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AN ATTEMPT AT RECONSTRUCTING THE MARINE FISHERIES CATCHES IN THE CONGO (EX-ZAÏRE), 1950 TO 2010

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ABSTRACT

The catches of the marine fisheries of the Democratic Republic of the Congo, formerly known as Zaïre (here: ‘Congo (ex-Zaire)’ or ‘DRC’), were estimated, in spite of low availability of quantitative data and pertinent literature. Reconstructed total catches were estimated to be at least twice as much as the data supplied to FAO on behalf of the Congo (ex-Zaire), with around 764,000 tonnes between 1950 and 2010 compared to 338,000 tonnes reported to the FAO on behalf of the Congo (ex-Zaire), of which about 70% were taken by the small-scale fisheries. The reconstructed catches illustrate the fact that while political turmoil caused the nascent industrial fisheries to fold, wars and other conflicts contributed to increasing the contribution of small-scale fisheries to total fisheries removals, thus demonstrating the resilience of small-scale fisheries and their crucial role in contributing to the food security of coastal communities.

INTRODUCTION

The Democratic Republic of The Congo (here alternatively referred to as “DRC” and “Congo (ex-Zaire)”) is located in West central Africa, bordered by nine countries: the Republic of the Congo, the Central African Republic, Southern Sudan, Uganda, Rwanda, Burundi, Tanzania, Zambia and Angola, with Lake Tanganyika, the second largest freshwater lake in the world, forming its eastern border. Although Congo (ex-Zaire) is one of the largest countries of Africa, its coastline is extremely narrow, with a straight-line extent of 40 km from North to South.

Historically, the Congo (ex-Zaire) suffered from a succession of political disasters; repression, corruption, and violence are words that occur commonly when retracing the history of the country. Much of this sad story is yet another case of the ‘curse’ affecting countries rich in natural resources, in this case minerals such as diamonds and recently rare earths, as required in computer manufacturing. Since independence (in 1960), the country changed its name four times, suffered two major wars and a multitude of lesser, but still violent conflicts¹. As a result, nearly 2 million people were displaced; over 5 million people alone died due to the prolonged conflict between 1998 and 2007, described as the deadliest conflict after World War II, and one that involved thousands of child soldiers (Weijs *et al.* 2012). The “debruillez-vous” (approx. “you-are-on-your-own”) policy declared by president Mobutu in response to his government’s inability to pay public salaries, and who redirected public funds to pay off his cronies during his long tenure (1960 to 1997), led to a tremendous growth of the informal economy.

The decline of the formal economy and increase of poverty coincided with the “Zairianization” of the country in the 1970s, where many industries collapsed. In spite of a recent slight improvement, around 71% of the population still lives under the poverty threshold of 1 US\$ per day, which is far behind the level of 1960 when the country gained independence from Belgium (Weijs *et al.* 2012). The country today ranks 168 over 169 in the human development index (UNDP 2010). Most of the economy, being informal, is undocumented, and this applies to fishing as well (Muzigwa Kashema 2006), although fishing rank second in household activities, right after agriculture (Weijs *et al.* 2012). Weijs *et al.* (2012) write on this: “With regards to data availability and quality: this investigation finds a strong bias towards humanitarian issues and eastern DRC, a lack of studies that aim to bring underlying structures

¹ http://www.ucdp.uu.se/gpdata/gpcountry.php?id=38®ionSelect=2-Southern_Africa [Accessed on 22/10/2013].

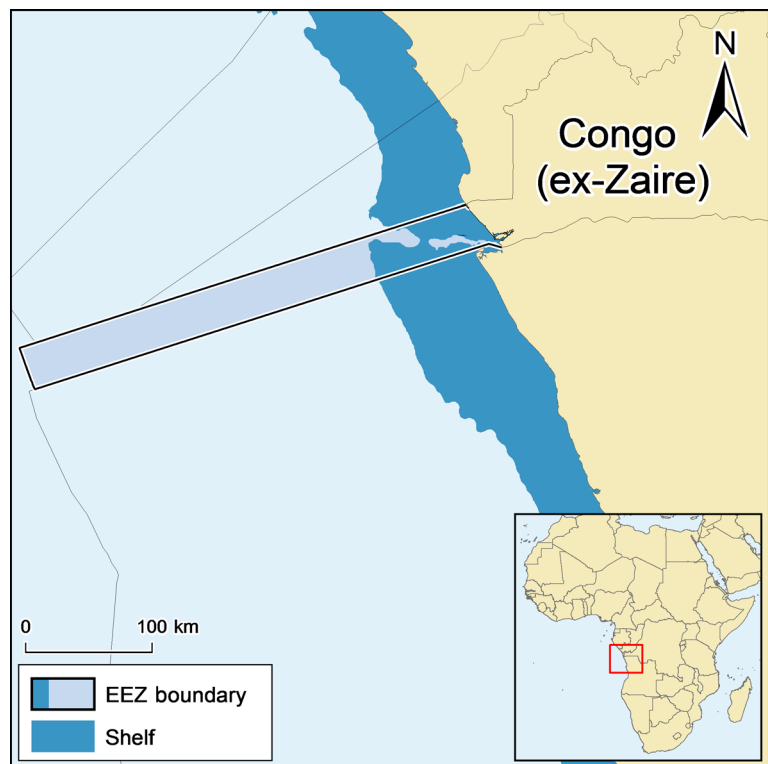


Figure 1. Map of Congo (ex-Zaire) and its Exclusive Economic Zone (EEZ).

