European Commission

VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

N°43
MARCH 2024

Analysis of the fisheries value chain in the Union of the Comoros

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural, aquaculture and fisheries development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society, and environment.

The European Commission has developed a standardised methodological framework for analysis (https://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d/info_en). It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

The value chain context

The Union of the Comoros (UC) is a small island state in the Indian Ocean, rich in biodiversity, dependent on its own natural resources and highly vulnerable to climate change. National food systems are unable to meet demand and the country is over 80% dependent on imports for its food needs. The Exclusive Economic Zone (EEZ), which is 70 times the size of the country's land area, offers the fishing industry great potential, which is still not well exploited, in terms of job creation, income improvement and food security.

The fisheries value chain (VC) is also of potential interest for private investment, both domestic and foreign, fuelling the virtuous circle of growth. The pressure on natural resources is high in an island context with reduced land availability, a natural incentive for the country to make the blue economy a new source of growth and development. The development of fishing is a priority for the government through the Emerging Comoros Plan and its Recovery Plan. This study draws the current picture of the VC, identifying its development potential and the challenges it faces.

The European Union intervention

Under the 2021-27 Multi-Annual Indicative Programme, the EU is supporting the government of the Comoros in its efforts to achieve strong, sustainable and inclusive growth, promoting decent employment and food security for the population. The EU supports the implementation of a 'Pacte Vert et Bleu' (PVB) which aims to: (1) promote the conservation and sustainable management of ecosystems; (2) develop more sustainable and healthy food systems; (3) strengthen institutional governance.

The PVB is part of a wider Team Europe Initiative, supported by the EU, France (the member state in situ) and the European Investment Bank, contributing to the development of an inclusive green and blue economy. The development of the fisheries VC is considered as strategic in this approach.

