Food and Agriculture Organization of the United Nations

FAO FISHERIES AND AQUACULTURE TECHNICAL PAPER

ISSN 2070-7010

715

Diagnosis of aquaculture employment governance in selected African countries

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2024

Required citation:
Menezes, A., Ligeon, C., Murekezi, P. & Jolly, C. 2024. *Diagnosis of aquaculture employment governance in selected African countries*. FAO Fisheries and Aquaculture Technical Paper, No. 715. Rome, FAO. https://doi.org/10.4060/cd0424en

ISSN 2070-7010 [Print]
ISSN 2664-5408 [Online]

ISBN 978-92-5-138715-3

Preparation of this document

The document was prepared under the overall supervision of the National Planning and Development Support (NFIAN) of the Food and Agriculture Organization of the United Nations (FAO), which commissioned various country case studies to form the basis of a general study on the governance of aquaculture employment in Africa and an overall synthesis report. Weaknesses and strengths were assessed, and suggestions were proposed for improvement of the governance of aquaculture employment in Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia. The international experts Professors Curtis Jolly and Carel Ligeon assisted with data analysis and the overall synthesis of the results. The purpose of the study was to obtain a comprehensive understanding of the governance of aquaculture employment in the ten African countries, learn from both positive and negative lessons, and propose potential solutions to improve aquaculture governance and the public perception of aquaculture. In-depth analyses were conducted through direct interviews with 84 fish/shellfish hatchery/farmers, owners and/or farm managers, aquatic feed factory managers, and wholesale traders. This report summarizes some of the issues facing general aquaculture employment governance, current "best practices" and potential challenges for the aquaculture industry in African countries and draws on some of the best practices of aquaculture governance in other countries, comparing them with the situation in the ten countries.

This document was prepared in the framework of the ongoing efforts by the FAO Fisheries and Aquaculture Division in line with the Sustainable Development Goals and the Blue Transformation to ensure food security and reduce poverty by developing countries.

Abstract

Many countries are promoting aquaculture as one of the prime drivers of the rural economy and the employment of women and youth. However, the industry is criticized for inadequately representing the needs of workers. Most African countries have shown a willingness to advance industry goals through domestic programme planning and facilitating foreign direct investment. However, there is a need for coherent strategies for employment governance. Hence, immediate change is required to modify the governance of aquaculture employment to foster industrial transformation. The objective of this research is to enhance understanding of the governance of aquaculture employment in ten African countries (Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia) and to determine their level of compliance with existing employment legislation in those countries. The ultimate goal is to learn from both positive and negative lessons and propose possible corrective measures for substandard practices in order to improve the public perception of aquaculture. The study seeks to evaluate existing employment governance in the aquaculture industry and to use the acquired knowledge to inform policymakers and industry leaders on the status of governance in employment.

The results of the study show that the types of governance vary by country, with hierarchical governance predominating at the public level and participatory governance most identified at the private level. The group of individuals employed in the aquaculture labour force is young and dominated by men. A large proportion of individuals surveyed had some higher education or completed high school. In management and supervision, men's participation is three times more than that of women. Aquaculture workers received at least the minimum pay with additional bonuses. Women's pay was comparable to that of men, and expatriate pay was based on skill, experience and training. There was an absence of social dumping and forced child labour. Benefit packages varied by firms. There was also a lack of integrated planning, communication, adequate research, training and insufficient consideration of the different ecological and management scales. Many laws and codes of conduct of aquaculture employment exist under the mandates of multiple ministries, but there is no critical examination of these regulations to verify whether these laws or codes of conduct are appropriate for aquaculture. Legislative enforcement is also weak or absent. Almost all enterprises surveyed were compliant with the regulations in force at the various ministries. There was no clear-cut information from which the ministries organized and managed the employment process. Governments should compile all regulations and create a guide for employers to enable transparency, accountability, predictability and equity in employment. This will help improve good governance and foster sustainable development in aquaculture. Governments must establish employment sector specific rules and regulations, including those in the aquaculture sector.

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Abbreviations

ANA	National Aquaculture Agency (*Agence National d'Aquaculture*) (Senegal)
CEO	chief executive officer
CV	curriculum vitae
ECOWAS	Economic Community of West African States
EUFC	Egyptian Union of Fishermen Cooperatives
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
ILO	International Labour Organization
MIFOTRA	Ministry of Public Service and Labour
TEVET	Technical, Entrepreneurial and Vocational Education and Training
TEVETA	Technical, Entrepreneurial and Vocational Education and Training Association
TVET	Technical and Vocational Education and Training
UIF	Unemployment Insurance Fund

Acknowledgements

This report benefited from the collective efforts of various national experts, FAO colleagues and several organizations who reviewed and validated it. The national and international experts who developed the case studies and assisted with the quantitative and qualitative analyses of individual reports and anecdotical information are: Mr Sherif Sadek (Egypt), Mr Francis K.E. Nunoo (Ghana), Mr Charles Ngugi (Kenya), Ms Joyce Maganga (Malawi), Ms Ebinimi Ansa (Nigeria), Mr Jean Claude Ndorimana (Rwanda), Mr Boubacar Ba (Senegal), Mr Thomas Hecht (South Africa), Mr Simon Owani Olok (Uganda), Mr Alexander Shula Kefi (Zambia) and Dr Carel Ligeon (United States of America). They are acknowledged for their invaluable contributions.

Sincere gratitude goes to the fish farmers, the key value chain players and all other participants in this policy research paper who participated in field visits, telephone and Zoom surveys, as well as the validation meeting, and provided valuable inputs and information.

The authors are especially indebted to FAO colleagues Mr Nathanael Hishamunda and Mr Junning Cai, who assisted with the review of the national case studies and this synthesis, Ms Millie Gadbois, Mr Buba Bojang and Ms Daniela Kalikowsi for their enriching queries and comments during the peer review process.

Special thanks are extended to Lisa Falcone, Maria Giannini and Marianne Guyonnet for their support in the publishing process, José Luis Castilla Civit for the layout design.

Executive summary

Aquaculture continues to grow at a fast pace, from 7.8 million tonnes in 1980 to 114.5 million tonnes in 2018; in 2020, global aquaculture production reached a record 122.6 million tonnes, at a total value of USD 281.5 billion (FAO, 2022), including 87.5 million tonnes of aquatic animals. However, during the period 2000-2021, aquaculture in Africa expanded at a rate of 8.8 percent faster than the average global annual growth rate of 5.0 percent during the same period, with a contribution of 2.4 million tonnes, representing 2 percent of total world aquaculture production. As in the rest of the world, governments in Africa aim to improve public and private governance to enhance the performance of aquaculture administration in facilitating the adoption of practices, leading to new combinations of public and private regulations, codes and standards of employment, and ultimately improving the public perception of the industry. While these are aimed at improving aquaculture development, there is insufficient evidence to determine the fair and equitable treatment of aquaculture workers. Ten reports from Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia on the governance of aquaculture employment are summarized to evaluate the existing nature of employment governance.

The assessment is opportune given that aquaculture in Africa is in its early stages of development. The evaluation provides an in-depth analysis of gender equity and equality, occupation types, salary scales, and benefits, such as health, education, training and recruitment, through direct interviews with 84 fish/shellfish hatchery/farmers, owners and/or farm managers, aquatic feed factory managers and wholesale traders. The enterprises surveyed comprised 6 hatcheries, 7 cage culture operations, 64 large, medium- and small-scale aquaculture operations, 2 oyster facilities, 3 feed mills, and 2 wholesale traders.

This report documents various forms of ownership, production and employment practices in aquaculture in countries requiring alterations to their levels of existing governance in terms of recruitment and employment. Most countries have multiple departments, ministries and agencies that direct aquaculture governance, but each ministry operates independently; thus, no consolidated groups are assisting the ministry that is responsible for the cointegration of planning and decision-making. The types of governance vary by country with hierarchical governance predominating at the public level. Four out of the ten countries – Egypt, Rwanda, Senegal and Uganda – have hierarchical types of governance, while three – Ghana, Malawi, and Uganda – have participatory types. Kenya identified the type of governance as anecdotal and Nigeria as collective. Some countries exhibited multiple combinations: Egypt is hierarchical and command and control; Senegal is hierarchical and decentralized; and Zambia is participatory and collective. Most of the private sector enterprises in the countries exhibited participatory forms of governance, such as in Kenya, Malawi, Rwanda, Senegal, South Africa, Uganda and Zambia. Three exhibited market governance, Malawi, Nigeria and Zambia; and Malawi and Nigeria hierarchical. Ugandan firms showed collective action, while Senegal's demonstrated cooperative behaviour.

All countries that participated in the survey have ratified and adopted the International Labour Organization employment policies. However, these countries lack a common set of regulations as governing guidelines for recruitment and employment practices in aquaculture. Almost all enterprises surveyed are compliant with the regulations enforced by the various ministries. However, there is a lack of a clear guidebook that ministries can use to enforce labour laws and regulations. A common template used

for employment services in the marketing chain is also lacking. Although many laws and codes of conduct exist at various ministries regarding aquaculture employment, no critical examinations of regulations have been performed to verify whether the laws are tailored to meet the needs of the aquaculture sector. Employers face numerous constraints in hiring staff, especially when basic education is necessary to achieving good governance in aquaculture employment. Also, the challenges include a lack of integrated planning, poor communication, understanding of the interactions in public-private sector relationships, inadequate research, limited training, and insufficient consideration of different ecological and management scales.

Bureaucratic procedures and processes are rampant, and often involve excessive red tape to access public services needed to establish and operate aquaculture production and marketing businesses. Practitioners have reported that the processing of requirements and resolution of concerns in their operations took an exceedingly long time and involved multiple visits to numerous offices. For example, establishing certification for a commercial aquaculture enterprise requires a formal application, site survey and assessment, development and approval of a technical plan, environmental clearance, and waste discharge and water abstraction permits, among others, all of which are handled by different offices and agencies.

The age profile showed that the aquaculture labour force comprises predominantly youth individuals, with 75.4 percent workers aged between 20 and 39 years. Moreover, only 1.5 percent are younger than 20 years, 17.82 percent are between 40 and 49 of age, 4.92 percent are between 50 and 64 of age, and 0.32 percent are older than 65 years. A large proportion of individuals surveyed attended high school or completed high school; the percentage of men ranged from 97.82 percent in Egypt to 82.12 percent in Nigeria, whereas that of women ranged from 77.98 percent in Zambia to 2.18 percent in Egypt. Significantly, the number of women who received high school diplomas or attended high school is low, preventing them from acquiring valuable skills for employment.

Most countries classify jobs into four categories: managers, supervisors, technicians and labourers. However, in Ghana and Rwanda, the classification is much more elaborate. The chief executive officers and managers occupy the highest positions, followed by supervisors, and technicians and others; the numbers in each category depend on the size of farm, number of species and complexity of the operation. For operational purposes, jobs are further classified as permanent, temporary, annual, seasonal or casual. This classification also describes the role of the individual within the industry, and employees are mostly permanent, with or without contracts. The countries reported 60.7 percent permanent employment; however, in Ghana, 23 percent of all employees were permanent, and Nigeria reported 34 part-time workers. Most part-time or casual workers are seasonal. Men dominate all job classifications, except administrative support, where women are predominant. In the managerial class, men are the dominant group. In management and supervision, men participate three times more than women, which is not surprising since men tend to have higher levels of educational attainment at the first-degree and postgraduate levels.

Employed expatriates are either part of the foreign investor's organization or employed as chief executive officers that are part of the managing team. Ghana has the largest share of expatriates, 13 expatriates, all men, occupying various top managerial positions, primarily on foreign-owned farms. Most farms complied with the equal job-equal pay policy, and there was no discrimination between men and women or between Nigerian domestic employees and employees from the Economic Community of West African States (ECOWAS) subregion. There was no reported incidence of social dumping.

Most employers comply with all rules and regulations, recruiting staff with high school diplomas, some high school education, or advanced education. All companies reported no discrimination in wages or salaries offered to employees, as compensation

depended on the position and job description (equal job, equal pay principle). The salaries and wages applied in the sector were comparable to those in the livestock and crop subsectors.

Companies offered several other benefits and incentives to employees, including food basket gifts, overtime pay, free accommodation, free meals, and invitations to become part of the organization by purchasing stock options. The survey results reported that not all the companies surveyed are willing to cover employee health costs. Approximately 65 percent of fish labourers in Egypt are not covered by social and medical insurance, while in Ghana, Nigeria, Rwanda and South Africa the burden of insurance is placed on the national insurance schemes. Additionally, not all countries have formulated policies regarding administration of pension schemes, and few countries have enforced the Pension Scheme Act in aquaculture. Most of the firms have adopted policies of annual leave and overtime pay.

Survey data reveal a gender gap in employment across the board. In many countries, women are overwhelmingly employed in administrative support. Gender differences in employment are evident in some aquaculture units, wherein employees in hatchery and grow-out operations are predominantly men, while those in the processing segment of the supply chain are women controlled.

This study recommends restructuring the entire aquaculture industry in the ten countries, especially in terms of enhancing the skills and education of workers. A national drive should be implemented to train graduates, particularly women, with practical skills to support fish farms in public and private aquaculture enterprises. Additionally, concerted efforts should be made to develop universal guidelines for employment governance in aquaculture.

1. Introduction

Aquaculture production in Africa has increased rapidly over the past two decades, but production is still lower than the output of Asian countries, even though the African continent holds some of the greatest unexploited potential for aquaculture growth and development (Kobayashi *et al*., 2015). The volume of aquaculture production in Africa has grown almost fivefold in the past twenty years, while its value has risen almost tenfold. The contribution of aquaculture to national gross domestic product increased in most African countries between 2009 and 2018, but it remained negligible at less than 2 percent in 2018 and much lower than the 16–18 percent contribution by capture fisheries (FAO, 2022). Reasons for the slow development of African aquaculture, despite the apparent abundance of natural resources and a growing demand for food, include a lack of infrastructure and development capital, inadequate research information, limited technological knowledge and poor governance (Hinrichsen *et al*., 2022).