and dynamics into the picture, as well as a lack of focus on local needs. Additionally, there is little centralised data collection and exchange of findings, critical appraisal of available data, and a lack of methodologically sound, robust scholarly research. Local research capacity is lacking, there is a gap between research and policy... The reliability of official figures is questionable, but there are few alternatives.”

The present reconstruction is proposed as a complement to official data, which fail to document the contribution of coastal fisheries, often overlooked, to food security in the DRC. This is viewed as particularly important as Congo (ex-Zaire) remains “chronically” food insecure (OCHA 2011).

METHODS

Often the few literature sources describing the fisheries Congo (ex-Zaire) refer to the two main sectors, industrial and artisanal fisheries. However, subsistence fishing is mentioned by numerous sources, notably when describing the livelihood strategies of coastal communities and/or bushmeat surveys (Lagoin and Salmon 1970; de Merode *et al.* 2004; Weijs *et al.* 2012). Due to the narrowness of the DRC’s coastline, and thus its small Exclusive Economic Zone (EEZ), foreign fishing fleets are relatively small. However, their presence cannot be overlooked, as the impact of foreign fishing in the EEZ of other West African countries – even small ones, such as The Gambia – is extremely important.

Farming and related activities constitute the main livelihood activities for 97% of the population in the Bas Congo, a province bordered by the Congo River and the Atlantic coast, of these farming and related activities 20% is fishing (Weijs *et al.* 2012).. Although there is a large overlap between artisanal and subsistence fisheries in the DRC, we rely on the nature of the craft to identify ‘artisanal’ fishing, whose main purpose is to catch fish for sale, as opposed to subsistence fishing, whose main purpose is household consumption. Thus here, fisheries involving canoes are considered artisanal, while all land-based fishing is considered subsistence fishing.

Artisanal catches

The marine artisanal fisheries of the Congo (ex-Zaire) are not well monitored and reported upon in official statistics (Weijs *et al.* 2012), and thus, their catches are here estimated indirectly. The artisanal catch per unit of effort was estimated by dividing an observed localized catch of 150 tonnes (Lagoin and Salmon 1970) by the number of units involved, i.e., 20 canoes, i.e., 7.5 t·canoe⁻¹·year⁻¹ for 1967. We assumed this CPUE was constant between 1950 and 1967, and 10% lower in 2010 compared to the 1967 CPUE given the high fishing pressure by the many small-scale boats operating in the small EEZ of the DRC. We interpolated linearly CPUE estimates to complete the time series. Effort estimates were available for 1967 (588 canoes, Lagoin and Salmon 1970), 1994 (800 canoes, Horemans 1996) and an estimated 3,230 fishers along the Atlantic coast, which translates into 1,615 canoes (assuming two fishers per canoe) for 2008, of which only 5% are motorized (Mavinga Ngembo 2008). We assumed the effort was 10% lower in 1950 relative to 1967, given a lower number of canoes (Lagoin and Salmon 1970), and that the effort was constant from 2008 to 2010. We interpolated linearly effort estimates and then multiplied the annual CPUE by the annual effort estimates to obtain total artisanal catches. A taxonomic breakdown was obtained by allocating a third of catches to the first five categories described in the FAO profile² of the country, a third to the six following categories, and the final third to the remaining seven categories (Table 1).

Subsistence catches

Marine subsistence catches were surveyed in 1967 in a coastal community of the Congo (ex-Zaire) and estimated at 100 t compared to an artisanal catch of 150 t within the same community (Lagoin and Salmon 1970), i.e., subsistence catches were equivalent of 66.7% of artisanal catches. We assumed this ratio was constant between 1950 and 1967 and multiplied it by the reconstructed artisanal catch during the same time period (2,934 t·year⁻¹ for 1967). We assumed that subsistence catches increased due to high insecurity in the eastern areas and migrations of people towards the coast, by 10% between 1967 and 1996 (first Congo war), i.e., 3,217 t·year⁻¹ for 1996 and by 20% between then and 2003 at the end of the second Congo war, i.e., 3,860 t·year⁻¹ for 2003.

