculture sought to preserve ‘animal capital’ (game and fish) by implementing a series of environmental protection measures, which would, in the best case, stabilise fisheries resources and significantly increase production.¹⁷ Once the war ended, several Belgian hydrobiological and ichthyological missions systematised the study of fishing in the rivers and great lakes of the African rift as a scientific basis for a rational policy dedicated to the sustainable development of a promising, if still lacklustre, pisciculture sector.

Measures taken by the colonial State to promote closed-water pisciculture

From that moment on, the colonial authorities concentrated their efforts on the simultaneous development of open-water fishing in rivers and lakes, on the one hand, and closed-water pisciculture on the other hand. They did this on the basis of personal experiments carried out, with mixed results, since the mid-1930s. The reasons for this two-pronged strategy were diverse.

In North Kivu, Henri-Martin Hackars, the conservator of the Albert National Park, developed a few ponds in the indigenous areas Beni and Vuhovi to dissuade Lake Edward fishers – who had been displaced from the park because of sleeping sickness (*trypanosoma gambiense*) – from returning by providing them with other piscicultural resources.¹⁸ In Katanga, the colonial

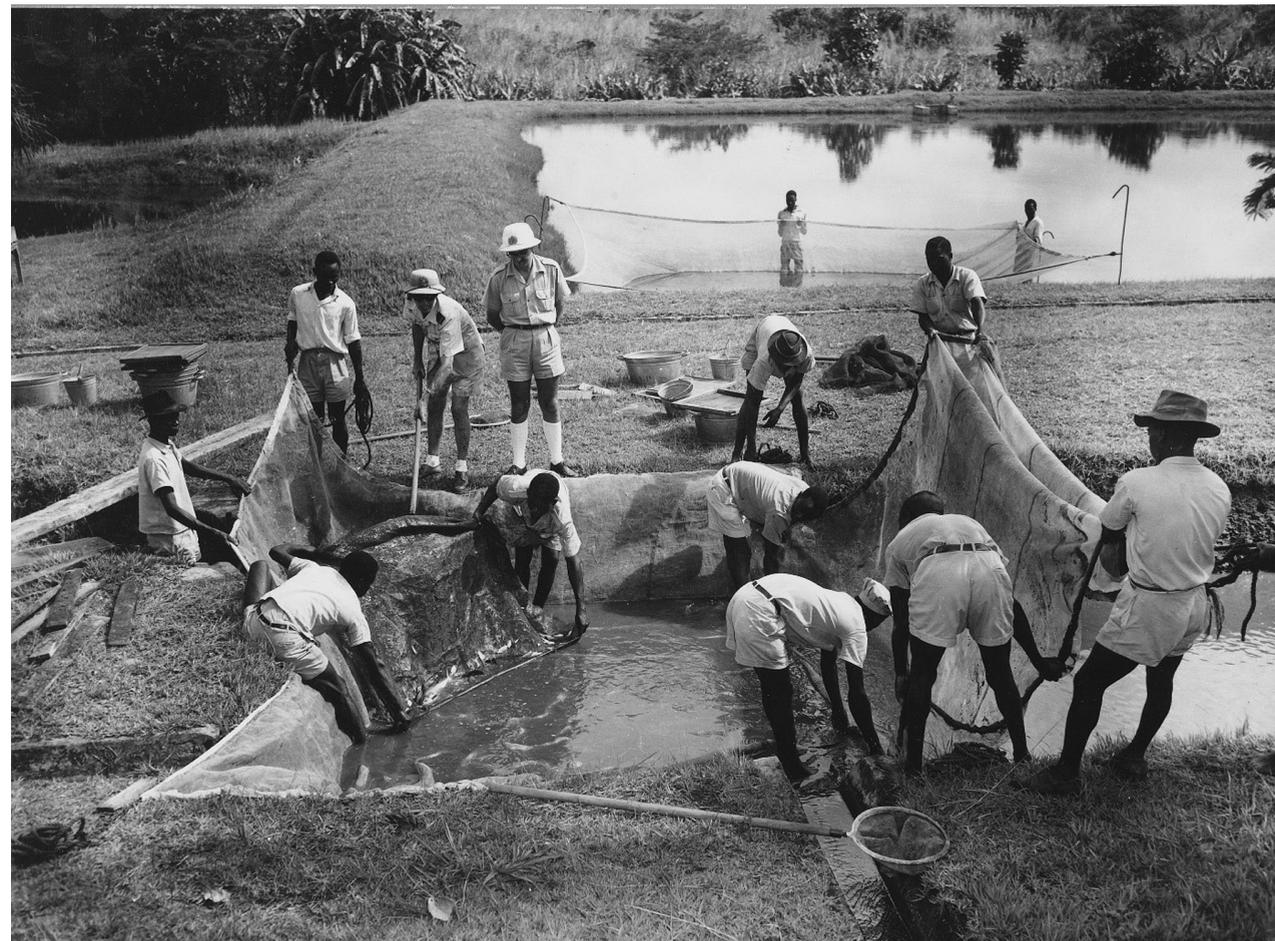
14 Van Schuylenbergh, *Faune sauvage*, 227-258; Patricia Van Schuylenbergh, ‘Entre délinquance et résistance au Congo belge: l’interprétation coloniale du braconnage’, *Afrique et Histoire* 7:1 (2009) 25-48.