African aquaculture (excluding algae) suffered a slight contraction in its annual output (down 1.2 percent in 2020 compared to 2019), mainly because of the decrease in production in Egypt, Africa's major producer. The declining trend observed since 2016 in Nigeria, the largest producer in sub-Saharan Africa, worsened in 2020 with a sharp decrease of 9.6 percent. In Uganda, the same production figure of 120 000 tonnes was reported for more than five consecutive years, indicating production stagnation. Aquaculture in the rest of Africa enjoyed double-digit growth of 14.5 percent, reaching 396 700 tonnes in 2020 from 346 400 tonnes in 2019 (FAO, 2022). Disaggregation of production by subregions revealed that the highest production levels are found in North Africa, notably Egypt. West and East African production levels followed at a distant second and third positions, respectively. Aquaculture production is the lowest in Southern and Central Africa. Egyptian aquaculture production volume alone was 1.6 million tonnes in 2020, more than 67.6 percent of total production of all the remaining African countries (754 000 tonnes in 2022), with production mostly comprised of tilapia. Nigeria ranked second in production (261 700 tonnes in 2022). Of specific interest is the very low contribution of marine aquaculture output across Africa despite there being an abundance of marine resources (Hinrichsen *et al.,* 2022).

The aquaculture sector in Africa is diverse in terms of the technologies used, natural resources available and value chain structures. It predominantly takes place in inland waters, which accounts for 82 percent of the production volume (FAO, 2022). Ocean-based aquaculture is mainly practised in the Mediterranean and Black Seas (70 percent of marine production) but also in the Indian Ocean (29 percent). About 43.6 percent of African production consists of Nile tilapia, but other significant freshwater fish species are African catfish (11.9 percent) and common carp (10.5 percent) (FAO, 2017a). Egypt and Nigeria are the largest producers of aquaculture in Africa. The dominant species of fish cultured in Egypt and Nigeria are tilapia and African catfish, respectively. Similarly, tilapia production in Kenya, Rwanda, the United Republic of Tanzania, Uganda and Zambia is largely undertaken by small and medium enterprise (SME) operators. Other examples of SME aquaculture ventures employing limited numbers of workers include shellfish farming in Namibia (Pacific oyster, *Crassostrea gigas*, and African abalone, *Haliotis midae*) and Senegal (*C. gigas*), and family and cooperatively owned seaweed farms in the United Republic of Tanzania (FAO, 2021).

Employment is a key indicator for the assessment of the socioeconomic contributions of the aquaculture sector to food, incomes and livelihoods (FAO, 2018; Valderrama,

Hishamunda and Zhou, 2010). In 2020, aquaculture production created about 634 000 jobs in Africa (FAO, 2022). Both capture fisheries and aquaculture are important sources of employment in Africa, particularly for smallholders and value chain actors in rural areas (Filmer and Fox, 2014). With rapid population growth, a young population (60 percent of the African population is under the age of 25) and the increase in education for young women, it is anticipated that 11 million young people will enter the job market in sub-Saharan Africa every year. The continent, however, creates only around 3 million new jobs annually (Arulingam *et al*., 2019; African Development Bank, 2017; Filmer and Fox, 2014), which leaves an excess of 8 million people unemployed. Thus, the large-scale creation of jobs in rural areas is critical for addressing unemployment and generating income, particularly for youth (Valderrama, Hishamunda and Zhou, 2010). The study results by Chan *et al.* (2021) showed that under the scenario of "business as usual", with slow aquaculture growth and almost stagnant capture fisheries, Africa's fish sector is projected to provide 22 million direct and indirect jobs by 2050. However, assuming a strong gross domestic product growth scenario, 58 million people will be directly and indirectly employed in the fisheries and aquaculture sectors, representing 2.4 percent of the total projected population in Africa in 2050 (Chan *et al.*, 2021). The role and governance of the state and the private sector are indispensable for achieving these projections, especially in creating an environment for youth participation in aquaculture (Béné *et al*., 2016).

Such projection results indicate that good employment governance (according to Arulrajah, 2016), which is based on social, ethical, democratic and economic principles, involves important aspects regarding people management aspects, such as participation, consensus orientation, accountability, transparency, responsiveness, effectiveness and efficiency, and equity and inclusiveness, and follows laws and regulations. All these will be required to ensure the smooth absorption of large numbers of young people into the workforce and prevent inequities and irregularities in the workplace. Good employment governance is also required to reduce scepticism of the causal relationship between aquaculture and environmental pollution, labour exploitation, low wages and social dumping (Béné *et al*., 2016).

1.1 RATIONALE

Structural changes are continuing throughout the aquaculture industry as farms and related firms have multiplied and become more specialized and diversified. Cage culture production in inland freshwater bodies has recently been the leading area of productivity increase. Aquaculture generates a substantial amount of employment opportunities, and although considered an occupation dominated by men, many women are directly and indirectly involved at various nodes of the value chain (St. Louis and Oliveira, 2022; FAO, 2016; Weeratunge, Snyder and Sze, 2010). It is expected that with the increased demand for fish, small- and medium-scale enterprises will be displaced by larger industries and controlled by a few large-scale players. The behaviour of these enterprises is subject to change in terms of employment and the treatment of employees and will require good employment governance if the countries are to achieve their stated objectives of productivity enhancement and increases in rural employment while meeting the Sustainable Development Goals.

Over the past decade, large-scale investments, production intensification and increased public support in the leading producing countries, such as Egypt, Ghana, Kenya, Malawi, Nigeria, Tunisia, Uganda, South Africa and Zambia, have led to a significant increase in production (Adeleke *et al*., 2020; FAO, 2018; Cai, Huang and Leung, 2019). The aquaculture sector has seen many positive developments, including domestic strategic planning for the sector; however, there is a need for coherent governance strategies in employment that embodies equity, transparency and accountability. The effects of governance on industry growth and development are

contingent on policies that focus on improving employment quality in the industry as investments increase (Phillips *et al*., 2016; Murekezi, Martone and Menezes, 2020).

Knowledge gaps exist on the working conditions of the over 19 million farmers and other workers worldwide who are involved in building, maintaining and operating aquaculture enterprises of many different sizes, locations, and types in freshwater and marine environments (Cavalli *et al*., 2019). Not all countries have elaborated policies focusing on aquaculture employment policies in Africa. Policies describing workers' rights, collective bargaining, and freedom of association and protection against anti-union discrimination in aquaculture are undefined. Furthermore, not all 6.2 million aquaculture workers in Africa (Satia, 2016) are protected from hazards, injuries and diseases, as the regulatory and risk management systems that are needed to protect them are absent (Cavalli *et al*., 2019). However, there is an undergoing reform process, guided by the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa (Chimatiro, Nouala and Seisay, 2014) (Hinrichsen *et al.*, 2022). Many workers are not eligible for compensation; among those, the precariously employed workers (e.g. women, children, seasonal workers, migrant workers, and rural and remote workers) do not always report occupational injuries and diseases for fear of victimization. This lack of communication contributes to suboptimal prevention efforts, as the true burden is not identified, nor are the prevention techniques prioritized. Aquaculture in sub-Saharan Africa is semiorganized, and employment procedures are inconsistent and largely unregulated.

Most African countries include poverty eradication, food security, income generation and gender mainstreaming as part of their national aquaculture planning goals. Some individuals in these countries believe that industry growth leads to gender employment inequity and hiring malpractices. While the proportion of women to men in aquaculture is much closer than in capture fisheries, the prevailing belief that men are more likely to succeed in aquaculture than women acts as a barrier to their success and income generation (Burroughs, 2018). The claim is that such notions of lack of inclusion of women and youth in the industry relate to cultural perceptions, resource acquisition and poor employment governance. Gender-based discrimination, such as access to productive resources and start-up capital and discriminatory gender norms, coupled with a lack of education and training, hinders women's career development in aquaculture and limits their upward mobility in the sector, preventing them from engaging in certain activities and restricting their access to decision-making and leadership roles. However, there is limited research to support or refute these claims, and there are widespread concerns that at the international level there is a danger of "social dumping",[1] as countries selected for the study compete to remain attractive to would-be investors. Hence, the sector must modify the governance of aquaculture employment to foster transformation and accommodate anticipated industrial changes.

1.2 OBJECTIVE

Improving the understanding of the governance of aquaculture employment in selected African countries (Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia) is critical for increasing sustainable aquaculture production in those countries. Studying aquaculture employment governance in African countries will further the learning of both the positive and negative lessons from diverse employment governance practices and encourage stakeholders to suggest possible corrective measures for improving inadequate practices. This study seeks to evaluate existing employment governance in the aquaculture industry and use the

1. Social dumping is the practice, undertaken by self-interested market participants, of undermining or evading existing social regulations with the aim of gaining a competitive advantage. Migrant workers are absorbed in the workforce without observance of local customs or regulations.

acquired knowledge to inform policymakers, fish farmers, organizations and industry leaders on the status of governance in employment. The specific subobjectives of the study focus on the following diagnostic evaluations:

(i) understanding the effects of employment governance on working conditions and their predictability in aquaculture;
(ii) evaluating how employment governance affects employees' participation in decision-making in aquaculture;
(iii) comprehending how aquaculture employment governance influences renumeration according to age and gender distribution in conformity with the equal job, equal pay concept;
(iv) making a comparative analysis:
    (a) between locally and internationally recruited employees;
    (b) condition of services across sectors; and
    (c) verifying whether the claims of social dumping (especially to determine if locally recruited labour is exploited) are true.
(v) determining the trends in governance models of employment in aquaculture;
(vi) identifying areas of poor governance (weaknesses in the governance schemes) and suggesting strategic measures for improvement; and
(vii) relating employment governance to existing national policies, legislation and regulations related to employment in general.

1.3 SCOPE OF THE STUDY

The study makes an in-depth assessment of the policy and regulatory framework of labour employment governance in the selected African countries, and questions why the conditions and terms of employment are perceived negatively despite having many appropriate policies and laws in place to guide governance and support employment. Study results will serve as a guide to sub-Saharan countries in the governance and support of aquaculture labour employment. The aim is to educate industry employers on the governance of an expanding industry while enhancing workers' satisfaction by adequately providing for their rights and benefits. Clearly, this study is important for identifying options for African countries to expand the aquaculture sector while allowing all stakeholders the freedom to exercise their labour rights as specified by the existing labour regulations of their respective countries, in conformity with the standards of the International Labour Organization (ILO).

2. Methodology

This study was undertaken during the period November 2021 through September 2022. The first part of the study involved an intensive literature review of national government documents, scientific papers, relevant FAO, ILO and World Bank documents, as well as other related industry papers on aquaculture governance. This was done to provide background information on aquaculture administration and development in the selected countries. The information extracted from these documents was used to plan a field survey to investigate the process and governance of labour employment. The countries selected by FAO to create regional balance were Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia. The survey was preceded by consultations with some of the responsible public technical managers at central and local government levels.

Data on production trends and spatial distribution of industries were reviewed to select farms or operations that would represent the industry in each country. The second step involved the development of a structured interview guide, which was pre-tested for interviewing industry stakeholders who were owners or represented owners of aquaculture enterprises. The structured interview guide focused mainly on labour recruitment and employment, employee characteristics, demographic distribution, qualifications, working conditions and property rights. The information gathered included, but was not limited to, working conditions in aquaculture and their predictability (employer, recruitment/placement conditions, types of positions and their occupation, working hours, salaries and wages, benefits, promotions); employees' participation in decision-making; and gender and age distribution by position and payments (men versus women regarding equal job, equal pay).

A total of 84 enterprises were surveyed, namely 6 hatcheries, 7 cage culture operations, 64 large-, medium- and small-scale enterprises producing food-size fish and fingerlings, 2 oyster facilities, 3 feed mill enterprises and 2 wholesale traders (Table 1).

TABLE 1
Enterprises selected by country for aquaculture governance survey, April 2022

Country	Hatchery	Cage	Farm ponds				Oyster beds	Feed mill	Traders	Total sample
			Large	Medium	Small	Subtotal				
Egypt	4	3				18		3	2	30
Ghana			6	2	3	11				11
Kenya		3								3
Malawi	1	1		2	2	4				6
Nigeria						10				10
Rwanda			3			3				3
Senegal	1				2	2	1			4
South Africa				5		5	1			6
Uganda				7		7				7
Zambia			4			4				4
Total	6	7	13	16	7	64	2	3	2	84

The businesses produced tilapia, African catfish and other species, such as mussels, abalone, oysters, bream, seabass, shrimp, mullet, meagre, ornamental fish, bonytongue, merchant, trout and three-spotted bream.

The data collected were synthesized and analysed to establish differences in employment practices between locally and internationally owned or managed firms; the differences in working conditions, and the salaries between men and women, internationally recruited employees and local hires; and the differences between employment in aquaculture and other similar sectors. Lastly, the data were used to verify claims of social dumping (especially to determine if locally recruited labour was exploited). Other key aspects of interest included the application of the "equal job, equal pay" principle between men and women; exploitation of child labour; trends in governance models of employment in aquaculture; and identification of areas of poor governance (weaknesses in the governance schemes) and suggestions of strategic measures for their improvement. The data collected were qualitatively analysed to observe any significant patterns or trends. Comparative analyses were made by relating the existing industry employment governance to national policies, legislations and regulations related to employment in each country.

3. Governance, resources, planning and employment conditions

The findings originate from the ten country reports and are supported by the findings of the literature review and secondary data. The data examined include information on governance, aquaculture planning, basic employment conditions, regulations based on criteria set by the ILO (1996) and adopted by African governments, as well as the level of compliance and benefits of employment.

3.1 GOVERNANCE

In most African countries, aquaculture administration and governance are still under the purview of numerous ministries. Despite having been practised for over 70 years, with a combination of hundreds of small and large projects and numerous species, aquaculture still needs to find its own place within the government structure; its policymakers have been housed in various ministries, such as the Ministry of Agriculture, the Ministry of Animal Production, the Ministry of Fisheries, and the Ministry of Natural Resources, Parks and Wildlife (Brummett, Lazard and Moehl, 2008). The selected countries have administrative structures located within the Ministry of Agriculture, the Ministry of Natural Resources, Reclamation and Lands, or the Ministry of Livestock. Ghana, Senegal and Zambia have separate ministries dedicated to fisheries and aquaculture. Most of the countries have several departments in associated ministries involved in aquaculture governance, but there are no signs of interagency or joint committees that assist the ministry chiefly responsible for organizing, planning and execution of governance practices. Each of the associated ministries operates independently but within the national plan (Table 2).