Table 1. Assumed taxonomic composition of the artisanal and subsistence marine fisheries of the Congo (ex-Zaire)

Scientific name	Common name	%
<i>Pseudolithus</i> spp.	Croakers	6.6
<i>Cynoglossus</i> spp.	Tonguesoles	6.6
<i>Dentex</i> spp.	Seabreams	6.6
<i>Pomadasys</i> spp.	Grunts	6.6
<i>Galeoides decadactylus</i>	Lesser African threadfin	6.6
<i>Pentanemus quinquarius</i>	Royal threadfin	5.5
<i>Epinephelus</i> spp.	Groupers	5.5
<i>Lutjanus</i> spp.	Snappers	5.5
<i>Brachydeuterus auritus</i>	Bigeye grunt	5.5
<i>Arius</i> spp.	Sea catfishes	5.5
<i>Sardinella</i>	Sardinellas	5.5
<i>Ethmalosa fimbriata</i>	Bonga shad	4.7
<i>Trachurus treacae</i>	Cunene horse mackerel	4.7
<i>Sphyrna</i> spp.	Barracudas	4.7
<i>Carcharhinus</i> spp.	Requiem sharks	4.7
<i>Raja miraletus</i>	Brown ray	4.7
<i>Farfantepenaeus notialis</i>	Southern pink shrimp	4.7
<i>Parapenaeopsis atlantica</i>	Guinea shrimp	4.7

² www.fao.org/fi/oldsite/FCP/fr/COG/profile.html [Accessed on 22/10/2013].

de Merode *et al.* (2004) surveyed sources of wild food within poor households of the Congo (ex-Zaire) by asking the household member who prepared the food, and found that fish played a major role in household incomes, and less so as other food items. de Merode *et al.* (2004) estimated each household caught in total around 522 g-household⁻¹·day⁻¹ and 191 kg-household⁻¹·year⁻¹. These numbers were obtained by dividing the daily value of the fish caught by each household (0.035 \$-household⁻¹·day⁻¹ worth of fish, part of which is kept for personal consumption and the other part sold to obtain other food staples) by the unit price given by the authors (\$0.067 US/kg). Considering a household size of 5 people³, the subsistence per capita catch is herein estimated at 38.1 kg-capita⁻¹·year⁻¹ for poor households. To assess the poor urban and rural populations living in coastal areas in the 2000s, we first extracted coastal population estimates from CIESIN (2012) for 2010 (17,072 rural and 51,272 urban). We multiplied these estimates by 72% and 59%, the percentages of poor population to the total population in rural and urban areas respectively⁴. The resulting total poor population is then multiplied by the per capita catch of 38.1 kg-capita⁻¹·year⁻¹ estimated above, which was assumed constant for the 2000s, and obtained a catch of 1,539 t-year⁻¹ for 2010. We then interpolated linearly to fill in the gaps for the intervening years (between 1967, 1996, 2003 and 2010). Given the overlap between artisanal and subsistence fisheries, we assumed the same species breakdown for artisanal and subsistence catches (Table 1).

Industrial catches

Industrial catches were assessed by Lagoin and Salmon (1970) between 1950 and 1968, and were estimated at 15,000 t-year⁻¹ for 1970 by Bongu (2006). Because of the narrowness of the DRC coastline, industrial vessels venture to the adjacent waters of the Republic of the Congo and Angola (Lagoin and Salmon 1970) prior to the Zairianization between 1976 and 1990, then to Angola, Namibia and Gabon (Muzigwa Kashema 2006; Anon. 2010). Thus, given the general over-exploitation pattern, notably due to the presence of foreign industrial fleets (Sumaila and Vasconcellos 2000; USAID 2006), various internal conflicts and an attempt to nationalize the industrial fisheries (Mavinga Ngembo 2008), industrial fisheries collapsed by the mid-1990s (Bongu 2006) and their catches were assumed to be zero since then. We interpolated linearly to complete the time series. Between 1950 and 1967, we allocated the catch equally to Angola (50%) and the Republic of the Congo and DRC (25% each), and between 1990 to 1996, to Angola, Namibia and Gabon. Reconstructed industrial catches were then compared to the catch data reported to FAO as caught by the Congo (ex-Zaire) in the Southeast Atlantic. Reconstructed industrial catches were compared to the DRC's catch data reported by FAO in area 47 (Southeastern Atlantic), these being overall similar, however with slight differences, the highest catch per year was taken into consideration in the reconstruction, for example, if the catch data for a certain year in the FAO dataset for area 47 is higher than the reconstructed industrial catch for the same year, then the reconstructed industrial catch is replaced by the reported catch.

Around 6,000 t-year⁻¹ of fish were caught by foreign fleets operating in the DRC's EEZ in 2002 (Anon. 2008); assuming that these fleets started operating at the end of the Zairianization, we interpolated linearly between 0 in 1990 to 6,000 t-year⁻¹ in 2002. We then assumed a decline of 10% to reflect the over-exploitation that prevails in the area. Given the presence of a Chinese fishing group in Boma (Mavinga Ngembo 2008), we assumed that these foreign vessels were primarily of Chinese origin (see also Pauly *et al.* 2013).