15 *Bulletin officiel du Congo belge*, 1937, 356-390.

16 African Archives Brussels (hereafter AA), Plan décennal (hereafter PD), no. 1841, dossier Pêche et Pisciculture, document P. Staner, 18 February 1947.

17 Van Schuylenbergh, *Faune sauvage*, 242.

18 AA, Agriculture (hereafter Agri) no. 418, Rapport de H.M. Hackars de la station de Mutsora, secteur Nord du Parc National Albert, 1 November 1939. On this subject, see Patricia Van Schuylenbergh, ‘Contribution à l’histoire du lac Édouard: enjeux socio-économiques et environnementaux autour des ressources halieutiques (vers 1920-1960)’, in: Pamphile Mantuba-Ngoma and Mathieu Zana Etambala (eds.), *La société congolaise face à la modernité (1700-2010): Mélanges eurafricains offerts à Jean-Luc Vellut* (L’Harmattan 2017) 125-160;



Congolese monitors empty an acclimatization pond for local fish species at the Gandajika fish rearing centre in Kasai. In the centre, Congolese monitors were trained in fish farming methods to propagate them in the *Paysannats Indigènes*. © Photo taken by C. Lamote (Inforcongo). Collection RMCA Tervuren, HP.1958.1.140, date unknown. Licensed under CC-BY 4.0.

farmer Jérôme Bussche put large artificial ponds at the disposal of his workers, whom he encouraged to fish by holding regular contests ‘with beautiful prizes among native fishers’.¹⁹ In Élisabethville, the creation of ponds started in 1943 in Heenen Park, the Keyberg station and the Wangermée farm. These ponds were used as an experiment in tilapia farming undertaken jointly by the province, the *Comité Spécial du Katanga* and the UMHK. In Kasai at the end of 1944, the successful acclimatisation of imported fingerlings (bluegills and tilapias) in two Tshikapa test ponds encouraged the *Société internationale forestière et minière du Congo* (Forminière) to launch a new programme of high-yield pisciculture.²⁰

After the war ended, the Belgian colonial government wanted to expand these local initiatives. Officials in Brussels and Léopoldville agreed to implement the *Mission Piscicole du Katanga* (1946-1947). Financed by a Katanga provincial tax called *Fonds Poisson* (‘Fish Fund’), it was designed to improve the living conditions of native fishers, but at their own (financial) expense.²¹ The district commissioner Céleste Halain and a small scientific team directed the project, which sought to take stock of existing infrastructure on the ground and wanted to experiment with pisciculture in the Élisabethville hinterland.²² A detailed report confirmed the enormous potential of pisciculture as practised in the Dutch colony of Indonesia, and recommended the organisation of a new *Mission Piscicole du Congo* (1949). The latter served as a prelude to the creation of the aforementioned Fisheries and Pisciculture Service as part of the General Directorate of Agriculture.²³ This department created the Ten-Year Plan for the Economic and Social Development of the Congo (1949-1959) to ‘provide, in the shortest time and at the lowest price possible, all the fish needed to guarantee correct nutrition to all indigenous people’.²⁴ The challenge was enormous, since it called for a fivefold increase in

Esther Marijnen, ‘Lakes as Rebellious Landscapes: From ‘Fishing Rebels’ to ‘Fishy State Officials’ in DR Congo’, *Geoforum* 133 (2021) 208-216. DOI: <https://doi.org/10.1016/j.geoforum.2021.10.002>.

- 19 AA, PD, no. 1841, dossier 08/01 Pêche et Pisciculture: document P. Staner, 18 February 1947.
- 20 State Archives Brussels (hereafter AE), Institut national pour l’étude agronomique du Congo belge (hereafter INEAC), no. 5532, Esquisse d’un programme de pisciculture à grand rendement au Kasai par Dr. H. Gillet, 5 February 1946.
- 21 AA, PD, no.1841, Programme de la Mission Piscicole du Congo par Halain, 1 January 1948.
- 22 Céleste Halain took assistants Marcel Huet, agricultural engineer, manager of the

hydrobiology section at the Groenendael research station and *chargé de mission* in the Belgian Congo, A. Hulot, a hydrobiologist assigned by INEAC, and Antoon F. De Bont, Doctor of Natural Sciences from the Université de Louvain (today KU Leuven).

