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Sustaining Fishery Resources for Economic Growth in Africa

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Executive Summary

The fishery sector plays a pivotal role in global food security, both in terms of consumption and production, as well as trade and employment. Attaining green growth in the fishery sector would help alleviate poverty, because of the benefits from trade, employment opportunities and sustainable food security. This study examined the potential of the fishery sector to mitigate poverty and the growing unemployment rate in Africa. Chad, Egypt, Ethiopia, Madagascar, Mauritania, Morocco, Namibia, Niger, São Tomé and Príncipe, and Seychelles were used as the target sample areas from the five African sub-regions for the study. The findings revealed that the fishing sector's potential in mitigating poverty and unemployment in the context of a green economy was unsustainable due to over-exploitation of the fishery stock, underutilization of the fishery resource, high employment pressure on the sector, and the increased frequency of export border rejection in the export market destinations because of quality deterioration.

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Introduction

A better understanding of sustainable fishery resource management in Africa can help increase the incomes of traditional fisher folks. The sector also has the potential to supply consumers with high-quality fish that would improve their diet and thus improve food security. Reduction of poverty and growing unemployment are becoming the priority agenda of several fishery management agencies in Africa and their partners in donor and multilateral institutions. This is mainly because sustainable fishing and appropriate utilization of existing fishery resource can play major roles in improving the livelihoods of poor fishing communities.

The sector's role in poverty reduction in the areas of consumption and production, trade and employment, is significant. Therefore, it is imperative to ensure the viability and sustainability of fishery resource in trade, employment, consumption and production.

This policy brief highlights key findings of a study on the potential of the fishery sector to mitigate poverty and unemployment in Africa. The brief proposes policy options to address challenges in the fishery sector, so as to help mitigate poverty and unemployment in Africa.

The findings of the study revealed that growth in captured-fish production in Seychelles, São Tomé and Príncipe, Morocco and Mauritania, was more than the growth registered in Niger, Namibia, Madagascar and Ethiopia for the study period (1980-2010). Based on the mean volume of captured fish production for the period, Morocco ranked first, with 667769.4 tons of fish; followed by Namibia (361052.5 tons), Egypt (288154.1 tons), Mauritania (110382.2tons) and Madagascar (99414.67 tons). With the exception of the annual growth rate registered in Chad (0.001%), all the countries of the study had their captured-fish production grow by almost 100 percent and above, for the period (1980-2010). Thus, it was affirmed that, the trend in captured-fish production in all countries considered in the study were found to have increased in volume over the period. Also, international trade played a significant role in striking the balance between domestic demand and supply, and fishing as a source of foreign income earnings.

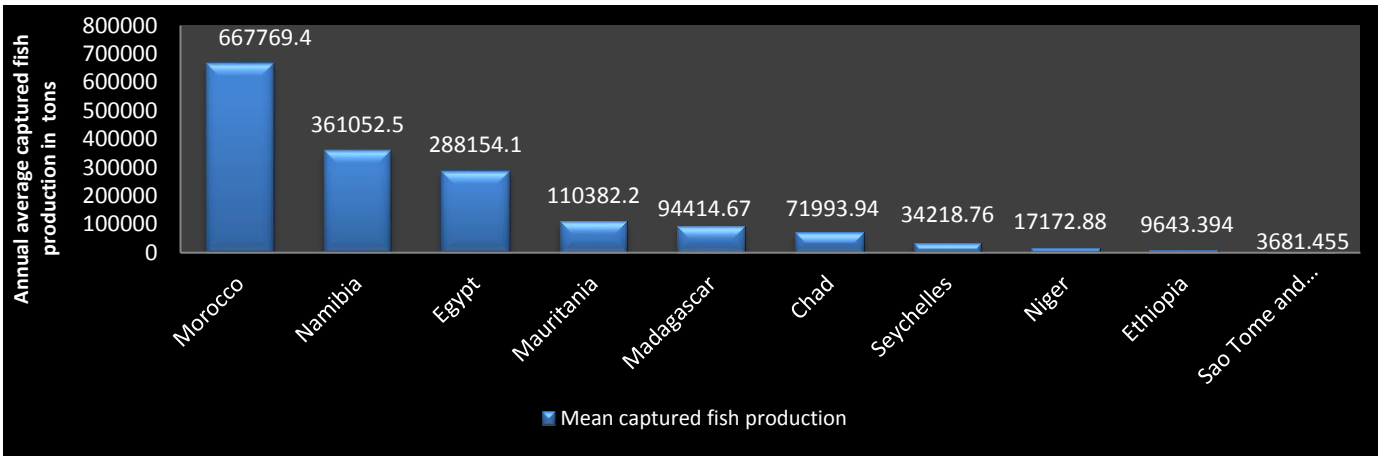

Figure 1: Average volume of annual captured fish production from 1980-2010 (Qty: tons)

The sustainability of the sector to mitigate poverty through the income derived from fish export was being undermined due to the increased frequency of export border rejection notifications. For instance, there were about 223 fish export rejections from Morocco, 42 from Mauritania, 38 from Namibia, and 10 from Seychelles from the European Union (EU) border within 1980-2014. This development was due to compromise on quality standards. The major quality issues for the exports border rejection notifications and alerts were as a result of non-compliance with the different export regulations relating to hygienic conditions, existence of heavy metal, mycotoxins, micro biological contamination, adulteration (missing documents), labelling, veterinary drug residues, bacterial contaminations, food and feed additives, packaging, pesticide residues among others. Therefore, there is the need for fish exporters in Africa to adhere to quality standards for export across the supply chain, taking the above issues into account.