TABLE 2
Country administrative structures, five-year plans and emphasis and mention of employment governance

Country	Administrative structure	Five-year plan	Main emphasis	Mention of employment governance
Egypt	Ministry of Agriculture and Land Reclamation works through the General Authority for Fish Resources Development	Fisheries and Aquaculture Development Plan	Production: Increase production to 3 million tonnes by 2025	Rural job creation
Ghana	Ministry of Fisheries and Aquaculture Development	Fisheries and Aquaculture Sectoral Development Plan (2011–2016)	Increase in sustainable production and marketing	Job creation and training
Kenya	Ministry of Fisheries and Livestock Development: State Department for Fisheries, Aquaculture and the Blue Economy	Third Medium Term Plan (MTP III) 2018–2022, Kenya Vision 2030, the Blue Economy Sector (2018–2022)	Poverty reduction through investment encouragement	Employment creation, especially for rural youth
Malawi	Ministry of Agriculture: Department of Fisheries	National Aquaculture Strategic Plan II	Sustainable fisheries development and production expansion	Emphasis on job creation for youth
Nigeria	Federal Ministry of Agriculture and Rural Development: Department of Fisheries and Aquaculture	National Aquaculture Strategy	Sustainable production, domestic selfsufficiency and exports	Emphasis on rural employment

TABLE 2 (CONTINUED)

Country	Administrative structure	Five-year plan	Main emphasis	Mention of employment governance
Rwanda	Ministry of Agriculture and Animal Resources (MINAGRI)	Master Plan for Development of Fisheries and Aquaculture in Rwanda 2011–2020	Poverty reduction and investments	Employment creation
Senegal	Ministry of Fisheries and Maritime Economy	National Strategic Plan for Aquaculture Development	Sustainable, profitable and inclusive sector	Employment creation
South Africa	Department of Forestry, Fisheries and the Environment	African Union Ten Years Aquaculture Action Plan for Africa 2016–2025 and National Aquaculture Strategic Framework	Food security, create jobs and contribute to rural development	Job creation
Uganda	Ministry of Agriculture, Animal Industry and Fisheries: Directorate of Fisheries Resources: Department of Aquaculture Management and Development	National Aquaculture Development Strategy for Uganda 2009	Sustainable production increases and rural development	Job creation
Zambia	Ministry of Fisheries and Livestock	National Aquaculture Trade Development plan	Sustainable development and job creation	Job creation

Strategic or development plans for advancing aquaculture have been promoted in many African countries, though some of them are outdated and currently under review. Strategic Frameworks for Aquaculture Development were completed for Cameroon, Ghana, Madagascar and Zambia as a first step in the process of more detailed planning (MINEPIA/FAO, 2005). In this approach, the roles of the private sector, government, non-governmental organizations and international donors are clarified (from the point of view of national governments). In 2007, Angola, the Democratic Republic of the Congo, Guinea, Nigeria and Uganda all had Strategic Frameworks in the pipeline, while Burkina Faso, Kenya and Mozambique were moving rapidly in the same direction. With the assistance of FAO, Ghana launched a National Development Plan in 2012 to 2016. Through the support of FAO, Nigeria has finalized a four-year Aquaculture Development Strategic Plan, which focuses on value chains to improve national fish production and create employment opportunities. Country development plans usually follow a top-down approach, with some stakeholder contributions, and are elaborated as a set of action proposals. These plans focus on aquaculture as the driver of rural economic development, income generation, food security, improvement in nutritional status and job creation. Labour employment is mentioned as an incentive for aquaculture investment in each of the plans, but the plans do not provide guidance or a framework for labour employment governance.

Aquaculture development plans outline the main objectives and methods to be used to achieve the goals. The plans emphasize numerous goals, with an overall emphasis on fish production, food security, rural poverty alleviation and job creation. Target groups, primarily youth, women, vulnerable groups such as low-income individuals, Indigenous Peoples and special citizens, are specified (Brugere, Troell and Eriksson, 2021). However, mechanisms for ensuring employment benefits for local people, and for forming rewarding public-private partnerships, are usually lacking. For the most part, aquaculture policies are aligned with higher national fisheries and economic development goals, but the goals and objectives are not always quantified, and in the cases where they are specified, they are based on estimates and not on realistic calculations. The planning documents are based on physical factors, without taking into consideration human capacities in terms of skills, training and education. Information on employment laws is sourced from the ministries or the departments of agriculture or fisheries, labour or other agencies and is usually not specific to aquaculture.

All country development plans focus on small-scale aquaculture for subsistence fish production and food security, whereas large-scale aquaculture emphasizes investment as a driver for rural economic development, with little to no attention given to youth employment creation. Governments are now making serious efforts to attract foreign direct investment (FDI) to supplement domestic capital for commercial aquaculture development. However, a document to guide employment of expatriate workers who typically accompany FDI is currently not available. Though the countries in the study lack a common set of regulations governing recruitment and employment practices in aquaculture, some key laws and decrees are in place that regulate the employment of individuals in the sector. All countries, however, have ratified and adopted ILO instruments, either in their entirety or modified. Modified laws by the various countries include conventions on employment.

3.1.1 Basic conditions of employment

Countries have established a system of laws intended to enhance the recruitment, employment and protection of workers' interests and assure a minimum standard of living for the population at large (Table 3). In addition to some basic civil rights protections, the system encompasses three bodies of law: (i) employment laws that govern the individual employment contract; (ii) collective or industrial relations laws that regulate the bargaining, adoption and enforcement of collective agreements, the organization of trade unions, and the industrial action by workers and employers; and (iii) social security laws that govern the social response to needs and conditions that have a significant impact on the quality of life, such as old age, disability, death, sickness and unemployment (Djankov and Ramalho, 2009). The question is, will these laws improve the governance of employment in the aquaculture industry in the countries selected for the study?

In Egypt, the employment law is primarily governed by Egyptian Labour Law No. 12 of 2003 (Labour Law). The Labour Law governs nearly all employment relationships in the country, where the employer is an Egyptian person or entity, including both Egyptian and foreign employers. Employment relationships are also governed by the Egyptian Civil Code for matters not regulated by the Labour Law. The employment relationship is further governed by Egyptian Social Insurance Law No. 79 of 1975. The enforcement of the employment law depends on the enjoyment and acceptability of the legislation by the employee (Gammal, 2016). If employees enjoy any preferable conditions established by employers, these will prevail over the Labour Law's provisions. The Egyptian Union of Fishermen Cooperatives (EUFC), which falls under the Agency for the Protection and Development of Lakes and Fish Resources, is usually owned and operated by the government. The EUFC includes aquaculture activities in its policies to align with the fishermen benefits from the Cooperative Insurance Fund. The government has tried to improve the shortcomings of the working conditions in aquaculture; however, the process of recruitment and employment is under the auspices of numerous ministries. Although the new employment law protects part-time or casual employees working in aquaculture, they are not covered by social insurance because they do not have work contracts with the owners of fish farms.

In Ghana, fisheries and aquaculture are expected to contribute to the Ghana Poverty Reduction Strategy (PRSP) II. The Republic of Ghana Fisheries and Aquaculture Policy (the Policy) provides the government's framework for the fisheries contribution to the PRSP II objectives, which emphasize rural and youth employment. The ratification and incorporation of the International Labour Protocols into Ghana's legal framework cut across all sectors, including the aquaculture sector, and are absorbed within the Ghana Labour Act 651 (2019). However, at the aquaculture farm level, most of the employment is done on a contractual basis and subject to renewal.

Like Ghana, Kenya has ratified the ILO labour regulations and includes them within the legislative frameworks governing fisheries and are applied to aquaculture. The Employment Act, 2007 requires every employer to ensure that men and women are paid equally for work of equal value and makes it an offence for anyone who engages in wage discrimination. The survey results revealed that all workers had equal job opportunities and equal pay for employees doing the same jobs.

In Malawi, the Constitution includes provisions such as the right to work in Section 29, the freedom of association in Section 32, and the right to safe and fair labour practices in Section 31. All persons have a right to join trade unions and to receive fair wages and equal remuneration for work of equal value. Safe and fair labour practices are also provided for under the Labour Relations Act (Cap. 54:01). This Act regulates trade unions, collective bargaining, strikes, lockouts and industrial disputes. In addition, Article 24 of the Universal Declaration likewise advocates that "everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay". Furthermore, fair and equal remuneration for jobs of equal value and protection of children from economic exploitation are protected in the Employment Act (Cap. 55:01), which stipulates the illegality of forced labour and discrimination while also stipulating equal pay, remedies for infringement of fundamental rights, employment of young persons, labour contracts, hours of work, weekly rest and leave, wages, discipline and dismissal. The private sector is required to observe these laws in their employment practices.

In Nigeria, although legislation specific to aquaculture employment is absent, there are general laws on employment, minimum wage, and health and pension schemes for workers. Under Section 40 of Nigeria's Constitution, all persons have the right to freely associate with others and form or belong to any trade union.

To create a conducive and enabling environment for the fisheries and aquaculture sector and achieve equitable, social and economic development in Africa, the African Union – Interafrican Bureau for Animal Resources (AU-IBAR) and its partners developed the Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa and a guide for the implementation of the framework (AUC-NEPAD, 2014).

In Rwanda, Labour Law of 2001 (MIFOTRA, 2012) sets industry-specific minimum wages in the small formal sector. The minimum guaranteed wage for different categories of work is determined by an order of the Minister for Labour. However, consultations with relevant social actors (employers and employees) are necessary before issuance of an order. The salary applicable to each professional category is determined under a collective labour convention.

As in Nigeria and Rwanda, Senegal has no formal legal framework specifically tailored for fisheries and aquaculture employment. Employment guidelines with legal and regulatory provisions for the sector are lacking. Although the sector is currently controlled by the Ministry of Fisheries and Maritime Economy, employment conditions depend on the laws and regulations from the Ministry of Agriculture and Rural Equipment and the Ministry of Labour, Social Dialogue, Professional Organizations and Relations with Institutions. The roles and responsibilities of the enterprises studied are well defined for each farm; however, there is no formal consultation body in charge of formulating and implementing decisions, as well as ensuring their control. The conditions of recruitment and work do not comply with the provisions of the ILO Labour Code, except for the working hours at the SIA and the Cabane Penchée farms. However, the wages distributed to workers are higher than the country's minimum wage (*Salaire Minimum au Sénégal*).

In 1996, the Government of South Africa announced its macroeconomic policy called "Growth, Employment and Redistribution" (GEAR). GEAR has multiple policy objectives, as well as strategies, to achieve projections and employment targets. Some of the more important of these policies and Acts include the extension of labour laws

to an increased number of employees, the extension of bargaining council agreements to nonparties, the Basic Conditions of Employment Act and the Employment Equity Act (Barker, 1999).

South Africa's Labour Relations Act No. 66 of 1995 (as amended) gives the right to unionize, regulates the organizational rights of trade unions, promotes and facilitates collective bargaining at the workplace and the sectoral level, regulates the right to strike and the recourse to lockout in conformity with the Constitution, and promotes employee participation in decision-making through the establishment of workplace forums. The current regulatory policy in South Africa mandates an eight-hour workday and a 40hour work week, with extra hours payable as overtime; the policy remains one of the prime products of the labour movement campaigns. South Africa has measures to ensure worker health on abalone and trout farms, including training and annual medical examinations (Cavalli *et al*., 2019).

In Uganda, employment contracts are regulated by four statutes: the Minimum Wages Advisory Boards and Wages Councils Act; the Employment Decree; the Trades Disputes (Arbitration and Settlement) Act, to some extent; and Uganda's Constitution and in various labour laws and subsidiary legislations. The right to unionize and collectively bargain is primarily limited by the lack of support from key players in both the private and public sectors (Businge, 2019). The Basic Conditions of Employment Act stipulates maximum working hours, overtime and work on Sundays and public holidays, and provides for daily wage payments applicable to certain classes of employees. The Act also regulates the sectoral determinations currently in force and strengthens collective bargaining in respect of the sectors regulated by those determinations.

TABLE 3
Ratification of the International Labour Organization (ILO) policies, presence or absence of employment contract laws, and enforcements related to aquaculture

Country	Ratification of ILO laws	Employment contract	Insurance and working conditions	Collective bargaining laws	Social security and health	Trade union laws	Industrial actions	Foreign employment
Egypt	✓	Not regulated	✓					✓
Ghana	✓	✓						
Kenya	✓	✓						
Malawi	✓	✓		Regulated		✓	✓	
Nigeria	✓	General laws of employment			Health and pension scheme			
Rwanda	✓	✓						
Senegal	✓							
South Africa	✓	✓	✓	✓		✓		
Uganda	✓	✓		✓		✓		
Zambia	✓	✓						✓

Note: ✓ = adopted or included in the regulations.

In Zambia, Employment Code Act No. 3 of 2019 regulates the employment of persons; prohibits job discrimination; establishes the Skills and Labour Advisory Committees, which provide regulations concerning the engagement of persons in contracts and their functions, the form and enforcement of the contracts; provides for employment entitlements and other benefits; the protection of wages of employees; the registration of employment agencies; regulates the employment of children and young persons; provides for the welfare of employees at the workplace; and provides for workplace employment policies, procedures and codes. According to the provisions of the Employment of Young Persons and Children Act of Chapter 268

of the Employment Act, no person shall, except under conditions to be prescribed, employ, or cause to be employed, any person under the age of 15 years. Any person who contravenes with the provisions of this subsection shall be guilty of an offence. The Act provides for improved conditions of service, reflecting a shift from the previous years, which provided more favourable conditions of employment, not for all the categories of the workers, including provisions for the employment of expatriate workers (Masengu, 2019).

Zambia's Constitution includes the right to form or belong to a trade union under Article 21(1). The country's national values and principles are also advocated in Article 8 of the Constitution. Among them are "human dignity, equity, social justice, equality and non-discrimination". These national values apply to the interpretation of the Constitution and the enactment and interpretation of the law. Collective bargaining laws, industrial actions and trade unions are also generally governed by the Industrial and Labour Relations Act, Chapter 269 of the Laws of Zambia. Moreover, social security payments and pensions are governed by the National Pension Scheme Authority Act, Chapter 256 of the Laws of Zambia. There is also a national health insurance scheme, to which all employers in all industries are required to contribute under the National Health Insurance Act No. 2 of 2018, unless specifically exempted by the Minister of Health.

3.1.2 Disability

Inequality in employment is one of the main obstacles to social and economic development for persons with disabilities in Africa. The premise starts with the basic presupposition that the lack of institutional capacities for implementing disability policies is the primary obstacle that hinders widespread delivery of social services to persons with disabilities in low-income countries (Yokoyama, 2012). Despite the inclusion of aspects of laws to protect the disabled in most African countries, Rwanda is currently the only country that has taken steps to ensure their employment in aquaculture. The number of individuals employed is unknown.