- 23 Marcel Huet, *Mission Piscicole du Katanga 1946-1947* (IMIFI 1948).
- 24 AA, PD, no. 1841, Rapport de C. Halain pour le groupe d’étude du plan sur le problème piscicole de la Colonie, 31 March 1948; Guy Vanthemsche, ‘Le Congo, une colonie en “voie de développement”’, in: Goddeeris, *Koloniaal Congo*, 201.

production (meat and fish combined) to compensate for the huge deficit facing a total population of 14 million individuals.²⁵ Halain estimated this could be done with piscicultural production of 231,000 tonnes during the period of the Plan, and a total of 1,800,000 tonnes through 1967, with the flooding of 365,000 hectares of indigenous lands for a budget of 1.5 billion Belgian francs spread over a period of twenty years.²⁶

To achieve this ambitious goal, a vast programme of piscicultural coordination and development with three main axes was launched. The first axis concerned the establishment of scientific and technical research stations (one for every two provinces), the main station being the one in Kipopo in Katanga. These stations were responsible for experimental ponds as well as for the biological and ethological study of various local and imported species, their reproductive capacity and compatibility with other aquacultural species, which natural and artificial feeds were suitable, and which farming methods were best. In April 1955, the main research station was placed under the management of INEAC, which had the principal role of providing knowledge and techniques in support of colonial and indigenous agriculture. As of 1957, the competencies were subdivided more precisely between the Fisheries and Pisciculture Service – for technical questions and propaganda – and the hydrobiology division of INEAC, for strictly scientific aspects.²⁷

The second axis was the creation, in each province of Congo, of an expandable network connecting fish nursery centres. Those would help to distribute the fingerlings over ponds built by potential breeders with a concentration of local labour (settlers, companies, missions) and, above all, by Congolese populations in traditional areas to guarantee their alimentary self-sufficiency. This was especially the case in those *Paysannats Indigènes* (Indigenous Peasantries) where authorities and agronomists agreed that good material conditions, the technical personnel and the labour force offered the best chances of success. As part of this collaboration between the State and INEAC, the *Fonds du Bien-Être Indigène* (Indigenous Welfare Fund, FBI) financed

25 *Ibid.* Halain estimated that the total production of meat (cattle and bushmeat) and fish required an input of 365,000 tonnes per year, while the official annual production was 35,000 tonnes of meat and 30,000 tonnes of fish, in addition to 8,000 tonnes exported.

26 *Ibid.*

27 After the war, the institute established new programmes and research units dedicated to local and regional agricultural production, combined with the best knowledge about the real potential

of each ecological zone as well as the socio-economic composition of the target populations. Studies of the nutritional value of vegetable or animal food products in equatorial forest zones at low altitude must have been an important spur to the creation of this new division. See Vladimir Drachoussoff, Alexandre Focan and Jacques Hecq, *Le développement rural en Afrique centrale 1908-1960/1962*, t. 2 (Fondation Roi Baudouin 1992) 220.

the building of ponds.²⁸ Fifty ponds were created at the Yangambi and Bambesa research centres at a cost of 3.3 million francs.²⁹

The third axis was education and communication intended to exchange scientific and technical information with piscicultural stations in the Union of South Africa and Northern Rhodesia, in particular via Anglo-Belgian fish farming conferences such as in Élisabethville in 1949 and Entebbe in 1952. Also, the colonial authorities, with the expertise of Belgian scientists, organised study missions to piscicultural experiments in other colonies, particularly Dutch experiments in Indonesia, including a mission to Java in 1955. Above all, the research station of Kipopo popularised piscicultural theories and practices to train European prospecting agents, fish farming advisers and Congolese monitors wishing to develop ponds in their areas of activity.

Colonial pisciculture: 'sustainable development'?

Pisciculture in the Belgian Congo developed rapidly in barely ten years. By 1952, there were twelve main nursery centres and nearly 47,000 ponds covering 2,151 hectares. Only a few years later, in 1958, 122,404 ponds covered a total of 4,081 hectares.³⁰ Even over twenty years, however, the figures never approached the 365,000 hectares envisaged by Halain. Shortly before Congo became independent, INEAC decided to put pisciculture on hold, and to concentrate its efforts on expanding production at the existing research stations (Kipopo, Yaekama and Bambesa) rather than extending a network of insufficiently managed ponds. These two elements clearly indicate that the durability of the project was far from guaranteed. In the years following Congolese independence in 1960, pisciculture stagnated, and the ponds dried up.³¹

What caused this collapse? Efficient and durable pisciculture required the constant, judicious production of resources and respect for

28 The FBI, created by a regent's decree on 1 July 1947, was intended to financially support all achievements and investments contributing to the material development of rural populations for an initial capital of more than 2 billion francs, especially in the rural economy and medico-social fields (in particular hygiene and food). See Maarten Langhendries and Reinout Vander Hulst, 'Gezondheidszorg: het paradepaard van de Belgische kolonisatie', in: Goddeeris, *Kolonial Congo*, 311.