Table 1: Frequency of export border rejection notification and alert received due to noncompliance of quality (1980-2014)

Year	Egypt	Morocco	Madagascar	Namibia	Ethiopia	Seychelles	Niger	Mauritania	São Tomé & Príncipe	Chad
1980-1985	0	1	0	0	0	0	0	0	0	0
1986-1990	0	1	0	0	0	0	0	0	0	0
1991-1995	0	0	0	0	0	0	0	0	0	0
1996-2000	0	4	0	0	0	0	0	1	0	0
2001-2005	0	7	0	2	0	1	0	0	0	0
2006-2010	1	120	2	23	0	0	0	24	0	0
2011-2014	3	90	3	13	0	9	0	17	0	0
Total number of border rejection and alert from 1980-2014	4	223	5	38	0	10	0	42	0	0

NB: Figures are the frequency of both export border rejection notification and export border alert notification from EU Border from 1980-2014. Source: The Rapid Alert System for Food and Feed (RASFF)

Sustainability of Aquaculture Fishing and its Monetary Value

The average annual aquaculture fish production in Egypt, Madagascar and Morocco was higher (282964 tons, 1835 tons and 959 tons, respectively), compared to the average volume registered in Namibia (12.3 tons), Ethiopia (19.2 tons) and Niger (27.12 tons), within the period 1980-2012. With the exception of negative incremental growth noted in the volume of aquaculture fishing in Ethiopia within this period; aquaculture fish production in Morocco, Namibia, Egypt, Madagascar, and Niger witnessed a steady incremental growth.

Table 2: Aquaculture fish production volume from selected six countries from the five African sub-regions, 1980-2012 (Qty, tons)

Country	Mean	Std	CV%	CAGR%	P value
Egypt	282964.1	313810.7	110.9013	5.922843	4.09E-23
Ethiopia	19.18182	14.47725	75.47384	-0.49514	0.298169
Madagascar	1835.242	1462.812	79.70674	5.615817	6.36E-11
Morocco	959.2961	776.1904	80.91249	7.70943	5.95E-09
Namibia	12.30303	22.34458	181.6185	6.682462	6.13E-10
Niger	27.12121	24.88317	91.74802	3.218242	6.78E-08

Figures are Author's calculation based on the data collected from FAOSTAT

NB: Figures for aquaculture fish production from Ethiopia were calculated from 1988-2012, figures for Namibia were calculated from 1992-2012, figures for Niger were calculated from 1984-2012. There were no aquaculture fish production data both in national and international statistical sources for Chad, Mauritania, São Tomé and Príncipe and Seychelles for the periods.

Similarly, the income derived from aquaculture fishing from 1980-2012 was estimated at USD 7,058,251,000 in Egypt, followed by USD 61,899,720 in Morocco, USD 46,607,390 in Madagascar, USD 1,001,757 in Niger, USD 631,130 in Ethiopia and USD 408,095 in Namibia. However, negative incremental growth was noted in the monetary value realized from aquaculture fishing in Ethiopia (-0.48) and Morocco (-0.82) during the period (1980-2012).

The findings suggested that, instead of being dependent on captured fishing as a means of sustaining the fishery biodiversity, there is the need for measures to be put in place to derive high income from the fishery sector. These measures could include having incentives for fishermen to engage in more aquaculture fishing and the deployment of modern fishery technologies to improve productivity.

Table 3: Aquaculture fish monetary value from six selected African countries (1990-2012), (USD 000)

	Egypt	Ethiopia	Madagascar	Morocco	Namibia	Niger
Mean (000 USD)	705825.1	63.1	4660.7	6189.9	40.81	100.2
Std	599584.3	24.57	2977.38	2641.84	70.23	115.53
CV%	84.95	38.94	63.88	42.68	172.09	115.33
CAGR %	6.78	-0.48	4.44	-0.82	7.39	3.69
P value	2.72E-13	0.363646	6.82E-05	0.14951	3.75E-09	0.00079

Figures are Author's calculation based on data collected from FAOSTAT

NB: Figures for Namibia were calculated from 1993-2012. There were no aquaculture production figures for Chad, Mauritania, São Tomé and Príncipe and Seychelles.

The Sustainable Yield and Employment Potential of the African Fishery Sector

As indicated in Table 4 below, the study predicted the maximum yield and number of employees for ensuring sustainability of fish production and conservation of the fishery stock.