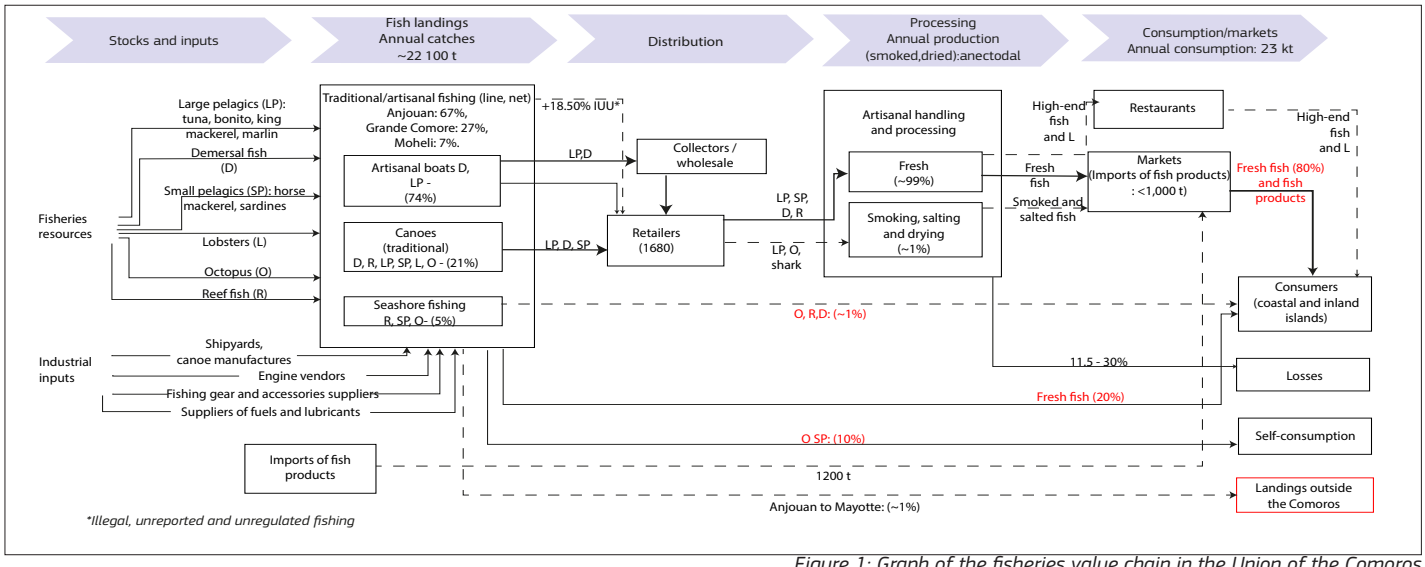

Figure 1: Graph of the fisheries value chain in the Union of the Comoros

Functional Analysis

Production and consumption

The Directorate-General for Fisheries Resources (DGRH) estimates catches in the UC at 22,000 t in 2020, made up of 81% large pelagics (tuna such as yellowfin tuna and bonito), 7% small pelagics and 12% demersal and reef species. Landings take place directly at the fishing villages, there are no developed fishing ports.

Fishing supplies the local market. With a population of around 800,000, 23-25 kg of fresh fish is available annually per capita. The UC imports a small amount of fish (~1,000 t: tinned sardines, dried or frozen fish) and official exports are almost non-existent.

Fishing is traditional and artisanal

Coexistence of several fishing segments

- **Seashore fishing (i.e. on foot)** in the intertidal zone mainly targets demersal fish and octopus, using rudimentary techniques. There were around 2,619 seashore fishermen (63% women) in 2020. This segment fulfils an important socio-economic function in coastal villages.
- **Traditional fishing** in the coastal fringe (less than 2-3 nautical miles) occupied by 2,782 non-motorised outrigger boats (made of wood or fibreglass canoes) in 2020. The most commonly used gear is the handline, especially for demersal and reef fish, but also tuna around coastal Fish Aggregating Devices (FADs). There are often two fishermen, including the owner of the boat.
- **Artisanal (i.e. small-scale)** in coastal waters (≤15-20 nautical miles) involved 4,400 fishermen in 2020 on 2,107 fibreglass motorboats (~ 6 m long) with a 15 horsepower (hp) engine. They use a variety of fishing gear (trolling, handlines, longlines, nets) and mainly target pelagic species. This type of fishing is also practised around coastal (<500 m) or deep (up to 1,800 m) FADs.
- **Modern artisanal fishing** uses ≥9 m boats with 2 40 hp engines, better equipped to exploit more distant resources with a high market value: demersal fish in the Mozambique Channel or large pelagic fish offshore. These 42 boats have isothermal compartments and can go on longer trips (4-5 days). The main fishing techniques are handline and trolling.

There is no longer any industrial or semi-industrial fishing in the country, since the failure of the Société Nationale de Pêche (SNP), but some actors are preparing to re-industrialise the fleet.

A small number of foreign industrial vessels fish in the Comorian EEZ, namely under private fishing agreements, or illegally.

Specific features of the islands

Mohéli is focused on demersal and reef resources (Figure 2), and hosts a National Park with a marine reserve. In Anjouan, "mass" fishing (mainly trolling) dominates and has led to the manufacture of boats. In Grande Comore, the market is lucrative and receives fish from the other islands. The diaspora has invested part of the substantial funds it sends to Grande Comore in fishing.