29 AE, INEAC, no. 5543, lettre du FBI au directeur général de l'INEAC Jurion, 17 August 1949; *Ibid.*, 'Projet de réalisation par l'INEAC avec l'appui du FBI de 2 centres d'alevinage (Yangambi et Bambesa) [no date].

30 *Bulletin Agricole du Congo Belge* (hereafter BACB), *Volume jubilaire 1910-1960* (1960) 154.

31 Theodore Trefon and Thierry De Putter (eds.), *Ressources naturelles et développement: Le paradoxe congolais* (L'Harmattan 2017) 114.



Congolese farmers empty a pond where tilapia are raised in Paysannat Nonda (Kasongo region, Maniema).

The pond is roughly landscaped and deforested. © Photo taken by H. Goldstein via soFAM. Collection RMCA Tervuren, HP.1956.32.361, date unknown.

social well-being and environmental protection. While colonial pisciculture theoretically sought positive socio-economic effects (providing the population with animal proteins, food security, economic diversification and employment opportunities in the sector) to combat rural poverty through the application of a relatively simple technology, it actually created crucial socio-cultural problems, on the one hand, and technical and economic problems on the other. These issues were the result of the Belgian colonisers' authoritarian approach to the choice of pond installation. By extension, they were the consequence of the colonisers' access to and use and exploitation of indigenous lands, as well as of their imposition of Eurocentric scientific understanding and technologies, without any real consideration of local knowledge. In other words, the colonial ruler used piscicultural science and techniques to legitimise processes and policies for the benefit of Congolese producers and consumers, but without their explicit consent.

Socio-cultural obstacles

To successfully achieve the goals set by the colonial authorities, piscicultural ponds had to be monitored by scientific techniques and had to have sufficient infrastructure, labour and feed to maintain stock. Some pilot projects had these resources, particularly those created by research centres and nurseries, a handful of companies such as UMHK and Cotonco, some religious missions and a few indigenous communities. Many others, however, lacked these resources and thus showed poor results. At the same time, traditional fishing methods were still in use, and traditional lifestyles and eating habits were entrenched and could, therefore, hamper the success of an imposed and constrained piscicultural model. This had been overlooked by the colonial authorities. Several historical, socio-anthropological and ethno-ecological examples demonstrated that certain populations in the Congo basin still used traditional forms of intensive production in stable and well-equipped environments akin to those of pisciculture. They had advanced know-how of the ecology and of overfishing thresholds. In some cases, existing fish ponds already had great economic, social and symbolic importance.³²

32 See, for example, Pierre Van Leynseele, 'Les transformations des systèmes de production et d'échanges de populations ripuaires du Haut-Zaïre', *African Economic History* 7 (1979) 117-129; Gustaaf Hulstaert, 'L'évolution de la production alimentaire des Nkundo (xix-xx^e siècles): Un bilan partisan', *Ibid.*, 171-180; Jérôme Mumbanza mwa Bawele, *Histoire des peuples riverains de l'entre*

Zaire-Ubangi: évolution sociale et économique (ca 1700-1930) (Dissertation in history, Lubumbashi, 1980); Marion Comptour, Sophie Caillon and Doyle McKey, 'Pond fishing in the Congolese cuvette: a story of fishermen, animals, and water spirits', *Revue d'ethnoécologie* 10 (2016) 1-27. DOI: <https://doi.org/10.4000/ethnoecologie.2795>.

The pisciculture project, established and overseen by white colonial personnel, occasionally accompanied by some Congolese monitors, therefore represented an affront to local communities that already managed piscicultural production, or that were diverted from their traditional fishing activities by restrictive rules and requirements. They were unwilling to abandon certain land rights in fishing zones for the benefit of artificial ponds. Furthermore, the lack of interest in a collectively managed pisciculture programme indicated a preference for family or individual ponds free from colonial intervention. In the province of Léopoldville, for example, a region with high hydrographic potential which local fishermen had occupied for centuries, local communities had developed their own ponds separately from those created by the local administration, and after experiments with collective ponds had proven a ‘fiasco’. The agronomist in charge of the programme explained this failure by referring to the ‘very individualistic’ character of the Lower Congo population.³³