Table 4: The maximum sustainable yield and employment effort of the fishery sector (1980-2011).

Country	Actual		Predicted	
	Yield (000 kg)	Effort (employment)	Maximum Sustainable yield (KG)	Maximum Sustainable employment
Egypt	1332444	93123	1089382463	294249
Chad	95000	435000	83209813	307253
Ethiopia	1332444	93123	12334618	12517
Madagascar	62434	254150	171354205	126896
Namibia	413564	25716	1064811100	42223
Morocco	888137	902520	8532952570	329074
Niger	74371	2268	213174314.1	5710
Mauritania	349744	902520	840938195	361755
Seychelles	74371	2268	222954241	11009
São Tomé & Príncipe	5057	1601	4079939	2826

NB: The result was analysed using Schaefer's Maximum Sustainable Yield (MSY) model, based on data collected from FAOSTAT and ILO, 2015. Fox model was fitted to calculate the maximum sustainable yield and effort of the Seychelles and Niger fishery sector.

Employment pressure beyond the predicted maximum number of employees was noted in the fishery sectors of Chad, Ethiopia, Madagascar, Morocco and Mauritania, but Egypt's fishery sector was found with a potential to absorb an additional 201,126 employees, so are Namibia, Niger, Seychelles and São Tomé and Príncipe, with the potential to absorb 16507, 3442, 8741, and 1225 employees, respectively.

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The Productivity of Fishermen in Africa

The trend in catch per unit employee of the fishery sector in Chad, Madagascar, Mauritania and Morocco had negative incremental growth rates, while Seychelles, Egypt, Namibia, Niger, Ethiopia and São Tomé and Príncipe witnessed positive incremental growth within the study period of 1980-2011. Furthermore, extreme differences were discovered in the productivity of fishermen across countries, ranging from the lowest volume catch per unit employee of 0.32 tons of fish in Chad; followed by 0.77 tons of fish in Niger, 1.22 tons of fish in Ethiopia, 1.41 tons of fish in Madagascar and 1.86 tons of fish in São Tomé and Príncipe. However, the highest catch per unit employee of 45.33 tons of fish was recorded in Namibia, followed by 17.59 tons of fish in Seychelles, 4.29 tons in Morocco and 3.40 tons of fish in Egypt.

Conclusion

Increase in fishing effort during the past thirty years (1980-2010), coupled with high local and international demand for fish products, has subjected wild-catch fishing and aquaculture in many of the African countries to intense fishing pressure. This has resulted in over exploitation of the fishery resource, particularly in Egypt, Chad, Ethiopia, as well as São Tomé and Príncipe. Thus, many fishery sectors in Africa are already under stress and lack environmental sustainability due to over-exploitation, creating an imbalance in the fishery ecosystem. If this trend continues, countries such as Egypt, Chad, Ethiopia, as well as São Tomé and Príncipe will have to undertake heavy tasks to restore the destroyed fishery resources base. On the other hand, the fishery resources of countries such as Madagascar, Mauritania, Morocco and Niger were found to be underutilized.

Moreover, the increasing frequency of export border rejection notifications and alerts for fish exported from Morocco, Mauritania, Namibia, Seychelles, Madagascar and Egypt resulted in reduction of income in the sector. This calls for strict adherence to quality control across the export market supply chain.

Definitely, the sector's potential in mitigating poverty and unemployment in the context of a green economy was found unsustainable due to over-exploitation of the fishery stock, underutilization of the fishery resource, high employment pressure and increasing frequency of export border rejection.

Policy Pathways

1. Strengthening quality control systems to adhere to standards across the fish supply chain would help provide fish products to export markets.

2. Placing aquaculture as a top priority in the fishery sector, particularly in countries with negative incremental growth in aquaculture fishing (Ethiopia); also in countries with high employment pressure (Chad, Ethiopia, Madagascar, Morocco, Mauritania); and those with over exploitation of the fishery stock (Egypt, Chad, Ethiopia, and São Tomé and Príncipe), would help reduce the existing pressure on the fishery ecosystem, and create alternative employment opportunities.

3. Deploying modern fish harvest technologies in countries with underutilized fishery resource (Madagascar, Mauritania, Morocco, Niger, Namibia, and Seychelles) would help improve income derived from the sector.

References

Europe Direct, The Rapid Alert System for Food and Feed. (2015). Export Border rejection notification and Alert. [Online]. Available: http://ec.europa.eu/%20food/safety/rasff/members/%20index_en.htm [6-3-2015]

FAOSTAT.2015. Fishery Commodity Data. [Online].Available: http://www.fao.org/%20figis/servlet/%20SQServlet?file=/work/FIGIS/prod/webapps/figis%20/temp/hqp_6482368862651822023.xml&outtype%20=html [20-2-2015]

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He produced this policy brief during his PhD internship at UNU-INRA.

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The Potential of Sustainable Fishery Resource in Mitigating Poverty and Unemployment in Africa

This policy brief and the working paper are available at collections.unu.edu

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