3.1.3 Unemployment Insurance Act

In sub-Saharan Africa, only an estimated 5–10 percent of the working population has some social security coverage. Some middle-income African countries have achieved some 20 percent to 60 percent coverage through targeted initiatives for the aged, minors under the age of 16, and the disabled. The scarcity of documented publications on unemployment insurance in Africa is convincing enough to assume that there is a serious scarcity of such policies in Africa. Other than South Africa, there is no African country with universal unemployment insurance (Molefe, 2011). The Government of South Africa established the Unemployment Insurance Fund (UIF) in accordance with the Unemployment Insurance Act (No. 108), of 1996. The UIF offers protection to working-age South Africans in circumstances of unemployment and illness and covers maternity and adoption leave. The UIF is administered by the Department of Labour, which is responsible for managing the fund and administering payments directly to the accounts of eligible claimants. South Africa's UIF is a mandatory and contributory scheme for all workers in the formal and informal sectors, including domestic workers who work more than 24 hours per month.

The Unemployment Insurance Act of South Africa (as amended by the Unemployment Insurance Amendment Act, No. 32 of 2003) was promulgated to establish the UIF. The UIF provides payments from the Fund for unemployment benefits to eligible employees, as well as for illness, maternity, adoption and dependent benefits related to the unemployment of these employees. It also provides for the establishment of the Unemployment Insurance Board and presents the functions of the Board and the designation of an Unemployment Insurance Commissioner.

3.1.4 Occupational health and safety

Aquaculture workers in Africa are at increased risk of developing occupational diseases and injuries attributed to various occupational hazards; generally, the risks are under-reported (Ngajilo and Jeebhay, 2019). The development of clinical occupational health services infrastructure and support structures remains a critical component in the implementation of basic occupational health services in Africa. In Egypt, the EUFC established the Cooperative Insurance Fund, which incorporates aquaculture workers. The Fund states that, in the event of disability resulting from an accident during work, it will pay a compensation equivalent to the percentage of the disability to the amount of compensation due upon death, which is determined by a decision of the competent medical authority designated by the Fund's Management Committee. In Malawi, the Occupational Safety, Health and Welfare Act (Cap. 55:07) regulates the conditions of employment in workplaces regarding the safety, health and welfare of persons employed therein. The Workers' Compensation Act (Cap. 55:03) makes provision for compensation for injuries suffered or diseases contracted by workers in the course of their employment or for death resulting from such injuries or diseases. In Nigeria, none of the farms surveyed have committed to the Employees' Compensation Act, which is an insurance coverage for workers in case of death, disability or injury while on duty. In South Africa, the governance and leadership for occupational safety and health are shared mainly by government departments: the Ministries of Health, Labour and Natural Resources (Moyo *et al*., 2015).

The various governments have established specific statutes to assist those who might be injured on the job or when operating equipment. The Acts provide for the safety and health of persons at work and in connection with the use of plant and machinery. These Acts can generally be described as proactive attempts by the governments to prevent and avoid work-related injuries and illness.

3.1.5 Pension schemes

The case studies reveal that only 60 percent of countries have some sort of pension scheme (Table 5). Almost all countries, except for Senegal and Uganda, have pension schemes for managers, administrative support and technicians employed in aquaculture. Uganda provides some form of gratuity, but not for labourers (Table 5). In Egypt, the number of employees with access to pensions ranges between 20 percent and 25 percent. Most of the allocated funds, however, are used for social protection projects, which suffer from severe deficits in terms of equity, efficiency and financial sustainability (Loewe, 2014). In Malawi, the Pensions Act, 2003 regulates mandatory pensions and matters relating to the supervision and regulation of pension funds and umbrella funds. The Malawian National Fisheries and Aquaculture Policy (2016) includes the promotion of decent employment in smallscale fisheries and aquaculture as one of the priority areas. However, no specific legislation has been developed for the governance of the aquaculture sector in terms of employment. In South Africa, farms contribute to their employees' pension plans or provident funds, with the large majority directed to provident funds that are managed by the government. The employers run the pension plans. Contributions to pension and provident funds ranged from 7 percent to 8.4 percent of employees' salaries. In addition, all farms contribute to life, and funeral, death, and disability payments.

3.1.6 Property rights

Property rights specify types of ownership; entrepreneurship involves identification of opportunities for employment creation. Property rights are central to development efforts and affect productivity through various channels, namely: (i) the likelihood of owners making land-attached investments; (ii) the scope for transferring land to more productive users and taking up their future non-agricultural employment; (iii) the

access to land tenure by young Africans, especially women, to engage in aquaculture significantly determines their future livelihoods and their ability to create future employment; and (iv) the ability to use land as collateral for credit. Weak property rights with lack of mechanisms for enforcement and lack of transparency in the rule of law and governance increase the risks of large-scale, land-related investment for local land users and the attraction of foreign direct investment and the creation of employment. Secure property rights are necessary for effective labour market functioning (Deininger, Xia and Savastano, 2015).

Land in many African countries today falls under different systems of property ownership, including customary land tenure; individual ownership; communal ownership; and waterways, pasture areas, unallocated vacant family land and permanently acquired areas for residential and industrial purposes. For example, estimates of the type of ownership present in specific sub-Saharan African countries range from an estimated 3 percent freehold in Mozambique and Zambia to 44 percent freehold in Namibia and 72 percent freehold in South Africa, with the remainder of land held under customary or state ownership. Institutional governance influences investments and the types of enterprises that are organized, which in turn affects the nature of enterprise governance. Several African governments claim ownership of land, with customary use rights recognized only when land is not sought by other more powerful interests. Governments can also expropriate land for public purposes with minimal compensation given for standing crops or for the value of buildings (Toulmin, 2009).

In Egypt, laws and regulations protect the right to property, but they also enable the government, under specific circumstances, to appropriate private property. In all the case study countries, only Ghana and Rwanda have freehold rights to land for aquaculture (exclusive and freely transferable private property rights guaranteed by the state) (Table 4). Regarding women's land rights, in most African countries, such as Egypt, legislative enforcement of land rights is ineffective since customs and traditions prevent women from claiming their rights to land, especially in the case of inheritance (Khodary, 2022). In Egypt, there is leasing of land, and in Zambia there are statutory rights in which land is held for 99 years. In Egypt, land rights are renewable every 5 years, Ghana every 50 to 90 years, Kenya 30 years, Rwanda 99 years, South Africa 10 years, and Zambia 99 years (Table 4).

In Ghana, about 80 percent of the land is in private hands, principally through the trusteeship of customary chiefs, who are charged with managing the lands for the benefit of their people; the remaining land is owned by the state. In most of the farms, the owners are members of the Ghana Aquaculture Association, a producer association that seeks to address all issues related to aquaculture in Ghana. Farm owners have not been able to address aquaculture employment issues apart from occasionally sharing their skilled labour temporarily with other farms. Most of the farms interviewed reported that they did not have any problems with the community and that the communities were welcoming. Survey data revealed that 70 percent of the land rights were customary before the company's occupation of the land, 20 percent were not, and 10 percent did not respond to the question. Regarding the duration of tenancy land use rights, 70 percent of the farms asserted that the duration of use rights was indefinite or forever. The owners of the farms also reported not experiencing any problems or conflicts with the surrounding community over land issues since starting their operations.

According to Kenyan property rights, most of the leases given are long-term (a riparian land lease in Kenya lasts about 99 years), with the company having water rights. Almost all the countries selected for the study have similar land rights in which the use of the land and its elements within a certain depth belong to the lessor. As Woodhouse and Ganho (2011) stated, designation of exclusive rights to use land provides prior rights to "green" water (rainfall and plant transpiration) on the land. The water is treated as a separate commodity or resource in several countries.

TABLE 4
Property rights and community problems

Country/ rights	Egypt	Ghana	Kenya	Malawi	Nigeria	Rwanda	Senegal	South Africa	Uganda	Zambia
Freehold rights	Leasing	✓	1 no; 3 yes		State grants rights to users and local community	✓		Mussel farms		Statutory rights of 99 years
Use rights	Leasing	✓	✓		Not more than 5 000 ha	✓		Trout farms; no mussel farms; land use rights for 10 years; one month to month		
Customary	Leasing	✓	✓			✓				
Time use rights	5 years	50–90 years	30 years			15/rights waved after 3 years if project has not started				
Water rights use	Land leased	✓				✓				None
Time water rights use	5 years	50 years				15 years renewable				Permits
Problems with community		No	No		80% no problems	No		No		
Producer association		No	✓		✓	✓	Affiliation	Belong to their species association		If the individual does not belong to to ADAZ
Association/ interaction		No	No		✓	✓	Co-operatives			

Note: ADAZ = Aquaculture Development Association of Zambia.

The complexity of the right to property increases when the right to private property contradicts the collective interests of the fisheries and the fish farmers' community. In Nigeria, the Land Use Act 1978 vested the powers for the administration of land in the state governors whose jurisdiction is limited to urban areas, which must be designated and backed by law. Rural land falls under the jurisdiction of local government authorities.

In Malawi, all the farms studied, except MALDECO and Nzeru za Abambo, reported belonging to one producer association or another. The farms Aglupenu, Hangere, Viphya and Chambo indicated that they are members of the Innovative Fish Farmers Network Trust and pay an annual subscription of MK 25 000 (equivalent to USD 24.36).

In South Africa, the protection of private property rights is enshrined in its Constitution, but most of the land (about 85 percent) is still in the hands of large commercial farmers. Mussel and oyster farms in South Africa do not have freehold rights to land, but they all have legal land use rights. Some farms have land use rights for ten years, while one of the farms has a lease that runs on a month-to-month basis. All oyster and mussel farms have 15-year renewable water and farming rights.

In Zambia, the Lands Act No. 29 of 1995 stipulates that the custodianship of statutory land is perpetually vested in the president on behalf of the people of Zambia. Following prescribed procedure in the law, the president has the authority to allocate land to citizens and non-citizens (Avadi *et al.*, 2022). Zambia's land tenure and administration, as in many other African countries, operate on a dual land tenure

system: customary and state land. Larger fish farms in Zambia adhere to the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (Avadi *et al.*, 2022). All larger-scale farms included indicated that they acquired their land through appropriate channels, either by purchasing the land and obtaining a title deed or by following customary norms and practices. Smallholder farmers culture fish in earthen ponds constructed on customary lands, which they primarily obtain through traditional ownership through inheritance. Most aquaculture farms hold rights to the land on which their farms are located; that is, the lands are purchased, given to them on lease for some specified period, often 5 to 50 years or more. The ruling or court's decision on water rights is ill-defined in Zambia, where local authorities issue permits to would-be users. Fish farmers extract water from perennial streams or by tapping groundwater by digging their ponds in wetland areas.

It is generally believed, however, that customary land tenure systems or traditional landholding institutions do not provide enough security and certain access to land, which is a disincentive for investing in land (Abdulai, 2006) and, therefore, a hindrance to employment creation. However, the flexibility displayed in many countries and their willingness to modify conditions to attract investments enhance the security of user rights. In Ghana, the legal framework for property rights provides security for aquaculture producers, and this ensures that business risks can be assessed rationally and that the government's arbitrary and holding decisions are minimized. It also provides security and ensures a supply of good quality water; the management and enforcement of land and water rights are clearly stipulated and understood by everyone concerned (Hishamunda *et al.*, 2014).

3.1.6.1 Water use and permits in aquaculture

There has been a global reform of water laws in African countries. Water laws have been revised in Burkina Faso, Ghana, Kenya, Mozambique, South Africa, Swaziland, Uganda, the United Republic of Tanzania and Zambia. These changes have fostered new systems in which almost all the nations' waters are declared as public waters under the ownership or trusteeship of the state. Citizens can access these public waters lawfully only after obtaining an administrative permit (or water rights, licences or concessions – all refer to essentially the same legal tool and are distributed with the payment of a fee; all are called "permits" in this paper) or by being exempted from such obligation.

Egypt depends on the Nile River for more than 90 percent of its water supply. Irrigated agriculture is by far the largest consumer of water (almost 90 percent) in Egypt, and extension of agricultural areas puts increasing demands on already scarce water resources (Wahaab and Badawy, 2004). The country receives about 94 percent of its freshwater from the Nile; the other water source is groundwater. The Ministry of Water Resources and Irrigation is responsible for water resources planning and management. The distribution of water is uneven and depends on where farmers are located along the Nile, with farmers who are upstream benefiting the most from water use. It was revealed that all the farms participating in the study obtain water permits to avoid huge penalties imposed by the Ministry of Water Resources and Irrigation. Almost all the countries selected for the study have similar land and groundwater rights in which the use of the land and its elements within a certain depth belong to the lessor. Water legislation has denied aquaculture the right to use freshwater and has placed strict conditions on discharged effluent. The right to private property also enables fish farmers to invest more in their farms, thereby improving their facilities, community life, local markets and commercial ventures.

Water rights in Ghana, Kenya, Rwanda, Senegal and Uganda are overridden by customary water rights or are balanced with other laws evolving from reasonable or equitable use of water resources among communities through which a river or stream

flows. In Nigeria, water use rights are under review by the National Assembly; the brief on the bill was drafted by the Nigeria Integrated Water Resources Management Commission. In South Africa, the 1998 National Water Act stipulates that water allocation is to be governed through the issue of water use permits to individual water users. However, in certain areas (usually the former Bantustan territories reserved for African settlement), the requirement for individual water licences has been waived in favour of small-scale water use. Zambia follows a common law property rights system. Common law is mostly applicable in urban centres, whereas customary law is more applicable in rural areas. The dual application of the laws makes the translation of water rights at the grassroots level an interesting case to explore (Chileshe, Trottier and Wilson, 2005).

3.1.6.2 Land rent and lease

Land rental markets are more prevalent in African countries with strong inheritance customs than in markets for land sales where permission for sale is impeded by tradition. Land rental is based on the type of land ownership. Land rental markets have been shown to be pro-poor in the sense that they help to improve access to land for land-poor households and provide income-earning opportunities for landed households with limited non-land resources, such as agricultural labour and farm management knowledge. Land rental markets assist in household labour employment through access to aquaculture enterprises that are family owned. Land rental markets generally improve land use efficiency and equity (Holden and Otsuka, 2014). In Egypt, land leases and rents are done through a public auction for a period of five years through a public tender, where the lease value is determined based on capacity of production, location and availability of service where other government bodies have significant impact on the Egyptian aquaculture industry policy. In Ghana, most land rent or leases are for a specific length of time. In Nigeria, lease procedures are not specified in specific documents, but are usually within a minimum number of years, e.g. five to seven years to enable the lessor to recoup investments. Agreements are written to ensure that each party is of good behaviour and keeps to their own part of the deal. For common waterbodies – such as Lake Kivu, on the border between the Democratic Republic of the Congo and Rwanda, and Lake Volta, Ghana – the government should provide an enabling environment for the sites leased in terms of amenities and security. Site leases in Ghana are usually short-term and are characterized by high lease costs and the need to renew leases to generate significant resources for governments/communities and encourage producers to comply with labour and environmental regulations. The Government of Kenya's National Land Policy (2007) takes a decidedly positive stance toward land leasing, stating that it has "the potential to provide access to land to those who are productive but own little or no land. An increasing proportion of farmers are participating in land rental markets".