Although this region was home to far more ponds (both in number and in surface area) than any other region, and despite the efforts authorities and agronomists made in other provinces, production at village level was negligible, with an average of 300 kg annually per hectare, versus 5 to 6 tonnes annually per hectare from company and mission ponds.³⁴ These numbers are no more than would be expected from natural waterways.³⁵ Some reasons for this might include the fact that pond fishing was presented as simple when actually it was exacting and required preliminary and feasibility studies in terms of the nature of the soil and the environment. Also, investment in material and in labour demanded a strict schedule of water installation and removal operations, just as in the creation of breakwaters. Furthermore, a thorough understanding of the biology and ethology of acclimatised species was required to ensure they adapted to the aquacultural environment. It further involved feed, capture, handling and transport. INEAC reported inadequate facilities, undrained ponds and poorly adapted feed. People often threw domestic waste, vegetables, termites or manure into ponds, polluting the waters and possibly spreading disease.

Low levels of interest in the colonial pisciculture project among local populations can also be explained by the fact that the model had been presented as a random response to subsistence needs, especially in agricultural areas, and, by consequence, was not pursued as a viable economic activity capable of generating sizeable revenue for producers. Several nursery centres and experimental ponds had been created as part

33 V. Deceuninck, ‘Visvangst en Viskweek in Neder-Kongo’, *BACB* 43:3 (1952) 884.

34 In 1958, nearly 90,000 ponds occupied 2,310 hectares, compared to nearly 20,000 in Kasai covering 519 hectares; there were only

6,000 in Katanga (153 hectares) (Ministère des Colonies, *La Situation économique du Congo belge et du Ruanda-Urundi en 1958*).

35 Drachoussoff, Focan and Hecq, *Le développement rural*, 220.

of the *Paysannats Indigènes*, where they were part of the village food supply chain that included croplands, orchards, cattle and transport methods.³⁶ Such experiments were haphazard, depending on various conditions and environments – for example, the restrictive forest environment in the Paysannat de Bambesa, various natural obstacles, scattered villages and a lack of means of transport in the Paysannat de Mwene-Ditu (Kasaï). With no agronomist in the field, individual ponds had been created by local farmers, who maintained them willingly but without much skill, especially in the area of appropriate feed.³⁷ In the Paysannat de Gandajika (Kasaï), a nursery centre sought to alleviate game poverty in the region and used a well-connected road network to supply the Cotonco cotton-growing workforce.³⁸ Finding little local interest in shared ponds, they introduced individual pisciculture instead, alongside the training of Congolese monitors, who had to convince locals that artificial tilapia production was possible and even desirable. Nevertheless, the centre saw the project collapse as the result of a new local trade in fingerlings.³⁹

Pisciculture was further constrained by the amount of time rural people devoted to working on agricultural programmes encouraged by the *Paysannats*. Ponds were often the last link in a long chain of activities agronomists oversaw, and were not given high priority. Incentives were offered to remedy this. At the Nyakabera (Kivu) breeding centre, provincial agronomists planned to give a cow to each worker who gave up part of his land to develop fish ponds. They considered this the only way to obtain local participation in the project, while at the same time

36 INEAC created the *Paysannats Indigènes* to expand and improve the agricultural production techniques of a workforce used to its 'customary environment' through the implementation of farming designed to conserve soil fertility under the supervision of services intended to provide a minimum of social and economic well-being and food security. See Piet Clemens, 'Agricultural Policies and Practices in Belgian Congo. The Origins and Implementation of the "Indigenous Peasantry" Scheme (1917-1959)', in: Jacques Vanderlinden (ed.), *The Belgian Congo between the Two World Wars* (Académie Royale des Sciences d'Outre-Mer 2019) 83-128; Leen Van Molle, Yves Segers and Stephanie Kerckhofs, "'C'est par la science qu'on colonise". Over de relatie tussen de Grote Depressie en de landbouwpolitiek

in Belgisch Congo', in: *Ibid.*, 159-189; Sven Van Melkebeke, 'Science as the Handmaiden of Coerced Labor: The Implementation of Cotton Cultivation Schemes in the Eastern Congo Uele Region, 1920-1960', in: Johan Heinsen, Martin Bak Jørgensen and Martin Ottovay Jørgensen (eds.), *Coercive Geographies: Historicizing Mobility, Labor and Confinement* (Brill 2021) 169-191. DOI: https://doi.org/10.1163/9789004443204_010.