Trading channels are very short

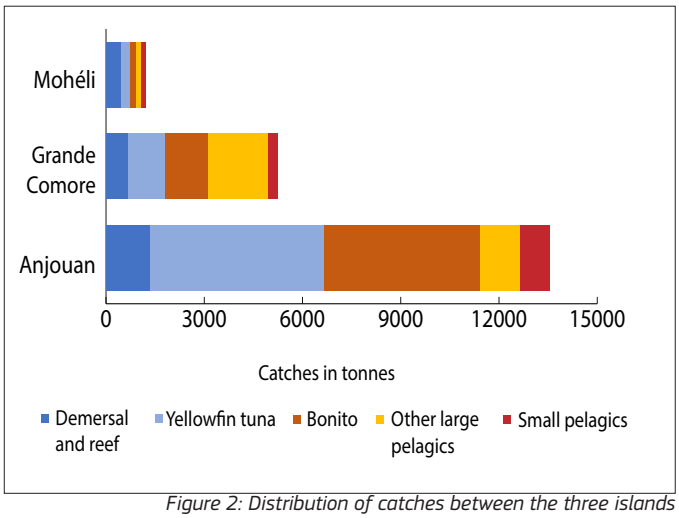

Figure 2: Distribution of catches between the three islands

Organisation and governance

Marketing channels are generally direct or short, with **distribution highly fragmented** into a large number of small actors.

When **cold stores and ice silos** do exist, the fishermen's groups manage them, with numerous problems (technical choices, management capacity, irregularity of supplies, etc.).

In Anjouan, an **Economic Interest Group (EIG)** organises the marketing of quality fish stored in small freezers and transported in coolers to distribution points in the interior of the island, to guarantee supply for retailers in remote areas. This model of fish preservation appears to be more effective than the cold room model.

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What is the contribution of the value chain to economic growth?

Financial viability of the actors

With the exception of seashore fishermen, who have other activities beside fishing, and a few small dealers in Mohéli, **all the VC actors have an annual Net Operating Profit (NOP) above the minimum wage** (660,000 KMF or €1,339).

The **good financial performance of traditional fishing** helps explain why canoes are still used on the three islands despite efforts to motorise them in recent years. Modern artisanal fishing is also performing well (and better than artisanal small-scale fishing), particularly in Anjouan.

Value added represents 5.8% of national GDP and 12.9% of GDP in the primary sector

Value added created

The VC's total gross value added (VA) amounts to KMF 31 billion (€63 million) per year. The manufacture of fishing boats in shipyards adds a further KMF 278 million (€564,000) of induced VA.

77% of the value is added by the primary sector (fishermen), 12% by fish marketing and 11% by the supply of inputs to fishing and marketing (Figure 3). The VA of fish processing is currently negligible. 56% of the direct VA (fishing and marketing) is generated in **Anjouan, where fishing plays a vital role in the island's development.**

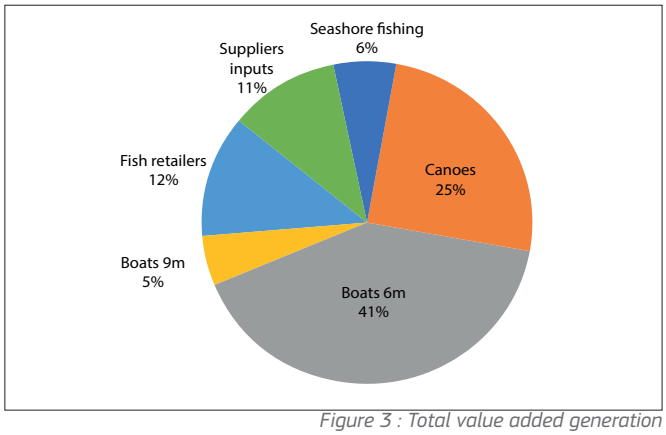

Figure 3 : Total value added generation

Macroeconomic weight of the value chain

Despite its small size, **the VC is significant on the macroeconomic stage**. It accounted for 6% of the national GDP in 2020. Fishing alone accounts for 13% of the agricultural GDP, which contributes more than a third of the country's GDP.

The VC has a **beneficial effect on the public finances** thanks to taxes on inter-island fish transport and, above all, on input imports. On the other hand, the State spends little on the VC, given the limited financial resources of the DGRH and the absence of support programmes. Direct taxes on VC operations are almost non-existent; however, in view of their financial viability, **fishing units could pay a fee** because they exploit a collective resource.