To disaggregate industrial catches we relied on the species disaggregation by Lagoin and Salmon (1970) in which 10 taxa were allocated different percentages as a function of their contribution to catches (Table 2).

Table 2. Species breakdown for the industrial catches the Congo (ex-Zaire)

Scientific name	Common name	%
<i>Otolithes</i> spp.	Croakers	12.5
<i>Cynoglossus</i> spp.	Tonguesoles	12.5
<i>Arius</i> spp.	Sea catfishes	10
<i>Polynemus</i> spp.	Paradise threadfins	10
<i>Pomadasys</i> spp.	Grunts	10
<i>Lutjanus</i> spp.	Snappers	10
<i>Sparidae</i> spp.	Seabreams	10
<i>Sardinella</i> spp.	Sardinellas	8.3
<i>Ethamalosa</i> spp.	Bonga shad	8.3
Miscellaneous marine fishes	N.A.	8.3

Foreign, illegal, unreported and unregulated (IUU) catches

MRAG (2005) estimated that for each landed tonne of fish, the equivalent of 1.23 tonnes were IUUs taken from the EEZ of the Congo (ex-Zaire). Over 36 cases of IUU fishing, 5 (13.9%) were cases of illegal fishing, i.e. fishing without authorization (MRAG 2005). Therefore, we estimated illegal catches by multiplying the total reconstructed legal artisanal catch given that industrial fishing is conducted elsewhere, by 1.23 and then by 13.9% to account only for illegal foreign vessels. Catches under this segment are considered unregulated since the DRC did not declare an EEZ officially yet. Similarly, given the documented presence of China in the region (Pauly *et al.* 2013), notably in the neighbouring Congo, these catches are allocated to Chinese vessels.

Discards

Documents assessing discards in the waters of the Congo (ex-Zaire) were not available. Therefore, to estimate domestic discards we assumed a similar profile with the domestic fleets of Gabon, where these fleets operated more recently, i.e., between 0.11% and 3.5% (averaged at 1.8%; Ekouala 2013). We applied the previous rate to the reconstructed industrial catch taken by the Congo (ex-Zaire). For foreign (Chinese) industrial discards, we applied a discard rate of 40% of total catches, i.e., 66% of landed catches (Weber and Durand 1986), which we applied to the reconstructed foreign catch.

³ <http://www.cleancookstoves.org/countries/africa/democratic-republic-congo.html> [Accessed on 23/10/2013].

⁴ http://www.ruralpovertyportal.org/country/home/tags/dr_congo [Accessed on 23/10/2013].

RESULTS

Small-scale fisheries

Artisanal fisheries were estimated at 353,000 tonnes between 1950 and 2010. Artisanal fisheries increased from around 4,000 t-year⁻¹ in 1950 to around 5,600 t-year⁻¹ in 1994 before the beginning of the first Congo war, and then increased rapidly to around 11,000 t-year⁻¹ in the late 2000s (Figure 2).

Subsistence catches increased slowly from around 2,600 t-year⁻¹ in 1950 to 3,200 t-year⁻¹ in 1996 at the beginning of the first Congo war (Figure 2). Subsistence catches increased then to a peak of 3,900 t-year⁻¹ in 2003 during the second Congo war, to decrease thereafter to around 1,500 t-year⁻¹, i.e., following a trend that is the opposite as that observed for artisanal fisheries (Figure 2).

Industrial catches

The total catches of the DRC's industrial vessels were estimated at 224,400 tonnes between 1950 and 2010; they increased from around 800 t-year⁻¹ in 1950 to a peak of 15,000 t-year⁻¹ in 1970, and then declined drastically at the start of 'Zairianization' to completely collapse in 1996 at the start of the first Congo war (Figure 3). These industrial reconstructed catches that are landed in the Congo (ex-Zaire) were mostly taken from Angola with 97%, compared to 1.4% taken from the Republic of the Congo and less than 0.3% for Namibia and Gabon and only 1.4% were taken from the EEZ of the Congo (ex-Zaire). The fraction of the catch taken from the waters of Gabon and Namibia increased in the recent years to be over two thirds (Figure 3), while catches taken from the Republic of the Congo peaked 450 t-year⁻¹ in 1977 right before they collapsed (0 t in 1990). Industrial catches taken from the EEZ of the Congo (ex-Zaire) totalled 3,200 t-year⁻¹, with a peak of 459 t in 1977.

Chinese foreign catches (legal) from the EEZ of the Congo (ex-Zaire) increased from 500 t-year⁻¹ in 1991 when they began, to a peak of 6,000 t-year⁻¹ in 2002, then declining to less than 5,500 t-year⁻¹ in 2010 (Figure 4). On the other hand, illegal catches increased from around 100 t-year⁻¹ in 1950 to 1,800 t-year⁻¹ on average in the late 2000s (ie. 2008-2010) (Figure 4), which appears to be compensating for the declining legal catch.