37 A. De Fauconval and G. Toumpsin, 'Les paysannats du Territoire de Mwene-Ditu', *BACB* 48:3 (1957) 549-551.

38 AA, PD, no.1841, Plan d'action de la Mission piscicole du Katanga (Congopresse, 15 April 1948).

39 A. De Fauconval et G. Toumpsin, 'Les paysannats du Territoire de Gandajika', *BACB* 48:1 (1957) 37.



A fish test pond in Élisabethville, near the УМНК factories and its toxic smoke. © Photo taken by E. Lebied (Inforcongo).
Collection RMCA Tervuren, HP.1977.43.28.51, date unknown. Licenced under CC-BY 4.0.

stabilising the workforce and providing the manure necessary for pond development.⁴⁰

Other socio-cultural factors may also have restricted the interest in or use of artificial ponds: a misunderstanding of the added value of pisciculture among Congolese who traditionally fished in mainly open waters, the persistence of dietary habits that rejected the consumption of certain species, the reluctance to feed fish artificially, the existence of social mechanisms intended to regulate the use of fish, and prohibitions on the use of certain fishing gear or access to certain sacred areas.⁴¹ In addition to the presumed lack of interest, local populations to some degree refused to participate.⁴² Traditional authorities engaged in passive resistance to any additional changes the policy would have required to the land laws – for instance, when collective land had to be transferred to private ownership by families or individuals. One might also imagine acts of sabotage as a form of resistance to external interference in the use of land and resources and to attempts to compartmentalise and control traditional property rights, access and exploitation.⁴³ This hypothesis requires further research and verification by other archival sources, in particular those from the territorial administration and religious congregations which could not be studied for this article.

Technical and ecological constraints

Other factors linked to the ponds' physical, chemical and biological life also contributed to the partial failure of the colonial pisciculture project. As a new discipline in applied science, pisciculture in the Belgian Congo had a fundamental shortcoming: it was not based on solid and verified scientific studies, especially concerning the biology of the water and the ethology of aquatic organisms. Research and experimentation took place simultaneously. While this was acceptable in test ponds where scientific and technical teams could respond quickly to unforeseen events, it was much more problematic in producing ponds, where problems could quickly snowball into something unmanageable. The appearance of invasive aquatic species was a primary

40 AE, INEAC, no. 5543, Mémorandum sur le centre d'aélevinage de la Nyakabera, Kivu (27 April 1949).

41 Yūji Ankei 'Fish knowledge of Songolo and Bwari', *African study monographs* 9 (1989) 1-88; Jean-Pierre Gosse, 'Le poisson dans les coutumes et proverbes des Lokele', *Africa-Tervuren* 8:3 (1962) 67-71.

42 Jean-Philippe Peemans, 'Land Grabbing and Development History. The Congolese Experience', in: An Ansoms and Thea Hilhorst

(eds.), *Losing your Land. Dispossession in the Great Lakes* (Boydell & Brewer 2014) 11-35.

43 These socio-environmental issues are particularly controversial, as demonstrated by the striking example of the conversion of mangrove forests into large areas of coastal aquaculture. See, for example, Claude Boyd, 'Mangroves and coastal aquaculture', in: Robert Stickney and Jim McVey (eds.), *Responsible Marine Aquaculture* (CABI Publishing 2002) 145-158.

source of biological imbalance in the ponds' trophic chains, as was the case in the Kipopo research ponds. Experimentation gradually modified the conditions of the aquatic environment, which grew increasingly susceptible to parasites. This led to an unexpected increase in populations of molluscs and fish-eating birds (cormorants) in the surrounding areas. This increase triggered outbreaks of infectious diseases such as diplostomiasis, which in turn led to blindness and eventually even to the death of the fish.⁴⁴ Molluscs were also hosts to other worms (schistosomes) which transmitted schistosomiasis (or bilharziasis) between humans. Ponds' stagnant waters also provided breeding grounds for mosquito larvae (*Anopheles* and *Stegomyia*), with outbreaks of malaria and yellow fever as a result. After testing chemical products reputed to be molluscicides (copper salt, antibiotics, slag from УМНК's blast furnaces) that proved toxic to fish, research focused on biological control through the introduction of certain malacophagous and larvivorous species. At this stage of my research, the documents consulted did not reveal any concern on the part of the colonial authorities about the possible ingestion of heavy metals contained in farmed fish, or about the observed effects on neighbouring human populations after the use of insecticides or biocides. It remains unclear whether the supposed benefits of increased protein outweighed those potential dangers. This hypothesis needs to be verified.

Another question concerns the acclimatisation of certain fish species, a constant in the colonial history of agriculture, botany and zoology. The colonial rulers of the Belgian Congo selected fish that tolerated a relatively wide range of environmental conditions, including temperature and the consistency of water quality. These were in general the most important environmental factors affecting aquaculture production.⁴⁵ One of the essential acquisitions for Belgian piscicultural plans was the production of two freshwater subspecies endemic to tropical Africa: *Tilapia macrochir* and *Tilapia melanopleura* (family *Cichlidae*), whose reproduction and growth in experimental ponds demonstrated adaptability to farming and led to their dissemination throughout tropical Africa, as well as to other continents.⁴⁶

44 A disease caused by a trematode (limnea) larva which continues its development cycle in the intestine of an ichthyophagous bird (cormorant), in a mollusc or in the eye of a fish. See Antoon De Bont, 'La diplostomiase dans les étangs de Wangermée', *BACB* 47:2 (1956) 384.