The rate of integration of the VC in the national economy is 73%, meaning that the activities are dependent on imports (fuel, oil, fishing equipment, etc.). **They have weak backward linkages with the national economy**, reflected in an indirect VA (goods and services produced in the UC, such as taxi services to transport fish) which represents only 10% of the total VA. **The VC's balance of trade is in deficit** because the value of imports of fishing inputs far exceeds that of fish exports. On the other hand, the VC has the advantage of reducing the food deficit in a country that is highly dependent on food imports.

The balance of trade of the value chain is in deficit, but the value chain reduces the deficit of the food balance

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The fisheries value chain in the Union of the Comoros makes a substantial contribution to the country's economic growth: its contributions to the national and agricultural GDP are high. It also has backward linkage effect on the national economy through the manufacture of boats. However, it is highly dependent on imports of consumables, which have a negative impact on its trade balance. The impact on the public finances is positive, due to the low level of expenditure on fishing and despite the absence of levies on the activity through fishing licences.

Is this economic growth inclusive?

Distribution of income between the value chain's actors

43% of the total VA is made up of NOPs, i.e. profits for actors (fishermen, traders, suppliers), **37% of wages and salaries** (fishermen who do not own boats, shore assistants for fishermen, retail employees), 14% remuneration for non-fishing boat owners (this is not a negligible proportion and shows that investing in fishing is worthwhile), 3% taxes, 3% depreciation and less than 1% financial charges (Figure 4).

The NOPs mainly go to small-scale fishermen (34%). The **traders** gain 29% of the profits, but pay only 2% of that out in salaries.

Jobs in fishing are increasing, while they decrease in agriculture

The VC is competitive and there are no dominant actors in the current situation. Fishermen are not disadvantaged in the distribution of income. Either they recover the entire gross margin (% of the landing price compared with the final price for the consumer) when the circuit is direct between the fisherman and the consumer (the most widespread case), or they recover a substantial part of the margin: between 39% and 77% depending on the marketing circuit and the islands.

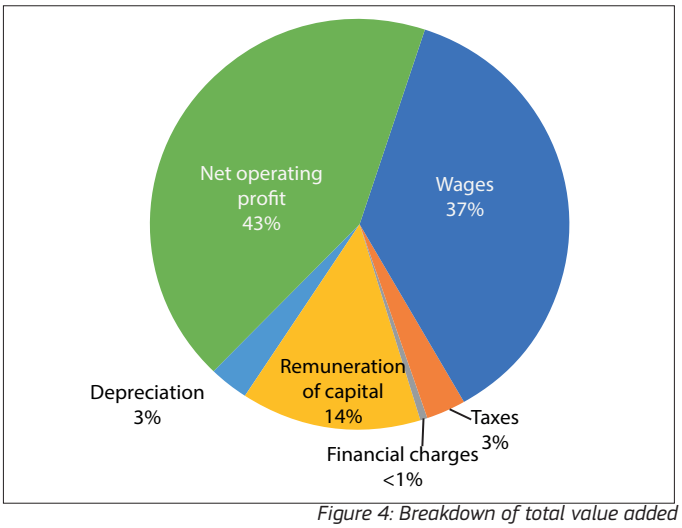

Figure 4: Breakdown of total value added

Inclusiveness and employment

The VC mainly benefits small-scale actors: regular income for fishermen who go out on the high seas to fish and for collectors; seashore fishermen who gain supplementary income; vulnerable populations, offering them access to a source of protein.

In some communes, mainly in Mohéli and Anjouan, the mayors intervene to **set a maximum selling price for fishermen**, with the aim of guaranteeing access to fish for the poorest of the population. However, this has the indirect effect of limiting the income of local fishermen or causing fish to be sent to Grande Comore, where prices are higher.

21,000 jobs, i.e. 1 job per tonne of fish

Fishing **makes a major contribution to the economy and social ties in coastal areas**. Rural villages also benefit from trading activities.