Discards

Discards within the waters of the Congo (ex-Zaire) were estimated at over 69,200 tonnes over the period between 1950 and 2010, of which around 99.9% were discarded by the Chinese fleets operating in the Congo (ex-Zaire) and approximately 0.08% by the domestic industrial fleets. Foreign discards increased overall, following the same pattern than foreign industrial catches from around 60 t-year⁻¹ in 1990, when China began fishing in the Congo (ex-Zaire) to around 4,800 t-year⁻¹ on average in the late 2000s (Figure 4). Domestic discards from all EEZs were estimated at around 4,000 tonnes between 1950 and 2010, increasing from low levels in the 1950s to a peak of over 260 t-year⁻¹ in 1970 (Figure 5), and then decreased with the decrease of industrial fishing.

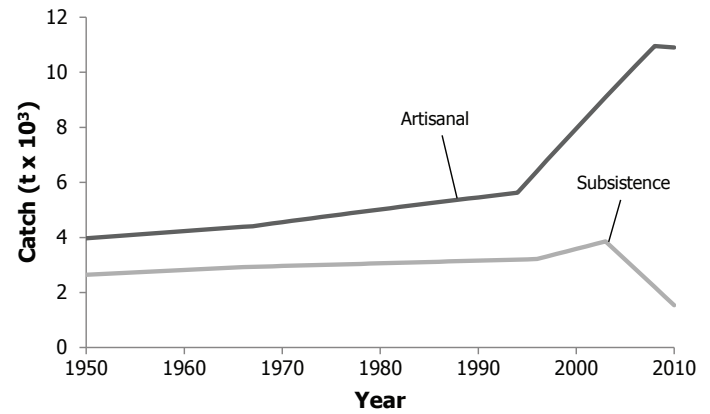


Figure 2. Reconstructed small-scale catches in the EEZ of the Congo (ex-Zaire), 1950-2010.

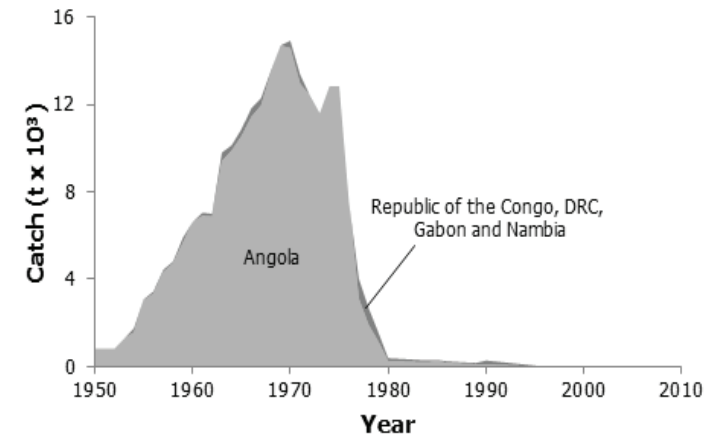


Figure 3. Reconstructed industrial catches by vessels from the Congo (ex-Zaire), showing the EEZs from which these catches were taken, 1950-2010.

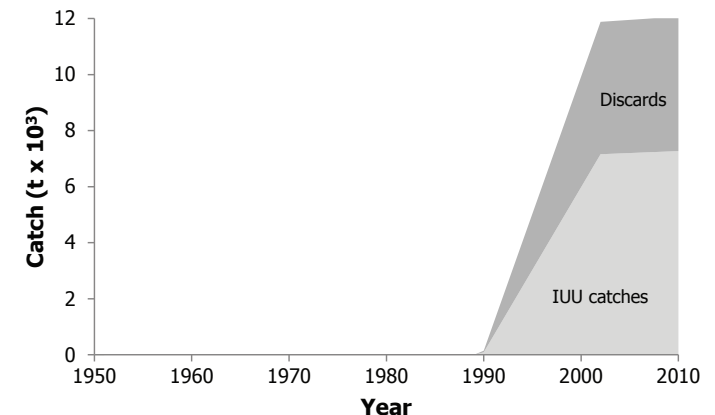


Figure 4. Reconstructed foreign industrial catches and discards by China within the EEZ of the Democratic Republic of the Congo, 1950-2010. Note: no foreign catches from 1950-1989.

Total catches

Total (domestic) catches landed in the Congo (ex-Zaire) were estimated at 764,000 tonnes between 1950 and 2010 compared to 338,000 tonnes of catch data supplied to the FAO on behalf of that country. Around 30% of the reconstructed total catch were industrial, and were all taken from outside the waters of DRC between the mid-1950s and the late 1970s, with around 231,000 tonnes during this time period (Figure 5), and corresponded to around 20,000 tonnes of discarded catch.