45 Teichert-Coddington, Popma and Lovshin, 'Attributes of tropical pond-cultured fish', 183-198.

46 Fry were sent to the Linkebeek Fish Farming Station, north of Brussels, and from there

to Brazil and Thailand. See Roger S.V. Pullin, Christine Marie V. Casal and Randall E. Brummett, 'Fish Genetic Resources of Africa', in: Paul Skelton and Guy Teugels (eds.), *African Fish and Fisheries: Diversity and Utilisation* (Royal Museum for Central Africa 2001) 64-68; Claude Lévêque, 'African Freshwater Fish and Fisheries: a Biological and Cultural Heritage', in: *Ibid.*, 14.

With intensive feeding, *Tilapia melanopleura* turned out to be a remarkable transformer of waste and low-value vegetable products such as leaves from cassava, colocase and bananas. However, these fishes' excessive and uncontrollable proliferation caused the disappearance of certain other species introduced into the ponds.⁴⁷ This was combated through the introduction of other voracious species (such as *Hemichromis fasciatus*) to control the reproduction of tilapia. Tilapia breeding also encountered other obstacles such as water quality. Despite positive experiences in ponds in Katanga with above-average physico-chemical qualities, most waters in Congo had weakly mineralised, acidic water, which prevented extensive pisciculture. Experience therefore proved that ponds in poor soil gave small yields and provided little in the way of food production. Even when situated in richer soils, high yields could only be obtained by regularly using feed supplements. In forested areas, where ponds could not be installed without some land clearance, and some tree species and a lack of light reduced the biogenic capacity of the water, the formation of putrid mud proved harmful to fish. In other areas, flood waters from rivers that fed ponds mixed with marsh and runoff waters. The resulting transformation of the trophic chain caused periodic natural pollution that led to disease and the death of fish.⁴⁸

Conclusion

This article, which ploughs fields until now left fallow, is based on a preliminary investigation but provides valuable insights into the question of whether colonial fish farming was a sustainable development project.

The fish pond project in the Belgian Congo responded to a major preoccupation of the colonial authorities: reducing the poverty associated with a non-industrialised society and characterised by insufficient resources to meet basic food security. Malnutrition was considered a long-term problem that required sustainable responses. In this sense, the Belgian Congo's pisciculture project can be seen as part of a 'moral economy' in which the colonisers categorised something as unacceptable and provided a basis of

47 Recent studies confirm that introduced tilapia populations have led to the co-introduction of parasite species and their subsequent transmission to native host species (thanks to Prof. Maarten Vanhove (UHasselt) for sharing articles on this subject. See, in particular, Michiel Jorissen et al., 'Historical museum collections help detect parasite species jumps after tilapia introductions in the Congo Basin', *Biological*

Invasions 22:9 (2020) 2825-2844, DOI: <https://doi.org/10.1007/s10530-020-02288-4>; Michiel Jorissen et al., 'Molecular footprint of parasite co-introduction with Nile tilapia in the Congo Basin', *Organisms Diversity & Evolution* (2022), DOI: <https://doi.org/10.1007/s13127-022-00563-x>.

48 R. Gruber, 'Note sur l'influence des crues de la rivière Lilanda sur un pisciculture de *Tilapia melanopleura* DUM', *BACB* 51:5 (1960) 1147-1160.

values by which it might be remedied.⁴⁹ The pisciculture programme was designed to reduce the food shortages that followed the Second World War and reinforced an additional economic objective: to keep the workforce healthy enough to sustain production. Rural areas, as formulated in the *Plan Décennal pour le développement économique et social du Congo*, had been subjected to heavy demands, and their development was presented as dependent and vulnerable. Like other colonial agricultural projects, notably the *Paysannats Indigènes*, the colonial pisciculture project was paternalist and technocratic, restrictive to both local populations and their natural environments, and failing to take into account local knowledge. To provide food for large groups of the population, it used intensive, rapid, low-cost production methods. At the same time, however, it also sought to protect ‘fish resources’ from fishing activities considered endangering and to exploit these resources economically. To achieve all these different goals, intensive research into the fish and agricultural methods was combined with a network of breeding centres, the creation of experimental and production ponds in several regions of the country, as well as in the *Paysannats Indigènes*, and the adoption of a training plan for field personnel to promote a dynamic pisciculture.