Women make up the majority of seashore fishermen, and traders in Grande Comore. They are also active in fish processing cooperatives (drying, salting, smoking), which are struggling to develop (inadequate equipment, destructive bad weather, irregularity of resources, etc.).

Young people are involved in traditional and, to a lesser extent, small-scale artisanal fishing, and sometimes in trading. They also help with landings.

In **2020, there were 21,082 jobs** in fishing, in a country with a high inactivity rate. Employment in the fisheries VC has been increasing over the last 5 years, while it has been decreasing in the agricultural sector. The fisheries VC in the UC generates just over 1 job per tonne of fish caught.

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The growth generated by the value chain is fairly inclusive, as income (net operating profits) and wages make up a significant proportion of the value added created. The value chain creates activity for small units and vulnerable populations, and provides work at sea and on land in coastal areas. Revenues are fairly evenly distributed, with no dominant actors. Women and young people are present in the value chain.

Is the value chain socially sustainable?

The social profile of the fisheries VC in the UC (Figure 5) illustrates the difficulties it faces in achieving social sustainability. None of the six areas analysed presents a satisfactory situation, but all, with some differences, show a moderate but improving situation (Table 1).

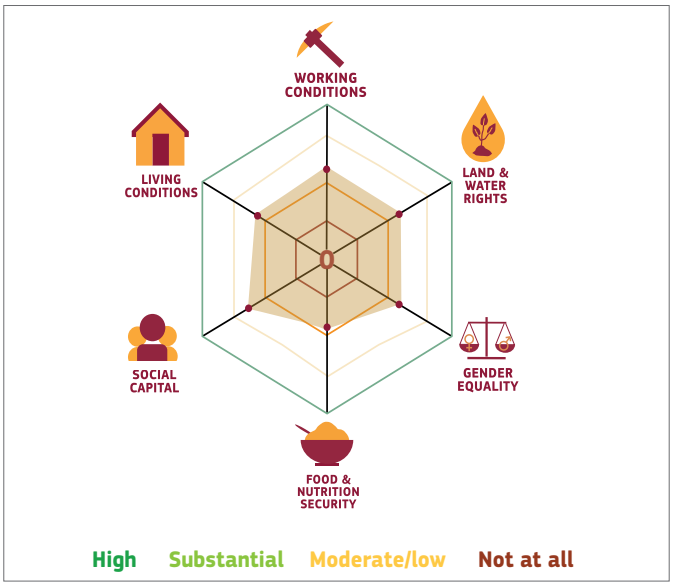

Figure 5: Social profile of the VC

Informality, weak organisations, insufficient training of fishermen

Fish accounts for a significant proportion of the protein in the Comorian population's diet, starting with fishermen, whose consumption is much higher than that of the rest of the population. However, the country's strong dependence on imports to cover food needs (chicken in particular) is only partially offset by the increase in catches. The value chain could play a much greater role in improving the food and nutrition situation.

On the whole, the value chain is sustainable from a social point of view. There is considerable room for improvement in the six domains covered by the social analysis particularly in terms of safety at sea, which remains a fundamental element of working conditions and a major concern for fishermen. Other areas that need to be improved are the circulation of fish within and between the islands to promote access for a greater proportion of the population; women's incomes to improve their conditions and reduce gender inequalities; the status of fishermen's organisations so that they can play a real role as cooperatives and strengthen the existing social capital.