Domestic catches from the DRC's EEZ, including small-scale catches (artisanal and subsistence) were estimated at over 535,000 tonnes between 1950 and 2010 compared to around 134,000 tonnes of catch data supplied to the FAO (after filtering out catch data from outside the EEZ, i.e., industrial catches taken by the DRC). Domestic catches, small-scale in nature, increased overall between 6,600 t·year⁻¹ in 1950 to a peak of 13,200 t·year⁻¹ in 2008, and decreased slightly thereafter to 12,400 t·year⁻¹ in 2010. The bulk of increase is observed in the mid-1990s at the beginning of the first Congo war. Total removals from the EEZ of the Congo (ex-Zaire) were estimated 712,700 tonnes between 1950 and 2010, including 76% domestically caught and 24% of foreign catches (by China), of which 20% were illegal (Figure 6).

DISCUSSION

Total catches taken by the Congo (ex-Zaire) were estimated at 766,000 tonnes between 1950 and 2010, twice as much as the catch data supplied to the FAO on behalf of the DRC. Only the small-scale portion of these, i.e., 70% were taken from the DRC's small EEZ. While total catches taken by DRC (including from outside the EEZ) declined dramatically when the 'Zairianization' of the economy was implemented, while small-scale catches increased during the war period. This can be explained by the fact that the conflict was moving westwards towards Kinshasa, the capital city, which may have pushed people to (i) increase their informal resource-seeking activities, including fishing (Weijs *et al.* 2012), and (ii) find in fisheries (along with agriculture) the only alternative to deal with poverty induced by government failure to create conditions that would have allowed the economy to develop.

The governments of Angola and Namibia helped the DRC considerably, notably with troops, in taking back the Eastern part of the country from rebels, which provided a basis for mutually beneficial fisheries agreements which considerably helped coastal communities of the Congo (ex-Zaire) through local fish landing and processing.

These agreements, however, could not prevent the collapse of the DRC's industrial fisheries, a direct result of their nationalization. Thus, after first the 'Zairianization' of the country and the nationalization of fisheries, and then the "you-are-on-your-own" policy, industrial fisheries declines drastically then stagnated at very low levels. With the political instability that had led the country to the first Congo war (1996), industrial fisheries collapsed completely and people thereafter were highly reticent to invest (Mavinga Ngembo 2008).

It appears that only foreign fishing fleets, i.e., the Chinese fleet, operates within the small EEZ of the DRC (Pauly *et al.* (2013). On the other hand, before their complete collapse in 1996, the shift in fishing grounds by the industrial fleet, i.e., going further north (to Gabon) and south (to Namibia) shows that political conflicts and over-exploitation drives fleets to venture further in search for fish, perhaps a last desperate move, before their complete collapse. Marine fisheries, as illustrated by official data seemed to have completely collapsed after the 'Zairianization' of the country, but this is only visible because the industrial fisheries were properly monitored. The industrial fisheries thus collapsed due to the absence of a state, rather than the war itself.

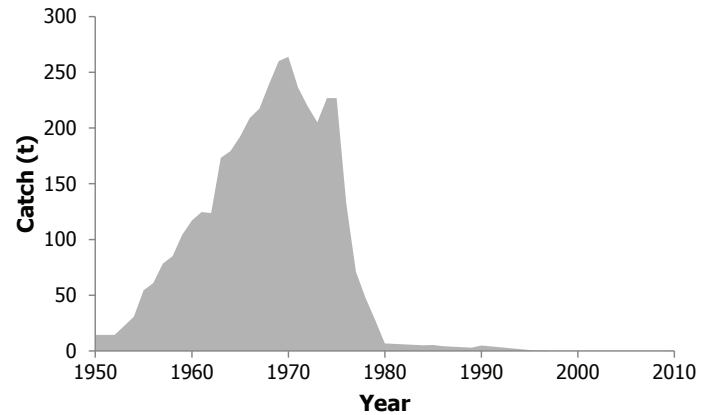


Figure 5. Reconstructed by the Congo (ex-Zaire) from the EEZs of Namibia, Angola, Gabon and the Republic of the Congo, 1950-2010.