The project suffered from many shortcomings on different levels. Scientifically, pisciculture was still in its infancy when Congo became independent. In its new ten-year plan covering 1960–1970, the INEAC expressed its willingness to focus on open waters rather than on closed-water farming, which still posed many questions. Meanwhile, new approaches, such as integrated rice-fish production based on practices widely used in Indonesia, were trialled in Katanga. Moreover, balance sheets of colonial agriculture were disappointing. A 1960 INEAC report pointed to a latent crisis (agricultural involution) that could only be averted with substantial financial aid.⁵⁰ At the economic level, there was a continuous and significant decline in the ponds’ productivity over the years after independence. In terms of social well-being, the colonial project did not deliver either. Its constraint on rural populations, the lack of training, the technical difficulties inherent in creating ponds and the socio-cultural obstacles limited the increase in food security and self-sufficiency of the local population. During the colonial period, the Belgian coloniser had no explicit desire to promote income-generating activities or leave them in the hands of local populations. At the ecological level, it seems

49 Vellut, *Congo*, 219.

50 Vellut, *Congo*, 243; a phenomenon studied by Clifford Geertz, *Agricultural Involution. The Process of Ecological Change in Indonesia* (University of California Press 1963) in the context of peasant agriculture in colonial Java, where the author demonstrates that the combined effect of

colonialism, rapid population growth and ‘cultural backwardness’ produced by social instability and the inefficiency of institutions led to an increase in agricultural productivity per hectare without improving the lives of the inhabitants, which has generated a hopeless cycle of poverty and missed opportunities (involution).

that, apart from experimental ponds, ponds intended for local production often underwent biological, chemical and physical transformations. As a consequence, pollution eventually altered the piscicultural species and possibly also affected the neighbouring biodiversity, soils and human populations due to the ingestion of or proximity to biocidal products. Lastly, at the educational level, the limited number of specialised trainers (in addition to INEAC agronomists) and, above all, of Congolese monitors, as well as late investments in pisciculture education infrastructure, made it impossible to sustain jobs and to ensure the future of the sector.

In sum, similar to the Belgian agricultural experts who examined the manure problem during the 1970s and the 1980s, colonial administrators and scientific experts who fostered pisciculture aimed for ‘sustainable growth’ rather than for ‘sustainable development’. In other words, the latter had the desire to increase production quantitatively rather than imposing qualitative changes – including the harmonisation of the economic, social and environmental sectors – for the benefit of local populations, whose way of life and well-being would be enhanced by an economy that promoted a healthy natural environment.⁵¹ In the colonial context, the biosphere was expected to provide economic growth. Techniques geared to efficient and intensive productivity over the largest possible area were deployed to combat the depletion of resources and overcome environmental obstacles. These techniques were not meant for food production based on the understanding that resources were limited. The technocratic arrogance of colonisation perfectly illustrates the need to abandon the widespread myth according to which sustainable development is based on growth, as described by the capitalist West (the ‘monoculture of the mind’ in the words of Vandana Shiva), and rather focus on guaranteeing better harmonisation of social justice and environmental protection through the redistribution of wealth.⁵²

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51 See, Yves Segers in this issue, ‘Brown Gold: Agronomists, Fertiliser Advice and Emerging Environmental Awareness in Belgium, 1970-1991’, *BMGN – LCHR* 137:4 (2022). DOI: <https://doi.org/10.18352/bmgn-lchr.11695>; Ronald Carroll and Martha Groom, ‘Sustainable Development’, in: Martha Groom, Gary Meffe and Ronald Carroll, *Principles of Conservation Biology* (Oxford University Press 2006) 592-593.

52 Erik Gomez-Baggethun, ‘Sustainable Development’, in: Ashish Kothari et al., *Pluriverse: A Post-Development Dictionary* (Tulika Books 2019) 71-73; Joan Martínez-Alier, ‘Environmental Justice’, in: *Ibid.*, 182-185; Joan Martínez-Alier, *The Environmentalism of the Poor* (Edward Elgar 2002); Vandana Shiva, *Earth Democracy: Justice, Sustainability and Peace* (North Atlantic Books 2005).

history in Central Africa, with a focus on nature protection, natural resources, colonial sciences and zoological collections. Her publications include: *Faune sauvage et colonisation. Une histoire de destruction et de protection de la nature congolaise (1885-1960)* (Peter Lang 2019), DOI: <https://doi.org/10.3726/b16159>, and 'To live, work, and die for Kasai rubber: Confession of a Belgian trader (1900-1914)', in: Mathilde Leduc-Grimaldi and Patricia Van Schuylenbergh (eds.), *The Congo Free State: What Could Archives Tell Us? New light and research perspective* (Peter Lang 2022) 357-404, DOI: <https://doi.org/10.3726/b19048>. E-mail: patricia.van.schuylenbergh@africamuseum.be.