3.1.7 Licensing

The regulation of the aquaculture sector is through an aquaculture licence, permits and the consenting process. Many countries require licences or permits before starting an aquaculture enterprise. Starting and operating aquaculture farms in Africa potentially requires a range of authorizations and permits. In Ghana, Nigeria and South Africa, the most important of these is conducting an environmental impact assessment for clearing lands in designated areas to produce fish. In South Africa, any enterprise wishing to produce more than 20 tonnes of fish products per year must obtain a licence for the use of water, as well as an alien and invasive species permit for the production and use of exotic fish. In Egypt, the licence for water use must indicate the quantity of water permitted for water use (fresh and brackish water), its source, inlet size and the method of drainage, including the conditions in Egypt. In Malawi, Senegal, Uganda and

Zambia, there are currently no licences issued for aquaculture businesses to operate fish farms, but licences and permits are required for genetic material transfer agreements. All countries in the study, however, need to comply with the FAO Code of Conduct for Responsible Fisheries and the African Union Policy Framework and Reform Strategy for Fisheries and Aquaculture. In summary, the licensing requirements for operating fish farms, hatcheries or aquaculture businesses are not clearly defined and lack transparency.

3.1.8 Property rights conflicts and conflict resolution

In Egypt, laws and regulations protect the right to property, but they also enable governments, under specific circumstances, to appropriate private property for large-scale investment projects. The complexity of the right to property increases when the right to private property contradicts the collective interests of the fisheries and fish farmers' community. Cage culture is rapidly expanding and, to date, Musinguzi *et al*. (2019) identified 263 installations with 20 000 cages on 18 waterbodies in Ghana, Kenya, Malawi, Rwanda, Uganda and the United Republic of Tanzania. Cage aquaculture can lead to conflicts with other uses, such as fishing, recreation, transport and conservation. In Malawi, Njaya (2016) identified conflicts between investors (cage owners) and small-scale fishers who operate their gear close to where cages are installed. Bueno *et al*. (2013) stated that zoning could allow the exclusion of areas that overlap with protected areas. In most countries, the solution to conflicts is usually designated at the community level by the central government unless a project is of monetary significance, which is then handled by the central government. With the expansion of cage aquaculture, however, a platform for international conflict resolution is needed.

4. Aquaculture employment governance

The access to and distribution of the benefits from aquaculture are typically mediated through a variety of institutions, both public and private. These negotiated gains emerge from the continuous interactions between individuals and groups within a given ecological, economic, social and cultural context. The role of the state remains prominent in aquaculture governance, and greater private sector involvement is also evident (FAO, 2017b; Hishamunda *et al*., 2014; Béné *et al*., 2016), especially in the formation of marine protected areas and the development of "rights-based approaches" (Allison, 2011). Countries have been promoting aquaculture as a means of providing rural employment, particularly for women and youth. Women and youth participation in aquaculture has been promoted through increased education. The percentage of women graduates in aquaculture has increased considerably over the past four decades, from zero or low numbers in the 1970s to recent rates of around 30–60 percent; the rates vary both by country and within countries (Williams *et al*., 2012). Laws permitting the access of land and the provision of soft loans to women and youth farmers have increased in many African countries, such as Egypt, Ghana and South Africa. The growth of aquaculture employment has been trending upwards in rural areas in Africa, and therefore, it is imperative to ascertain whether there is an existing set of laws that govern aquaculture employment and whether workers employed in those industries receive the desired treatment to encourage them to participate in the industry's growth. The type of governance, especially in aquaculture employment and productivity enhancement, is essential to business performance.

4.1 AQUACULTURE GOVERNANCE AND LABOUR EMPLOYMENT

Aquaculture governance involves how authorities efficiently organize and allocate resource use and stakeholders' participation in making and implementing decisions affecting the sector. The process involves accountability of government personnel to the aquaculture community and other stakeholders. It also includes the application of laws in the management and enforcement of good aquaculture practices to ensure that aquaculture prospers (Bush *et al.,* 2019; FAO, 2017b; Hishamunda *et al*., 2014). Effective governance of employment in aquaculture is indispensable for its sustained growth. The achievement of its potential involves optimizing the utilization of inputs necessary to improve the production of aquatic products, taking into consideration competing uses to which those inputs might be put by society (Hishamunda *et al*., 2014). FAO (2017) identified the principal issues confronting aquaculture governance. Such principles are only achievable with good employment governance in aquaculture. However, information pertaining to aquaculture governance in many African countries, such as Kenya, remains largely anecdotal. That is, governance based on qualitative or anecdotal evidence cannot be accurately measured or ranked.

All countries participating in this study incorporate elements of aquaculture employment governance into their labour laws, which are under the direction of one or several ministries. Each country has ratified and adopted in some form the ILO labour instruments (certification of unions, labour-management relations, collective bargaining and unfair labour practices) and workplace health, safety and employment standards (general holidays, annual vacations, working hours, unjust dismissals, minimum wage, layoff procedures and severance pay, Table 5). Special social issues

TABLE 5
Additional benefits other than salaries offered by employers to employees

Country/benefits	Egypt	Ghana	Kenya	Malawi	Nigeria	Rwanda	Senegal	South Africa	Uganda	Zambia
Pension		✓	✓	One firm		75/15		50/50		50/50
Manager		✓	✓	Contribution	✓			Provident	Gratuity	✓
Supervisor		✓	✓	Contribution	✓			Provident	Gratuity	✓
Administrative support		✓	✓	Contribution	✓			Provident	Gratuity	✓
Technicians		✓	✓	Contribution	✓			Provident	Gratuity	✓
Labourers		✓	NSSF	Contribution	✓			Provident		✓
Health		NHIS		✓				✓		✓
Insurance				✓				✓		
Annual leave								✓		✓
Sick leave								✓		✓
Maternity		✓						✓		✓
Nursing break										✓
Other benefits										✓
Accommodation		Some		✓	✓	✓				✓
Transport		✓	✓	Errands	✓	✓				✓
Training (job)			✓	✓	✓	✓		✓	✓	
Career development			✓	✓		✓		✓	✓	
Discount		✓		✓						
Bonus pay		✓	✓	✓						

Note: NHIS = National Health Insurance Scheme; NSSF = National Social Security Fund.

affecting women, child labourers and migrants, the focus of which is welfare and protection of these groups, are yet to be categorized and treated as a full component of aquaculture governance (Hishamunda *et al.* (2014). Companies regularly comply with government labour laws, but there are no set of guidelines particularly tailored to what is necessary for aquaculture employment governance, including transparency, accountability, predictability and equity.

4.2 GENERAL AQUACULTURE GOVERNANCE PRACTICED BY SELECTED COUNTRIES

The type of governance existing in the selected countries can be divided into public and private, which vary by country, with hierarchical governance predominating at the public level. Public governance involves the administration of public programmes within the operation of the organization of public agencies, programmes and activities managed to achieve public purposes. The management of the programmes falls within the fields of politics, policy implementation, public administration and management. Public governance consists of formal and informal rules, procedures, practices and interactions within the state and between the state, non-state institutions and citizens. Private governance, sometimes referred to as corporate social responsibility, is the mode of governance existing in the private sector and is dominated by participatory decision-making. The term "private governance" describes the various forms of private enforcement, self-governance, self-regulation and informal mechanisms that private individuals, companies and clubs, as opposed to government, use to create order, facilitate exchange and protect property rights.

Four out of the ten countries, Egypt, Rwanda, Senegal and Uganda, have hierarchical types of governance, while three, Ghana, Malawi and Uganda, have participatory types. (For the definitions of the different types of governance, see (Table 6). Kenya classified its type of governance as anecdotal and Nigeria as collective. Some countries exhibited multiple combinations of governance; for example, Egypt

TABLE 6
Definitions of types of governance

Types of governance	Definition
Hierarchical	Hierarchical governance is the direct application of state authority to target populations. It is often referred to as top-down governance.
Market	Governance through market mechanisms where demand and supply determine price.
Collective action	The collaboration of multiple, similar organizations or government agencies collaborating to manage a public service of regulatory function.
Collaborative	Collaborative governance involves the government, community and private sectors communicating with each other and working together to achieve more than any one sector could achieve on its own.
Command and control	Command and control is a legislative approach. Rules and legislation are imposed by governments and are often backed up by the threat of coercion, fines or state penalties.
Participatory	Participatory governance is an approach that encourages collaboration and partnerships among all parties in the community: local governments, community organizations, businesses and civil society groups. Such partnerships facilitate collective decision-making, resource sharing and implementation of collaborative activities.
Decentralized	Shifting responsibilities to regional and district entities of agencies.
Cooperative	Cooperative governance is the act of steering cooperatively owned enterprises toward economic, social and cultural success.
Anecdotal	The use of anecdotes in administering or making policy decisions.

exhibits hierarchical and command and control, Senegal is hierarchical, South Africa is decentralized and collective, and Zambia is participatory, market-driven and collective (Table 7). In general, with hierarchical governance, there is little, if any, consultation with stakeholders. Another type of governance is "market governance," in which market forces and supply and demand determine prices and quantities, and the "laissez-faire" policy is known for its almost complete absence of governance. The various types of governance for each country are described below:

- In Egypt, hierarchical governance is akin to "government," a command-and-control type of governance that can enforce unpopular measures. Participatory governance is increasingly explored in aquaculture. The Ministry of Agriculture and Land Reclamation develops overall policies for aquaculture and land reclamation in accordance with the national development plans. The General Authority for Fish Resources Development, a subsidiary of the Ministry of Agriculture and Land Reclamation, is the agency responsible for all planning and control of activities related to fish production.
- In Ghana, participatory governance is practised, although aquaculture authorities place great emphasis on production methods, environment, biosafety and security, provision of feed and seed, fish diseases and their control, species cultured, discharge of waste, etc., to the detriment of concerns about employment and maintenance of workers on fish farms.
- Aquaculture governance in Kenya has not yet been established. It requires setting up and implementing policies, strategies and plans, laws and regulations, and administrative and institutional arrangements to lead the development and growth of the sector. Given the predominance of the private sector, it is assumed that Kenya will follow the private sector-led type of governance.
- In Malawi, the participatory model is the norm, and the Department of Fisheries has the responsibility for administering, coordinating and regulating the aquaculture sector. It also has the authority to develop and enforce governance frameworks and regulations concerning aquaculture in the country. While the Department of Fisheries is responsible for policy formulation, development and implementation of public policies, the government has put in place regulatory mechanisms that operate to secure all stakeholders, including the needs of fish farmers.

TABLE 7
Types of public and private governance in the aquaculture sector in selected African countries

Governance model	Hierarchical	Participatory	Market	Collective action	Others
Country/sector					
Public companies					
Egypt	Hierarchical				
Ghana		Participatory			
Kenya					Unknown (anecdotal)
Malawi		Participatory			
Nigeria				Collective	
Rwanda	Hierarchical				
Senegal	Hierarchical				Decentralized
South Africa					Decentralized Cooperative
Uganda	Hierarchical				
Zambia		Participatory	Market	Collective	
Private companies					
Egypt					
Ghana	Hierarchical	Participatory			
Kenya		Participatory			
Malawi	Hierarchical	Participatory	Market		
Nigeria	Hierarchical	Participatory	Market		
Rwanda		Participatory			
Senegal		Participatory			Cooperative
South Africa		Participatory			
Uganda		Participatory		Collective	
Zambia		Participatory	Market		

- The Nigerian model is collective. The Government of Nigeria provides an enabling environment across the geopolitical zones for conducting aquaculture business to provide the nutritional needs of over 200 million Nigerians in line with the Sustainable Development Goals. The governance of aquaculture in Nigeria promotes fair employment in the country. The process of constituting good governance of aquaculture employment is facilitated by producer associations, non-governmental associations and farmers in collaboration with government agencies during stakeholder meetings, seminars, conferences and workshops.
- The Rwandan model is hierarchical, as the government recognizes that productive employment and decent work cannot be achieved through fragmented and isolated interventions, calling for sustained, determined and concerted efforts by all stakeholders, from the government, the private sector and civil society, among others. The goal will be achieved through strong coordination and cooperation across government institutions and agencies at both central and local levels. A paradigm shift is necessary where employment is integrated into all policy frameworks, including macroeconomic and sectoral policies emanating from the top down.
- Senegal displays elements of both hierarchical and decentralized forms of governance, where the National Aquaculture Agency, or *Agence National d'Aquaculture* (ANA), is the first public service created to promote the development of aquaculture in the country. Its mission, which was conceptualized

as a top-down administrative programme, is to contribute to the development of aquaculture. As part of the implementation of the aquaculture policy, ANA has now been decentralized to permit the inclusion and supervision of stakeholders and the exploitation of aquaculture resource potential with the establishment of four production sites and three regional offices.

- The governance framework in South Africa is cooperative and decentralized, but also mature in that it ensures public-private participation and legal and regulatory reviews to ensure the implementation of important amendments to national and provincial policy. Provinces have their own legislature, and as with national policy programmes, decisions are taken by consensus. The legislature functions autonomously and cooperatively within the framework provided by the Constitution. Provincial legislation allows for the documentation of provincial laws which must align with the Constitution. According to the Constitution, provinces may have legislative and executive powers, concurrent with the national sphere, over sectors such as aquaculture.
- Aquaculture governance in Uganda is hierarchical and is primarily based on the Fish Act (2000) and the Fish Rules (Aquaculture) of 2003. The management of the subsector is principally guided by Uganda Vision 2040, which seeks to transform Uganda from a subsistence economy to a healthy, industrious and prosperous middle-income status population by 2040. Employment in aquaculture at the Ugandan state level is hierarchical, with workers under directorates divided into departments, divisions and units.
- The Zambian state model is participatory, collective and market driven, and places emphasis on greater individual and collective participation by segments of organizations of actors along the aquaculture value chain who have been commonly excluded from decision-making. This model emphasizes that the private sector can provide better services than the traditional public sector in market response. Others have defined this as immanent aquaculture development (Belton and Little, 2011). This model has seen the establishment of 66 fish hatcheries across the country, with several fish farms being established through private sector participation. It establishes the importance of creating private sector employment.