Domains	Main problems	Mitigation measures
Working conditions	• Informal fishing activity not covered by Labour Code standards • Some children helping in landing are no longer enrolled in secondary school • Insecurity at sea despite recent improvements • Limited attractiveness for young people	• Professionalisation of fishermen • Investments in safety equipment, and training on engine maintenance • Facilitating access to motorboat ownership
Land and water rights	• Poorly understood extent of IUU fishing. • Inter-village conflicts in situations of open access to a collective resource	• Mobilisation of the Indian Ocean Commission (IOC) • Conflict arbitration bodies to be strengthened
Gender equality	• Low income generated by women who engage in seashore fishing (secondary activity) and in processing (technical and management difficulties) • Limited autonomy, except in the marketing of fish	• Economic models of processing cooperatives to be consolidated
Food and nutrition security	• High inflation on foodstuffs (including fish) in a context of high dependence on protein imports • Stagnation or worsening of food insecurity despite the contribution of fish • Importation of cheap food of poorer nutritional quality than local fish	• Improving fish circulation and strengthening integrated structures • Development of more flexible fish conservation models • Development of FADs • Further motorisation of the fishing fleet
Social capital	• Weakness of fishermen's organisations (functioning and negotiating capacity) • Irregular and discontinuous training of fishermen in new fishing techniques	• Support for the associations with an economic activity to move towards cooperative status • Strengthening intervention capacities of the Fisheries School
Living conditions	• Difficult and expensive access to care • Unstable electricity supply, poor water quality and availability, lack of sanitation facilities • Low level of education among fishermen	• Investments in the healthcare system • Directing (high) diaspora remittances towards improving living conditions

Table 1: Possible mitigation measures for the social problems encountered

Is the value chain environmentally sustainable?

Impact of the value chain activities

98% of the impact of fishing is due to fuel combustion, given that the majority of boats works with kerosene in the UC, which emits many potentially health-damaging pollutants. They are higher per tonne fished for trolling boats (which put more strain on the engine), and to a lesser extent for boats that use lines and fishing nets; longliners; and twin-motorised boats because they bring more fish per trip (Figure 6). The overall impact of the latter is limited because they are few in number (around 40 boats). The impact of canoes (loss and need to renew fishing gear, manufacture of canoes mainly in fibreglass) remains insignificant.

The contribution of trade to the total impact of the VC, from landing to the consumer's plate, is marginal.

Fishing primarily affects human health through the impact of fuel combustion (climate change, photochemical smog, particle formation, acidification, etc.) (Figure 6).

Given that Anjouan-based fishermen were responsible for 67% of national catches in 2020, and that troll fishing is favoured there, the environmental impacts are largely determined by the performance of Anjouan fishermen, who are responsible for 79% of the impacts.

Climate change

The impact of Comorian fishing on climate change is high compared to other fishing fleets in the region and other sources of animal protein.

The Comorian motorised fleet is not very efficient in terms of energy consumption, using much more fuel than other African fleets or neighbouring fleets in the Indian Ocean. There are many reasons for this: kerosene is less efficient than diesel, distances to be travelled to find FADs, fishers' preference for trolling (a very fuel-intensive fishing strategy), etc.
For example, the climate change **impacts** of fish caught in the UC **are higher** (>600%, expressed in CO2-eq.) **than** those **of chicken wings imported from Brazil**, including production and transport, even though, their nutritional values are not comparable as fish is much more nutritious.

Trolling for large pelagics and shore fishing on reefs cause environmental damage

Biodiversity

Reefs are very delicate and vulnerable to pressure including fishing. **The impact on biodiversity is a cause for concern, especially in Mohéli.**

Motorboats have an impact on climate change because they are not very energy-efficient

The creation of marine reserves (national parks) is helping to protect this environment. However, **destructive fishing practices** are still practised in the UC, with little surveillance. Net fishing is a threat to turtles and other species. Fishing with the plant poison Thephrosia, which is banned but still practised, is damaging biodiversity.

Comorian fisheries are mainly open access, with some **community management standards that are difficult to comply with.**

There is also pollution of ecosystems by plastics and microplastics, due to poor waste management on land and by fishing boats at sea.