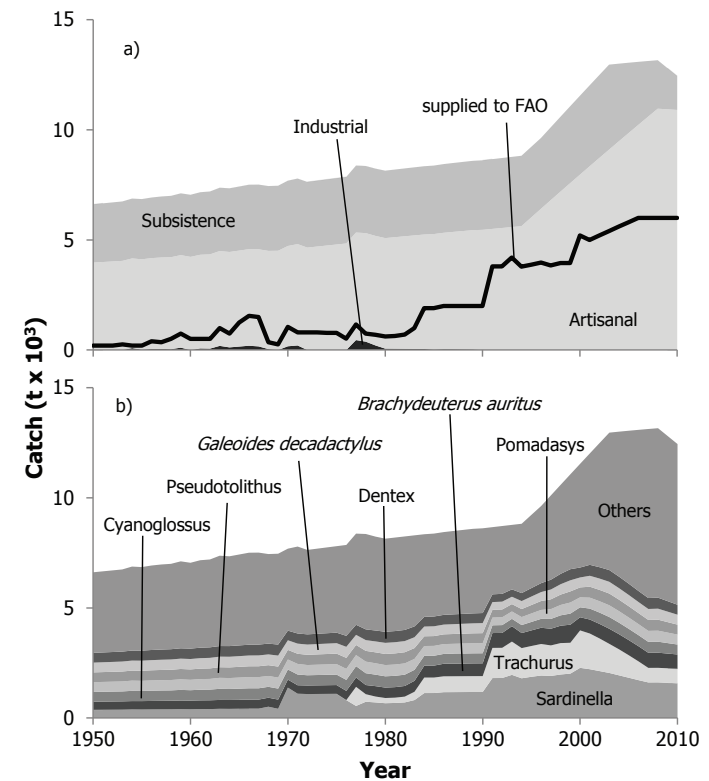


Figure 6. Reconstructed total catches for the Congo (ex-Zaire) within its EEZ by a) sector (data supplied to FAO shown as solid line; discards plotted but not visible on graph), and b) taxonomic categories, with 'Others' containing 20 additional taxonomic categories, 1950-2010.

On the other hand, the Congo (ex-Zaire) provides an interesting example of the resilience of small scale fisheries. With the war affecting mainly the central part of the country, it increased migrations towards the coast and toward Lake Tanganyika in the extreme east, whose catches increased during the war.

Moreover, while the contribution of marine fisheries to the total fishery product in DRC is considered insignificant, at only 2% (Muzigwa Kashema 2006), reconstructed catches landed represented almost a tenth of the total fishery yield (i.e., freshwater and marine catches), which shows that the unmonitored and overlooked marine fisheries the Congo (ex-Zaire) are a significant source of food and income for local coastal communities.

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Appendix Table A1. FAO landings vs. reconstructed total catch (in tonnes), and catch by sector (with discards shown separately), for Congo (ex-Zaire), 1950-2010.

Year	FAO landings	Reconstructed total catch	Industrial	Artisanal	Subsistence	Discards
1950	200	6,620	-	3,969	2,647	-
1951	200	6,660	-	3,995	2,665	-
1952	200	6,700	-	4,021	2,682	-
1953	250	6,750	-	4,047	2,699	-
1954	200	6,880	86	4,073	2,717	2
1955	200	6,850	20	4,099	2,734	-
1956	400	6,920	47	4,125	2,751	1
1957	350	6,970	51	4,151	2,768	1
1958	500	7,000	38	4,177	2,786	1
1959	750	7,110	106	4,202	2,803	2
1960	500	7,050	-	4,228	2,820	-
1961	500	7,160	70	4,254	2,838	1
1962	500	7,200	63	4,280	2,855	1
1963	1,000	7,370	188	4,306	2,872	3
1964	750	7,340	119	4,332	2,890	2
1965	1,250	7,420	156	4,358	2,907	3
1966	1,550	7,510	194	4,384	2,924	3
1967	1,500	7,510	163	4,410	2,934	3
1968	350	7,440	42	4,458	2,944	1
1969	250	7,460	-	4,507	2,953	-
1970	1,050	7,690	169	4,555	2,963	3
1971	800	7,790	206	4,602	2,973	4
1972	800	7,630	-	4,650	2,983	-
1973	800	7,690	-	4,697	2,992	-
1974	775	7,750	-	4,744	3,002	-
1975	775	7,800	-	4,790	3,012	-
1976	512	7,860	-	4,837	3,022	-
1977	1,155	8,370	451	4,883	3,031	8
1978	741	8,360	379	4,928	3,041	7
1979	693	8,240	208	4,974	3,051	4
1980	615	8,140	63	5,019	3,061	1
1981	640	8,190	59	5,064	3,070	1
1982	700	8,240	55	5,109	3,080	1
1983	1,000	8,290	51	5,153	3,090	1
1984	1,900	8,340	47	5,197	3,100	1
1985	1,900	8,370	23	5,241	3,109	-
1986	2,000	8,440	37	5,285	3,119	1
1987	2,000	8,490	35	5,328	3,129	1
1988	2,000	8,540	31	5,371	3,139	1
1989	2,000	8,590	27	5,414	3,148	-
1990	2,000	8,610	-	5,456	3,158	-
1991	3,800	8,670	-	5,498	3,168	-
1992	3,800	8,720	-	5,540	3,178	-
1993	4,200	8,770	-	5,582	3,187	-
1994	3,780	8,820	-	5,623	3,197	-
1995	3,876	9,220	-	6,017	3,207	-
1996	3,973	9,630	-	6,410	3,217	-
1997	3,844	10,110	-	6,800	3,308	-
1998	3,954	10,590	-	7,188	3,400	-
1999	3,945	11,070	-	7,574	3,492	-
2000	5,200	11,540	-	7,958	3,584	-
2001	5,000	12,020	-	8,340	3,676	-
2002	5,200	12,490	-	8,720	3,768	-
2003	5,400	12,960	-	9,098	3,860	-
2004	5,600	13,000	-	9,474	3,528	-
2005	5,800	13,040	-	9,848	3,197	-
2006	6,000	13,080	-	10,220	2,865	-
2007	6,000	13,120	-	10,590	2,533	-
2008	6,000	13,160	-	10,958	2,202	-
2009	6,000	12,800	-	10,929	1,870	-
2010	6,000	12,440	-	10,901	1,539	-