4.2.2 Private sector governance

The types of private sector governance taken by the different firms are noted below. The firms pursued a wide range of governance types (Table 7):

- Ghana: hierarchical, participatory;
- Nigeria: hierarchical and participatory types of governance, market;
- Kenya: participatory, workers engaged in decision-making;
- Malawi: hierarchical, participatory, market, workers engaged in decision-making;
- Rwanda: participatory;
- Senegal: participatory, cooperative, market, workers engaged in decision-making;
- South Africa: participatory;
- Uganda: participatory, market, collective; and
- Zambia: participatory, market.

The survey revealed that the aquaculture sector (public, private, small, medium or larger farms) depends on various legislation, laws and institutional frameworks, but there is no specific recognizable policy that directly supports aquaculture employment governance. In Ghana, Kenya, Malawi, Nigeria and Senegal, workers participated in decision-making at one time or another. In Malawi, participatory governance in aquaculture involved industry self-regulation using codes of conduct, co-management of the sector with industry representatives, and government regulations of community

partnerships. For instance, MALDECO fisheries, although hierarchical, is led by the general manager as the overall boss, with the farm manager taking care of the day-to-day operations of the farm. The employer noted that employees participate in decision-making through monthly and quarterly meetings held at the company, which indicates a participatory form of governance. Aglupenu, a fish hatchery, uses a combination of three types of governance: (i) the manager makes most of the decisions; (ii) the manager allows employees to participate in some of the decisions; and (iii) both parties make decisions. At Hangere and Viphya farms, the employers have both the hierarchical and the market model.

In Nigeria, all the farms surveyed indicated that they operated under the hierarchical governance model of employment, with some other forms of governance. About 20 percent of farms practised under a hierarchical model only; 70 percent practised under a combination of the hierarchical and participatory models; and 10 percent practised under a mix of hierarchical, market and participatory models.

In Rwanda, the farms surveyed are governed through a participatory-cooperative style of governance. The employees are satisfied with the hierarchical relationship since their inputs in decision-making are channelled through the administrative structure as friendly exchanges. The companies' management is also satisfied with the relationship and support from government institutions, especially the support received during the process of applying for fishing concessions used for cage farming. Management consults with government officials whenever bottlenecks occur and seeks guidance from specialized government institutions, including the Rwanda Agriculture and Animal Resources Development Board technical officers, who are responsible for aquaculture and fisheries.

In Senegal, an informal framework exists for consultation about production activities, and employees participate in decision-making. Final decisions, however, are taken by managers. It is important to note, however, the existence of a regional association of actors in the aquaculture sector of Saint Louis, which is affiliated with the national association of aquaculture stakeholders. It is only within this single framework that workers' representatives and employers consult with each other.

In South Africa, the type of governance is participatory. Except for trout farms, all other farms have a corporate structure governed by shareholders and a board of directors. The small-scale mussel farm shareholders work full time on farms, and as a result, they make decisions about farm operations and future directions on a day-to-day basis. The abalone and oyster farms, however, have a typical corporate structure where shareholders elect a board of directors, led by a chairman, which is responsible for the mission and vision statements and the medium- and long-term objectives of the farms. The board of directors appoints senior management – the chief executive officer (CEO), the chief financial officer and the chief operations officer – to oversee operations.

In Uganda, the structure is participatory, or team based, on nearly all farm-level enterprises and most of the aquaculture supply chain enterprises, such as feed and seed producers and suppliers. The survey found that workers were grouped into function or specialty-based teams, such as fish feeders, gear maintenance, fish stocking and harvesting, and fish processing and marketing teams, with a lean administration and financial management unit. For non-technical and administrative staff, workers were grouped into function-based teams, albeit with some skill level and experience to work on specific tasks involved in raising and marketing of the farmed fish.

In Zambia, the market-driven commercial aquaculture development model is prevalent, which has been built on a foundation of aquaculture infrastructure and industrialized production units through interventionist programmes (investments by government in human and institutional capacity, such as research stations and public fish hatcheries). This model emphasizes that the private sector can provide better services than the traditional public sector in response to the market.

4.2.3 Business types and structures

The types of businesses ranged from group businesses to joint venture capital and investment cooperation (see the definitions in Table 8). All countries have investments with capital originating from within, and six countries have foreign direct investments (Table 8).

TABLE 8
Types of business, ownership and levels of sales for selected firms in the study

Country	Sales (USD)		Ownership		Type of business	Dominant species
	Domestic	Exports	National	Foreign		
Egypt	2 614 484		✓	✓	Group,[1] investment cooperation	Nile tilapia, shrimp, mullets
Ghana	31 080 000		✓	✓	Group, investment cooperation, partnership[2]	*Oreochromis* sp., *Clarias* sp.
Kenya	23 000 000		✓	✓	Joint venture,[3] investment cooperation	*Oreochromis* sp.
Malawi	1 432 907		✓	✓	Group	*Oreochromis* sp.
Nigeria	1 555 229		✓	✓	Group	Catfish, *Clarias* sp.
Rwanda	5 950 000		✓	✓	Investment cooperation	*Oreochromis* sp.
Senegal	216 666		✓	✓	Group	Oysters
South Africa	2 770 000	23 800 000	✓	✓	Group	Mussels, abalone, oysters
Uganda	29 090 600	11 528 000	✓	✓		*Oreochromis* sp., *Clarias* sp.
Zambia	4 641 994	32 943	✓	✓		*Clarias* sp.

[1] A group is a mixture of business forms, which is a collection of individuals engaged in business either formally or informally operating, but without any legal document of incorporation or partnerships.

[2] A partnership is similar to a joint venture, but all partners agree to share risks, profits or losses, and the liabilities are unlimited.

[3] A joint venture is a business arrangement in which two or more parties enter a contractual agreement to pool their resources together to engage in fish production, processing or marketing.

Of the types of businesses, Kenya is the only country that has joint venture capital businesses, while Egypt and Ghana have a mix, comprised of group businesses and investment cooperation; Rwanda has investment cooperation only. The other countries have a mixture of business types, including group businesses (collections of individuals engaged in business), but without any legal document of incorporation and partnerships. Uganda and Zambia have all forms of business agreements. Egypt and South Africa are the only countries having businesses financed by domestic capital only, while Nigeria has investors with foreign direct investments, though these businesses were not participants in the survey. Three countries are involved in exporting food fish – Uganda, South Africa and Nigeria – the latter of which has attempted to ship ornamental fish to neighbouring African countries, but the quantity or value is unknown. The dominant food fish species produced for export is *Oreochromis* sp.

4.2.4 Recruitment

Highly qualified and engaged personnel contribute to high performance in the aquaculture sector. Recruitment and selection of personnel within public and private institutions form an integral part of success and performance of employees. This implies that an organization that recruits people who are qualified, skilled and with required competencies will contribute to its performance (Manyange, 2017). The investigation by Lio and Liu (2008) on the effects of good governance on labour productivity suggested that workers in a country with good governance have higher productivity.

As stated, all countries have similar employment labour laws (based on ILO instruments), although many of them organize and work with the private sector

and non-governmental organizations differently. The public sector in the selected countries permits certain freedom of employment practices within the private sector's jurisdiction. There is, hence, a diversity of recruitment practices existing in the various countries (Table 9).

Egypt: Approved jobs are obtained through recommendations from family and friends. The minimum wage is offered.

Ghana: In most cases, approved jobs in the aquaculture sector are advertised. Job announcements are mostly made by word of mouth, then through advertisement, followed by the process of headhunting. The details and the role of the employee within the organization are listed in the approved job description; shortlisted applicants are invited for an interview and assessment.

Kenya: Based on the interview with one of the managers, it is evident that the staff are hired on their abilities, education, dedication, hard work and loyalty; most of the staff, especially those at the lower level, are from the local community. One of the principal questions regards wages.

Malawi: If a farm vacancy occurs, an applicant will be hired if the person meets the requirements of the position. The employment hiring process includes a discussion of daily working hours, which, in most cases, is 8 hours a day for permanent employees. No advertisement is made in the press or at labour offices because the hiring numbers are small and labour is readily available in the surrounding communities. Once applicants are chosen for an interview based on the strengths on their resumes and qualifications, the conditions of service are discussed and listed.

Nigeria: Because of large-scale unemployment, workers at various companies spread the word about open vacancies. During the hiring process, the hours of work are discussed, which, in most cases, is 8 hours a day for permanent employees. No advertisement is made in the press or at labour offices because the hiring numbers are small and labour is readily available in the surrounding communities.

Rwanda: CVs are sent to the human resources centre. Wages offered are comparable to other jobs requiring the same education, skills and experience.

Senegal: CVs are sent to the human resources centre. In most cases, it is an 8-hour workday for most permanent employees, who are paid a wage at or above the minimum wage.

South Africa: CVs are sent to the human resources centre. Employment is based on qualifications.

Uganda: Companies use headhunting firms to select potential employees. Employees are offered the minimum wage.

Zambia: Relevant legal instruments exist that guide the employment of workers and consequent conditions of service. Employment Code Act, No. 3 of 2019 provides for improved conditions of service, reflecting a shift from the previous regime, which provided more favourable conditions of employment but not for all categories of workers (Masengu, 2019).

TABLE 9
Employment recruitment practices and other related information in aquaculture in selected African countries

Country	Head-hunting	Advertising	Word of mouth	Wages offer	Conditions of service	Women	Knowledge of employment regulations	Employment contracts
Egypt				Minimum	NI	NI	NI	NI
Ghana	✓	✓	✓	Minimum	Good	Encouraged	NI	✓
Kenya	NI	✓	NI	Comparable	Good	NI	NI	NI
Malawi	NI	NI	✓	Minimum	Good	Encouraged	Good	
Nigeria	NI	NI	✓	Above minimum	Average	Encouraged	Poor	✓
Rwanda	CV forward to HRC	NI	NI	Comparable		NI	NI	✓
Senegal	CV forward to HRC	NI	✓	Above minimum		Encouraged	Good	None
South Africa	CV forward to HRC	✓	✓	Comparable to others	Good	Based on qualification	NI	✓
Uganda	✓	NI	NI	Above comparable jobs	Excellent	Willingness to employ	Good	✓
Zambia	✓	✓	NI	Comparable to those in livestock	Good	Willingness to employ	Good	NI

Notes: CV = curriculum vitae; HRC = human resources centre; NI = no information.

4.2.5 Community and producer associations

All the surveyed farms work with local associations and cooperatives linked to aquaculture in their local areas. Farms in Kenya, Nigeria and Rwanda belong to producer associations, whereas the farms in Senegal have some association with producer groups. In South Africa, the farmers belong to producer groups based on the species (Table 4). Cooperation often includes technical support and market accessibility, including upfront input provision in outgrower schemes. If the state is unable to provide the resources or technical information, partnering with a private company is an option. Such public-private partnerships are a new means of developing the value chain through contract farming and aquaculture production. In Zambia, none of the farms that participated in the study belong to any producer association. However, all the farms belong to the Aquaculture Development Association of Zambia, which represents the interests of various stakeholders across the aquaculture value chain in the country. Aquaculture, whether parastatal or private, can also provide the capital and resources needed (MFL, 2020), but no formal contracts have been signed between the companies and those involved in the outgrower schemes.

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Aquaculture stakeholders from various African countries, Regional Organizations and financial institutions, discuss matters related to Governance of the sector in Sub-Saharan Africa.

©DFFE, South Africa

Abalone Farm in the Western Cape, South Africa.

5. Profile, career mobility and gender balance

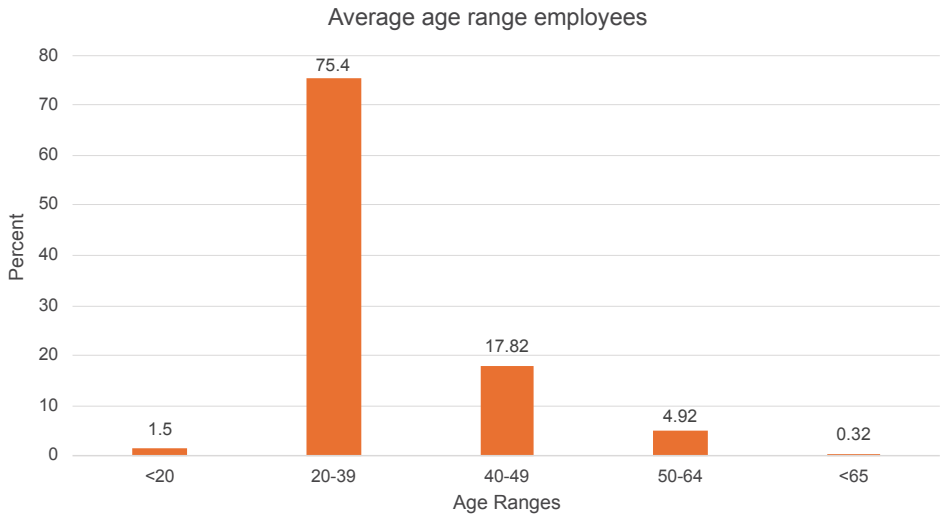
The definition of a young person for employment purposes is based on age. However, there is no universally accepted definition of "youth". International and regional statistical estimates apply an age definition of 15 to 24.4 years old for youth; however, raising the upper age limit is gaining momentum to reflect increasing educational attainment and the postponement of labour market entry beyond the age of 24 years. In practice, many employment policies directed at youth normally extend policies to 29 years of age. The African Union defines youth as those between the ages of 15 and 35 years old; if the upper boundary is extended to 39 years, youth employment in Figure 1 would comprise approximately 77 percent, more than twothirds of the subSaharan Africa region's working age population. The youth labour force approximates the total labour force and, therefore, youth employment issues might be better understood as employment issues (Betcherman and Khan, 2015). It has been noted that in sub-Saharan Africa youth (15 to 35 years old) are generally not interested in farming because of the arduous nature of farming in the region and the significant amount of time it takes before earning any income. One proposal to attract youth to agriculture is to encourage their participation in aquaculture enterprises. Even though the work may be strenuous, if not more than agriculture, the revenue and profits are attractive and accrue at an earlier time and at a faster rate than most livestock and agricultural enterprises (Ansah, 2018; Betcherman and Khan, 2015).