Management of fish stocks

According to the Indian Ocean Tuna Commission, which manages stocks of tuna and tuna-like species in the Indian Ocean, **two third of the most exploited stocks** by the Comorian fisheries VC (yellowfin tuna and Patudo), with the exception of bonito, are classified as **overfished and subject to overfishing.**

The UC manages four demersal stocks (Octopus cyanea - octopus, Lethrinus mahsena, Epinephelus merra and Variola louti). The latest assessment, in 2018, indicates that there is not enough information about the octopus stock as well as the overexploitation of the other three species.

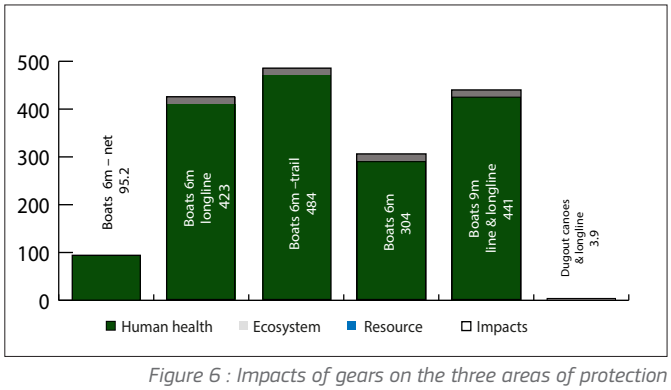

Figure 6 : Impacts of gears on the three areas of protection

The sustainability of the value chain from an environmental point of view is problematic, due to the intensive use of fuel by speedboats, a high rate of gear loss for canoes, and poor management of reef areas. The various strategies for managing fisheries resources, such as co-management agreements, are not fully understood and difficult to apply.

Main findings

The VC makes a substantial contribution to economic growth (operating profit and wages, return on invested capital, indirect taxes, high contribution to GDP), but some categories of actors struggle to earn an income above the minimum wage.

This economic growth is inclusive: the VC creates activity for small-scale units and provides work at sea and on land in coastal areas, yet women and young people, who are numerous in the VC, struggle to express their potential. **The VC is sustainable from a social point of view**, although several improvements need to be made: safety at sea, better access to fish, formalisation of activities. **Its environmental sustainability is more problematic**: low energy efficiency, overexploitation of stocks, poorly controlled impact on ecosystems.

Risks

Among the risks affecting the VC's ability to contribute to inclusive and sustainable economic growth, the most important are the **amplification of the climate change effects**, with VC stakeholders having little capacity to manage this risk; the **decline in remittances from the diaspora**, currently a major source of finance for capital investment in fishing; the **increase in production costs** (fuel, electricity, etc.); and the **degradation of coastal resources** if fishing is intensified without regard for its environmental impact.

Advantages and disadvantages

There are many advantages to the VC: the majority of actors earn more than the legal minimum wage; the VC has beneficial effects on the **public finances** in an indirect way (taxes on inter-island transport and input imports); it makes a major contribution to the **national economy** and to **social links in coastal areas**; it helps **to reduce food and nutritional insecurity**; **young people** and **women** are fairly well represented in the VC.

However, the VC also has negative impacts that need to be addressed: its activities are heavily **dependent on imports of inputs**, whose price is rising; **organisations are weak** and their negotiating capacity is limited; **working conditions at sea remain** dangerous despite some improvements; **monitoring of fishing practices is insufficient**, both to reduce the risks of IUU fishing and to safeguard the sustainability of fish stocks.

Fishing in the UC is essentially traditional and small-scale (seashore, canoes, day boats). Yet it contributes to 6% of the national GDP and 13% of the agricultural GDP. This economic growth is inclusive of several categories of vulnerable actors: subsistence fishermen, women and young people. The value chain also contributes to social connections in local areas and reduces food and nutritional insecurity.

It is therefore a sector that needs to be protected and developed, provided that fishing activities are better formalised and more secure, and that attention is paid to its environmental impact. Co-management agreements, which aim to make fishing compatible with the protection of ecosystems, could be applied more effectively. Even if the contribution of the Comorian fleet to the overexploitation of pelagic stocks at regional level is minimal, given its low fishing effort (20-25,000 t per year), and despite certain estimates giving a sustainable catch potential of 33,000 t, the increase in catches should be considered with caution.