Appendix Table A1. Reconstructed total catch (in tonnes) by major taxa for Congo (ex-Zaire), 1950-2010. 'Others' contain 20 additional taxonomic categories.

Year	<i>Sardinella</i>	<i>Trachurus</i>	<i>Brachydeuterus auritus</i>	<i>Cynoglossus</i>	<i>Pomadasys</i>	<i>Pseudolithus</i>	<i>Galeoides decadactylus</i>	<i>Dentex</i>	Others
1950	371	-	371	443	443	443	443	443	3,660
1951	373	-	373	446	446	446	446	446	3,680
1952	375	-	375	449	449	449	449	449	3,710
1953	378	-	378	452	452	452	452	452	3,730
1954	387	-	380	466	464	455	455	455	3,810
1955	384	-	383	460	460	458	458	458	3,790
1956	389	-	385	467	465	461	461	461	3,840
1957	392	-	387	470	469	464	464	464	3,860
1958	393	-	390	471	470	466	466	466	3,880
1959	401	-	392	483	480	469	469	469	3,950
1960	395	-	395	472	472	472	472	472	3,900
1961	403	-	397	484	482	475	475	475	3,970
1962	405	-	400	486	484	478	478	478	3,990
1963	418	-	402	505	500	481	481	481	4,100
1964	414	-	404	499	496	484	484	484	4,080
1965	420	-	407	507	503	487	487	487	4,130
1966	426	-	409	514	509	490	490	490	4,180
1967	425	-	411	513	509	492	492	492	4,180
1968	512	-	409	495	493	489	489	489	4,070
1969	418	-	418	500	500	500	500	500	4,130
1970	1,379	-	365	458	454	437	437	437	3,720
1971	1,102	-	385	487	482	461	461	461	3,950
1972	1,088	-	388	464	464	464	464	464	3,830
1973	1,091	-	391	468	468	468	468	468	3,870
1974	1,095	-	395	472	472	472	472	472	3,900
1975	1,098	-	398	476	476	476	476	476	3,930
1976	813	-	418	500	500	500	500	500	4,130
1977	548	866	425	515	504	458	458	458	4,140
1978	738	342	417	536	527	488	488	488	4,330
1979	708	266	472	522	517	496	496	496	4,260
1980	672	236	473	512	511	504	504	504	4,230
1981	683	240	478	514	512	506	506	506	4,250
1982	708	263	483	513	512	506	506	506	4,250
1983	815	376	497	498	497	492	492	492	4,130
1984	1,133	703	540	447	446	441	441	441	3,750
1985	1,134	703	543	448	447	445	445	445	3,760
1986	1,173	720	570	447	446	442	442	442	3,760
1987	1,176	720	573	450	450	446	446	446	3,790
1988	1,178	720	576	454	453	450	450	450	3,810
1989	1,181	720	579	457	456	453	453	453	3,840
1990	1,182	720	582	457	457	457	457	457	3,850
1991	1,814	1,370	674	351	351	351	351	351	3,050
1992	1,817	1,370	677	355	355	355	355	355	3,080
1993	1,959	1,510	699	334	334	334	334	334	2,930
1994	1,804	1,370	684	363	363	363	363	363	3,150
1995	1,872	1,397	709	384	384	384	384	384	3,320
1996	1,929	1,432	737	405	405	405	405	405	3,500
1997	1,910	1,386	757	445	445	445	445	445	3,830
1998	1,976	1,426	790	471	471	471	471	471	4,040
1999	2,016	1,400	821	504	504	504	504	504	4,310
2000	2,278	1,700	598	452	452	452	452	452	4,710
2001	2,215	1,620	635	497	497	497	497	497	5,060
2002	2,131	1,480	661	515	515	515	515	515	5,640
2003	2,046	1,320	686	533	533	533	533	533	6,240
2004	1,937	1,180	687	523	523	523	523	523	6,580
2005	1,828	1,020	688	512	512	512	512	512	6,950
2006	1,719	850	689	501	501	501	501	501	7,320
2007	1,616	660	686	497	497	497	497	497	7,680
2008	1,618	660	688	500	500	500	500	500	7,700
2009	1,598	660	668	476	476	476	476	476	7,500
2010	1,577	660	647	452	452	452	452	452	7,300