5.1 AGE PROFILE OF EMPLOYEES

The age profile in Figure 1 shows that the aquaculture labour force comprises predominantly youth individuals, with 75.4 percent workers aged between 20 and 39 years. Moreover, only 1.5 percent are younger than 20 years, 17.82 percent are

FIGURE 1

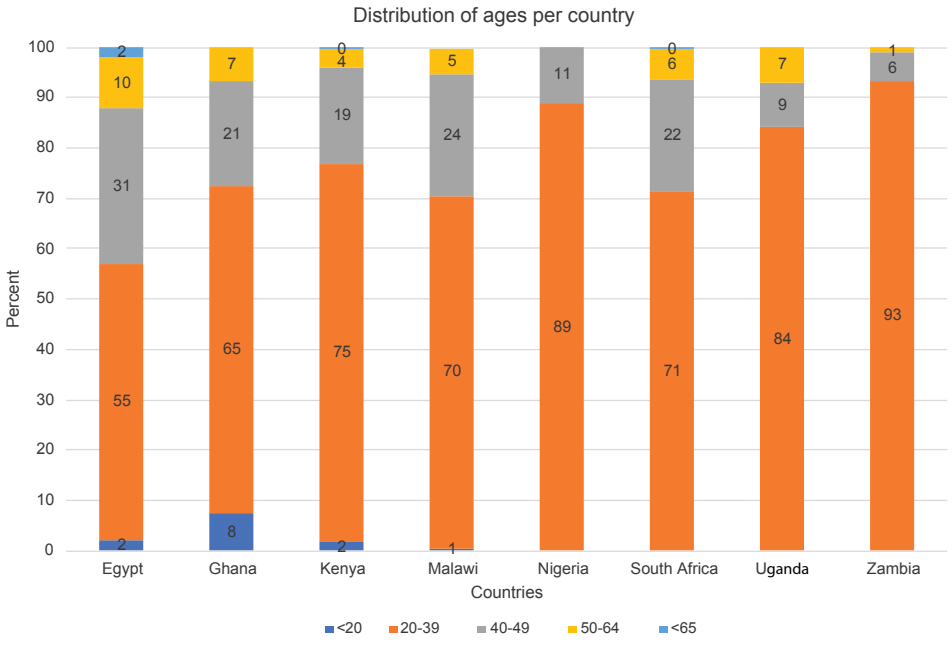
Average age of aquaculture employees in ten selected African countries, September 2022. Countries are Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia



between 40 and 49 years of age, 4.92 percent are between 50 and 64 years of age, and 0.32 percent are older than 65 years. These results correspond with the data presented by Hishamunda *et al.* (2014), which suggests that threequarters of the working population are still within their economic active age and might be willing to pursue some aquaculture activity. Studies conducted in Nigeria found that most of the workers were between 21 and 39 years of age (Omeje *et al.*, 2021; Akarue and Aregbor, 2015; Ifejika *et al.*, 2015). In Malawi, workers are invited to purchase shares in the company, which will greatly encourage youth participation in aquaculture.

All participating country data revealed that a significant number of young people are seeking employment in aquaculture. According to Figure 2, Egypt is the only country with less than 60 percent of individuals between the ages of 20 and 39 years. Ghana has 65 percent of its workforce between the ages of 20 and 39 years, while Kenya, Malawi and South Africa are in the 70–75 percent range and Nigeria, Uganda and Zambia are all above 80 percent.

FIGURE 2
Age and employment profile in eight selected African countries, September 2022



5.2 AGE PROFILE BY COUNTRY

In Egypt, the general population has the following age structure: 0–14 years of age, 33.6 percent (55 percent boys, 45 percent girls); 15–24 years of age, 18 percent (52 percent young men, 48 percent young women); and 25–54 years of age, 37.8 percent (51 percent men, 49 percent women). The labour employment in the aquaculture industry study revealed that employees ranged in age: 2 percent are younger than 20 years old, 55 percent are between the ages of 20 and 39 years, 31 percent are between 40 and 49 years, 10 percent are between 50 and 64 years, and 2 percent are older than 65 years. Egypt has 55 percent of employees between the ages of 20 and 39 years compared to Ghana with 65 percent, Nigeria 89 percent, Kenya 75 percent, South Africa 71 percent, Uganda 84 percent and Zambia 93 percent (Figure 2). All these countries, however, have similar age pyramids. The age structure of Ghanian employees on all farms indicates that the majority (65 percent) are between the ages of 20 and 39 years (Table 10). The percentages of the other age groups are: 7.55 percent for ages under 20 years, 20.74 percent between 40 and 49 years, and 6.60 percent between 50 and 64 years.

TABLE 10
Employment distribution by age of permanent aquaculture employees, September 2022

Age range	<20 y	20–39 y	40–49 y	50–64 y	>65 y	Full time	Part time
Country	%	%	%	%	%	Number	Number
Egypt	2.0	55.00	31.00	10.00	2.00	537	326
Ghana	7.55	65.00	20.74	6.60		951	220
Kenya	1.67	75.20	19.17	3.54	0.42	NR	NR
Malawi	0.56	70.02	24.10	5.05	0	NR	NR
Nigeria	0	88.89	11.11	0	0	NR	54
South Africa	0.20	71.40	22.12	6.17	0.10	NR	NR
Uganda	0	84.35	8.68	6.94	0	NR	NR
Zambia	0	93.30	5.6	1.10	0	NR	NR
Average	1.50	75.4	17.82	4.92	0.32	NR	NR

Note: NR = not reported.

In Kenya, employment among youth is a major problem for policymakers. The Government of Kenya Report (2010), in its Agricultural Sector Development Strategy 2010–2020, has indicated that youth will be informed about and encouraged to pursue lucrative ventures in the agricultural sector and processing plants across all levels of the value chain, particularly in processing and other value-added activities. The Youth Enterprise Development Fund, Constituency Development Fund, and the Innovation Fund for Agriculture and Agribusiness should provide the means and motivation for youth to engage in farming (Mandania, 2012). This study also revealed that most of the employees in Malawi are similar to those in Kenya, indicating the availability of youth for rural employment in aquaculture, which will also reduce the levels of youth rural-urban migration in the country.

Nigeria has the second highest (88.8 percent) percentage of workers in the 20 to 39 age range; this figure is similar in both the north and south zones. In the north, however, there is a much higher proportion of men younger than 20 years old working on aquaculture farms. In the north, 100 percent of women aquaculture workers are in the 20–39-year age group, whereas the south has 78 percent of women workers in this age group.

In Rwanda, Frefish Ltd employs 41 permanent workers who are between the ages of 20 and 39 years (26 men and 15 women). The Finefish Ltd Company employs 120 full-time staff on its two farms, which are located on Lake Kivu and Lake Muhazi. The company has 120 employees, of which 119 are between the ages of 20 and 49 years and 1 who is 50 years old. Kivu Tilapia Ltd has 60 permanent employees whose age ranges between 20 and 64 years of age; 14 employees are women.

In South Africa, most employees (71.40 percent) in the aquaculture sector are between the ages of 20 and 39 years of age. This information has been confirmed by AgriSETA (2020/21) and by the data from this study. In Uganda, most of the workers are young (under 40 years old) and are men. Table 10 shows that 84.35 percent of workers are between the ages of 20 and 39 years, with no workers younger than 20 years. There are more men than women in each of the age categories; a higher percentage of women are in the age group between 20 and 39 years. In Zambia, the data revealed that aquaculture absorbs young people in large numbers, with 93.3 percent of employees in the age range of 20–39 years. This implies that, with training, young employees will provide many years of employment for the industry.

Aquaculture contributes significantly to youth employment. Only a handful of the workers are under 20 and over 50 years of age. Ragasa *et al.* (2020) found that youth represented 14 percent and 24 percent of owners and managers, respectively, but contributed 68 percent of the family labour on farms.

In Egypt, the study revealed that 33 percent of children (55 percent boys, 45 percent girls) under the age of 15 years worked in aquaculture farms and enterprises. In Ghana, where child labour laws have been less enforced (Ellenbogen, 2003), no incidences of child labour use in aquaculture were reported. Notably, a Danish-owned aquaculture company operating in Ghana abides by Danish standards and prohibits child and forced labour and violations of human rights (Mathew, 2010). In Malawi, Section 23 of the Malawian Constitution of 1999 provides for the protection of children under the age of 16 years old from economic exploitation and work that is likely to be hazardous, interfere with education or be harmful to their health, physical, mental and spiritual or social development. However, the farms in Malawi permit children to work in aquaculture farms to earn money to pay for their education.

Zass and Sons farm, in northeast Nigeria, stated that it had employed some high school students who work a few hours after school as casual workers and received payment to support their education. In Senegal, children under the age of 15 years old – the legal minimum age for fishing – comprise onethird of the labour force in capture fisheries. Fishers reportedly like to employ children because of their lower wages. There was no mention of employment of child labour in South Africa, Uganda and Zambia.

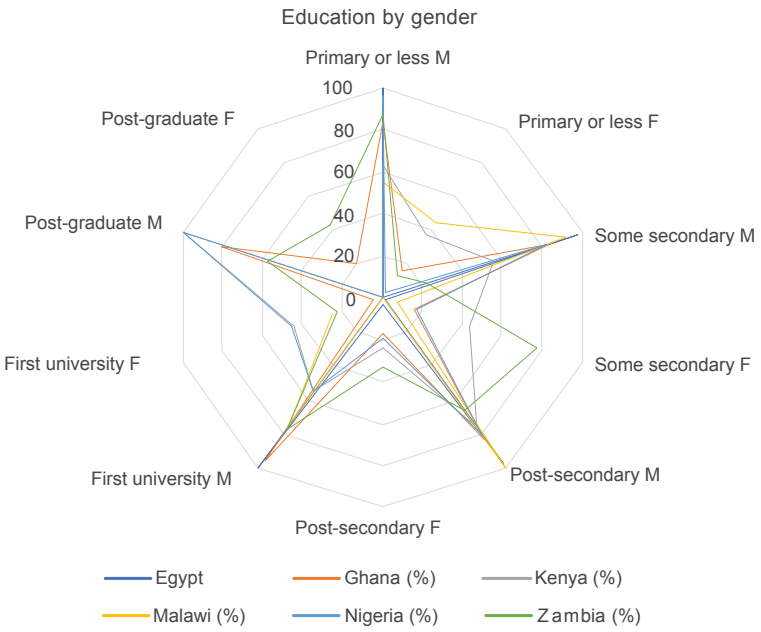
5.3 EDUCATION AND TRAINING

Although there are initiatives directed at accessing, documenting and publishing training needs, the present scale of knowledge, management and governance in African countries are grossly inadequate for the development of the aquaculture sector (Obiero *et al.*, 2016). For example, cage farming operations in Lake Victoria require a wide range of technical skills, ranging from seed-hatchery production and management to fish feed and feeding, as well as harvesting technology and related operation techniques. Hence, it is important for countries to organize innovative educational programmes to create or enhance knowledge and skills, which are key components of good governance (Menezes *et al.*, 2022).

Commercial aquaculture requires highly trained individuals in the biological sciences as well as training in economics, accounting, management and the social sciences. These skills can be acquired if individuals have a solid high school level education. In all countries studied, other than Senegal, most employees had completed high school or had some high school level education. Table 11 shows that the percentage of men who had completed or received some secondary training ranged from 97.82 percent in Egypt to 82.14 percent in Nigeria; for women, the percentages ranged from 77.8 percent in Zambia to 2.18 percent in Egypt. The number of women attending or completing secondary school was generally low throughout the survey (except in Kenya and Zambia), which may slow down their progress in acquiring marketable skills after employment. The lack of marketable skills among youth is widely recognized as a major barrier to youth employment in Africa today. According to the World Bank Enterprise Survey, 18.2 percent of enterprises in the region identify an inadequately educated workforce as a major constraint to achieving high work performance (World Bank, 2016). The literacy rate among youth (ages 15–24 years) in sub-Saharan Africa was 65.8 percent and 76.3 percent in 2010 for women and men, respectively, compared to global literacy rates of 88.5 percent and 92.5 percent (World Bank, 2015). Young women attain less education on average than young men, which puts them at a further disadvantage (Chakravarty, Das and Vaillant, 2017).

Figure 3 shows that men dominate almost all categories of education, except in Zambia where 77.8 percent of women have some secondary education. In the case of post-secondary education level, all countries, except Kenya (76.19 percent) and Zambia (67.7 percent), have a percentage above 80 percent for men. In South Africa, which is not listed in Table 11, women dominate in postsecondary education. In a

FIGURE 3
Education levels by gender and country



study by Omeje *et al.* (2021), the findings indicated that men (49.64 percent), women (44.21 percent) and youth (67.99 percent) in Nigeria had post-secondary educational qualification. High literacy levels of personnel in fish farming have been established to enhance the management of fish farms through the adoption of improved farm practices (Ogunmefun and Achike, 2017). A study in Lake Victoria, Kenya, showed that 78 percent of the women interviewed had a primary education, while only 4 percent of them had postsecondary levels of education and were the only cage owners.

5.4 COUNTRY PROFILE IN EDUCATION

In Egypt, the majority of farm owners and labourers received on-the-job training or had prior experience operating the farms. Workers were men and literate, as only 5.2 percent of them could not read or write. About 21.08 percent had some primary schooling, 41.92 percent had secondary or post education, and 31.05 percent had a first university degree. 0nly 14 women (1.6 percent) had schooling. Farmer training conducted in Egypt and Ghana has improved technology adoption and productivity among small-scale farmers (Dickson *et al.*, 2016).

In Ghana, not all farms were able or willing to provide data on the educational levels of their employees, but the study found that men (84.2 percent) received more secondary school training than women, at 16.7 percent; 95.5 percent of men and 4.5 percent of women had university training (Table 11). The distribution of educational qualifications of those seeking employment is much different from that of existing Ghana farmers. Asmah (2008) found that about 8 percent of fish farmers had no formal education, and 44 percent had only attained a basic level education (a primary to middle-school education, obtaining a certificate). Around 12 percent had attained a secondary level education, while 12.3 percent and 10.4 percent had post-secondary qualifications and university degree education, respectively. There was a general increase in people of all educational backgrounds going into fish farming.

In Kenya, a good percentage of employees received some schooling, either attended some secondary school or received a high school diploma. Table 11 shows that

there is greater balance between men's and women's educational attainment, where 56.01 percent of men employees and 43.99 percent of women employees had high school diplomas or received some high school training. Furthermore, 55.56 percent of men and 44.44 percent of women had first university degrees. The high percentage of individuals with a secondary level of education are those involved in daily farm activities, such as fish breeding, fry production, feeding, and handling and transfer of fish to markets. Although many of the workers in Kenya are employed as unskilled labour, most of those involved in cage farming have a primary, secondary and college level education.