The value chain is subject to a number of risks that are difficult to control (consequences of climate change, decline in financial transfers from the diaspora, etc.) and constraints that go well beyond the fisheries sector (unfavourable environment for investment and business environment). On the other hand, the actors in the fisheries value chain are fully capable of taking measures to reduce the degradation of ecosystems and coastal resources, to strengthen upstream and downstream activities in the value chain other than fishing, or to develop a capacity for strategic management coordinated by the State and based on strengthened professional organisations and a revitalised private sector.

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Recommandations

Some actions would help create a leverage effect on the VC or limit the negative impacts. They are closely linked to the objectives of the Pacte Vert et Bleu.

Recommendations	Actions	Objectives of the PBV
Increase funding for the DGRH to ensure proper management of the fisheries activities	• Review the monitoring of catches and boats and return to statistics on a self-funding basis to reduce dependence on projects. • Introduce fishing licences to control fishing effort, and in particular finance simplified and consistent statistics.	(3) (2)
Set up an information monitoring system for the sector and markets	• Identify the structures that can be mobilised to set up a system for collecting and periodically analysing information on the sector, with the DGRH in the lead (consular chamber, university, research institute, Fisheries School, trade union, service provider, etc.). • Set up this "observatory" in the appropriate structure to enable it to operate effectively (gathering and storing of information: prices, flows, consumption, etc., periodic analysis and distribution of fisheries situation bulletins and annual reports).	(2) (1) (3)
Promote initiatives to value downstream fish products	• Facilitate the purchase of small freezers, generators and refrigerated vehicles by associations of fishermen, shopkeepers, restaurateurs, processors, etc. to limit losses, store production surplus and distribute it more evenly. • Learn from past failures and study the feasibility of setting up one or two artisanal or semi-industrial pelagic fish canning units in Anjouan and/or Grande Comore, operating on a seasonal basis.	(2)
Develop the potential of fishing segments and islands	• Diversify the activities of vulnerable groups such as women: e.g. collecting/cultivating seaweed or oysters to meet the socio-economic needs of local communities. • Support upstream activities such as boat manufacturing: boost the input sector and local production of materials for FADs, to limit imports. • Benefit from the comparative advantages of the different fishing segments on each island and facilitate the inter-island movement of fish for more resilient food systems. • Start the semi-industrial fishing on the island of Anjouan, which has the best technical and economic advantages, once the option has been validated by fisheries research.	(2) (1)
Improve the performance and acceptability of co-management agreements	• Carry out a retrospective assessment of co-management agreements (dissemination of good practices, corrections) and their effects on stocks and ecosystems. • Strengthen support for actors and ensure rigorous monitoring of these agreements	(3) (1)
Improve the professionalisation of fishermen and the formalisation of fishing activities	• Clarify and strengthen the role played by fishermen's unions in relation to Producers Organisations (POs). • Consolidate the movement undertaken by the DGRH to formalise and strengthen the capacity of POs to provide services to their members. • Strengthen the skills of POs to become high-quality institutional partners in drawing up the sector's development strategy.	(3) (2) (1)

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / INTPA and is implemented in partnership with Agrinatura. Agrinatura (http://agrinatura-eu.eu) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development. The information and knowledge produced through the value chain studies are intended to support the Delegations of the European Union and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions. VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: https://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d/info_en

This document is based on the report: : Dabat, MH., Avadí, A., Sfez, P., Said, M. 2023. Analyse de la chaîne de la pêche dans l'Union des Comores. Rapport pour l'Union Européenne, DG-INTPA. Value Chain Analysis for Development Project (VCA4D CTR 2017/392-417), 141 pp + annexes. Only the original report binds the actors.