In Malawi, a majority of men (55.6 percent) had a primary education or less in comparison to women (44.4 percent) (Table 11). About 91.86 percent of men had some secondary education compared to 8.13 percent of women. In Malawi, men employees were better educated than women employees, but less educated than the men employees in Egypt. Beyond basic high school education, practical aquaculture training curricula at universities and technical colleges would produce professionals with hands-on experience.

In Malawi, MALDECO establishes aquaculture community associations and free on-the-job training to farmers. At Hangere farm, employees are given on-the-job training, but they are not provided with any subsidies to further their education. The only short courses that employees can attend are the ones organized by some partners, such as GIZ or the Department of Fisheries. Aglupenu farm provides on-the-job training but does not provide subsidies to employees to further their education.

In Nigeria, workers in aquaculture had some high school attendance or completed high school; a few had postgraduate training and two men had advanced university degrees. Men dominated at all educational levels. Table 11 demonstrates that there is a higher percentage of women with university degrees than women with lower educational qualifications. This is to be expected, as many women in aquaculture work as administrative staff and accountants; to qualify for employment, they need to have a diploma or university degree as per the employer's entry standards. On the other hand, men working as labourers tend to have some years of high school or completed high school compared to women.

TABLE 11
Levels of education by gender for aquaculture for selected African countries, September 2022

Level of schooling	Primary or less		Some secondary		Post-secondary		First university		Postgraduate	
Country	*M*	*W*	*M*	*W*	*M*	*W*	*M*	*W*	*M*	*W*
Egypt	100	0	97.82	2.18	97.82	2.82	100	0	0	0
Number interviewed	184		366		275		3		0	
Ghana (%)	84.2	15.8	84.2	16.7	83.3	16.7	95.5	4.5	80.0	20.0
Number interviewed	17		531		18		66		5	
Kenya (%)	63.345	36.66	56.01	43.99	76.19	23.81	55.56	44.44	100	0
Number interviewed	131		316		21		9		3	
Malawi (%)	55.6	44.4	91.86	8.13	100	0	75.0	25.0		
Number interviewed	27		84		8		20		2	
Nigeria (%)	96.88	3.12	82.14	17.86	80.56	19.44	54.84	45.16	100	0
Number interviewed	32		84		36		62		2	
Zambia (%)	87.5	12.5	22.2	77.8	66.7	33.3	77.8	22.2	57.1	42.9
Number interviewed	16		27		30		9		7	

Notes: M = men; W = women.

Most of the fish farmers in Nigeria are in Kwara and Osun States (Adefalu *et al*., 2013; Ogunlade, 2007). Dauda and Dasuki (2015) showed that a high proportion of respondents (31.4 percent) had postgraduate qualifications, while the majority (74.3 percent) had post-secondary education, which facilitated the acquisition of new skills. Umunna *et al*. (2019) stated that the most important training needs of farmers in aquaculture in Niger State was in value addition, such as smoking technology, improved packaging and labelling technology, improved short duration storage technology, catching and gutting fish, and improved washing and sorting techniques.

In Rwanda, Frefish Ltd employs 41 permanent staff, of which 26 are men and 15 are women: three have a university degree (two men and one woman); four have university degrees; four have some years of high school; and 30 have primary education completed or less. After recruitment, candidates receive paid job training at the company for three to six months with support from the Ministry of Education under the Rwanda TVET Board (TVET refers to Technical and Vocational Education and Training) skills development fund, sponsored by the World Bank. Each class has 20 to 30 trainees; at the completion of the training, 70 percent of trainees are given permanent staff positions, of which 30 percent must be women. The Finefish Ltd company employs 120 full-time staff on its two farms, located on Lake Kivu and Lake Muhazi: 114 employees have completed primary education or less, of which 12 are women; six including one woman completed the first university degree. Kivu Tilapia Ltd has 60 permanent employees, of which 14 are women. The education records of the employees show that one employee has an advanced university degree; ten have first university degree; four have post-high school or diploma; two have some high school or high school completed; and 43 have completed primary education. Rwandan farms have a higher percentage of women with a high-school education than employees in Senegalese farms.

In Senegal, the four farms studied had a total of 21 employees, five of whom had engineering or university degrees (one-third of the jobs recorded on all four farms), with only one being a woman. There were five technicians and 11 general workers. The number of employees were also much less than in Rwanda.

In South Africa, 5 percent of employees on the six farms had a primary school education or less. However, most employees had some years of high school education or had completed high school (77 percent), while 3 percent had obtained a first university degree (bachelor's degree). A small percentage (2 percent) had advanced university degrees (honours or a master's degree). Interestingly, 40 percent of all woman employees had a post-high school education, while only 8 percent of men had a post-high school education.

In Uganda, all staff had some level of education, from primary to post-secondary levels. In all enterprises, the top managers were university graduates in different fields, including information technology, environmental studies, human resources, engineering, and fisheries and aquaculture. In all surveyed enterprises, most workers on the hatcheries and production system, including feeders, had mid-level post-secondary training in aquaculture. The fish handlers and security guards had the least training, from primary to ordinary secondary level education.

In Zambia, most of the workers on the farms (33.7 percent) were those with diplomas or certificates, followed by those with a secondary education level, at 30 percent. Those who just had some primary education accounted for only 18 percent. The lowest percentage found at the farms was 7.9 percent, which referred to a Master of Science degree. At every level of education category, women were fewer than men (Table 11).

The study also revealed that women received less education than men in all areas (Figure 3).

The aquaculture sector needs education and training of all forms to promote aquaculture development in Africa. Countries should quantify and prioritize the levels and specialties required to improve levels of expertise, competency and skills of the different actors in the aquaculture sector (Menezes *et al.*, 2022).

5.5 JOB CLASSIFICATIONS

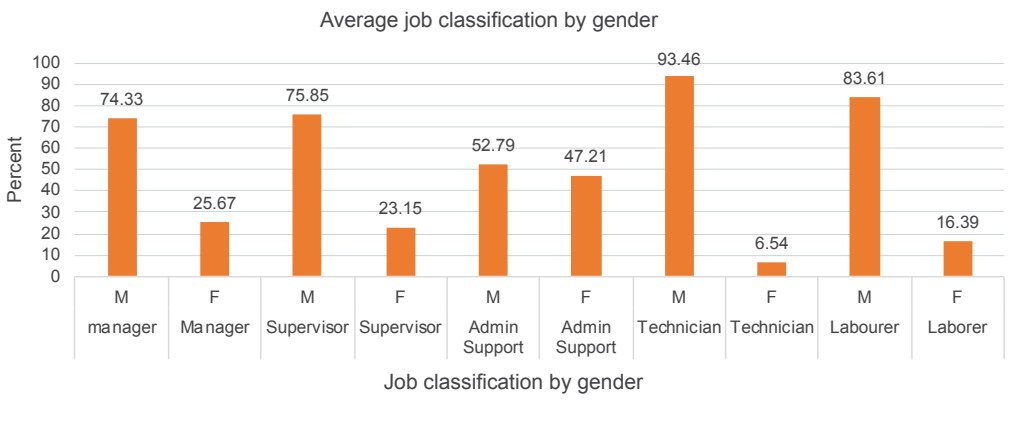
Most countries classified jobs into four categories: managers, supervisors, technicians and labourers. In Ghana and Rwanda, however, the classification is more elaborate. The CEO and managers occupy the highest positions, while supervisors are mainly in line positions. The numbers in each category depend on the size of the farm, number of species and complexity of the operation. However, almost all farms adopted the same structure for operation. For operational purposes, jobs are classified as permanent, temporary, annual, seasonal or casual. This classification also describes the role of the individual within the industry.

Ratios of the various classifications are meaningless because the number of managers to the number of workers depends on the species, production intensity, efficiency, the risks associated with the production of the species, level of capital investments and social sustainability. Figure 4 shows that men dominate all classes of employees, with women's participation being less for administrative support than for management, supervisory and technical jobs. Women tend to have lower status jobs and often suffer pay inequalities for the same work, e.g. in salmon processing in Chile (Ramirez and Ruben, 2015). In developing and developed countries, women are the bulk of workers in post-harvest, product transformation activities (FAO, 2017b).

In a study in the early days of the salmon industry in Central Chiloé in Chile, women were given lowerlevel jobs, but their willingness to work and knowledge of the industry assisted them in surpassing the men in newly developed service jobs in the aquaculture industry. Because of cultural norms, women were traditionally placed in lower levels jobs, but with changing education levels, women were able to access higher paying service jobs at higher levels than men (Rajaratnam and MacDougall, 2016). In addition, 40 percent of all jobs in aquaculture and services went to women. The data revealed that a high percentage of women in Central Chiloé worked outside the home and were employed in the aquaculture industry and services sector (81 percent) (Ramirez and Ruben, 2015).

FIGURE 4

Average age of aquaculture employees in ten selected African countries, September 2022. Countries are Egypt, Ghana, Kenya, Malawi, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia



In Egypt, aquaculture employs over 580 000 people (Shaalan *et al.*, 2018), although this figure may be overestimated (FAO, 2018). Apart from direct permanent jobs, other employment opportunities include seasonal workers during harvesting and other periods of intensive activity, as well as indirect employment in the fish trade, transport, processing, retailing, and boat and net manufacturing sectors (FAO, 2009).

In comparison to Egypt, Ghanaian aquaculture workers are classified based on gender (men or women), national or expatriates, or types of contracts (permanent, contractual, seasonal or casual). Out of the 1 300 workers employed, only 22.2 percent were women. The jobs were classed as managers, foremen or supervisors, technician feeders, cook, weavers, security, drivers or labourers.

In Kenya, jobs are classified according to function as in Ghana, but in this study the workers are classified as managers, supervisors, administrative support staff, technicians and general labourers. Information from the three enterprises studied showed that of the 318 employees, five were managers, five were supervisors, eight were administrative support staff, and 300 (90.6 percent) were classified as general labourers. In Farm A (Victory Fish Farm), 80 percent of the labourers were full-time employees. Farm B (Jewlet Fish Farm) had 95 percent of labourers employed full time and an additional 5 percent when harvesting fish from cages or collecting eggs from the brooders held in the earthen ponds.

The classification in Malawi differed from that of Ghana and Kenya. The study showed that workers were classified into nationals and expatriates. There were 184 full-time nationals, of which women made up 18.8 percent of the full-time positions and 12.13 percent of the 99 part-time employees. There were only three men expatriate managers. Employees were also classed as permanent, contractual, seasonal or casual. Of the 184 employees, there were 12 national managers and 3 expatriate managers, of which three were women nationals.

In Nigeria, the number of labourers predominated more than any other job position, which is to be expected due to the lack of automation, which requires an increased number of personnel to conduct routine farm activities. Such tasks include fish breeding in hatcheries, feed production, manual grading of fish, stocking of ponds, feeding, preparing and maintaining ponds, pumping water and control of water flow in and out of the ponds, and harvesting and processing of fish. Managers, supervisors and administrative support staff constituted 9.2 percent, 8.25 percent and 11.86 percent, respectively, of the total employees. Administration and labourers made up 13.63 percent and 56.94 percent of all employees, respectively. Administration offered a programme for graduates under the age of 30, who would be trained on the job to manage the technical work.

Rwanda classified functions and employer needs. The first company employed a managing director, secretaries, accounting clerk, labourers, and marketing and sales staff. In another company, there was an office manager, personal assistant, logistics, storekeeper, hatchery manager, and eight permanent staff supported by casual workers. A farm manager with a team managed all farm operations, including stocking cages, feeding, security and harvesting, and several workers took part in marketing and sales.

In South Africa, employees with first university degrees and advanced university degrees typically occupied managerial, research and administrative posts, while supervisors and technicians typically had some years of post-high school education or a college diploma. Most of the general labourers had some years of high school or completed high school. While most employees held full-time positions, two of the farms also employed part-time or seasonal general labour for an average of three months of the year during the peak harvesting season. About 74 percent of the managers were men, 55 percent of the supervisors were men and 67 percent of the support staff were women. All the technicians were men, and 62 percent of the labour force were men. The Employment Act in South Africa provides an institutional framework to devise and

implement national, sector and workplace strategies to develop and improve the skills of the workforce. It also integrates those strategies within the National Qualifications Framework contemplated in the Qualifications Authority Act.

In Uganda, most of the workers were on contract and full time, with 20–30 percent of the personnel regarded as casual or wage earners. Seasonal labourers' work included grading and sorting fish, cleaning and repairing cage nets, and maintaining farm infrastructure. In all cases, workers were nationals apart from among senior management and a few technical staff, which included nationals from China, Kenya, Ukraine and Zimbabwe. All the foreign nationals were men and had full-time employment.

In Uganda, emphasis is especially placed on creating employment opportunities for youth in a country marked with an especially young population, a median age of 16.1 years (MGLSD, 2001). Several actions have been considered and taken by the government since 2001 to boost youth contribution to the national economy, including more education, skills development and direct grants to individual youth and youth groups (MGLSD, 2019; Makumbi, 2018).

In Zambia, the workers in the first company included 13 managers: 8 men, 4 women and 1 expatriate man. In the second company, there were five national supervisors who were men, and seven administrative support staff, with three men and four women. In the third company, there were 31 national technicians, of which 11 were women. Among the labourers, 28 were men and four were women.

5.6 GENDER EQUITY AND BALANCE

Employment legislation in Africa is aimed at equality in the workplace (Schoeman, 2010). Gender or sexual equality envisions that both men and women should receive equal treatment and should not be discriminated against based on their gender (United Nations, 2020). For Africa as a whole, the employment-to-population ratio of men was estimated at about 69.2 percent compared to the employment-to-population ratio of women, at only 39.2 percent (Anyanwu and Augustine, 2013). All countries listed gender equity as part of the employment schemes, but there was no specified regulatory body designated for enforcement.

The 15- to 35-year age group attendance at school illustrates the educational gap between young men and women, and gender balance, and the school employment transition in Africa given the extended periods in education for men and the fewer young women attending primary and secondary schools. Unemployment is partially a problem of imbalance in education, as well as youth insertion into the labour market (Assaad and Krafft, 2017). While young men typically take two to three years to make the school-work transition, young women often never make it. Young women are at much greater risk of being neither in education nor in employment than young men, thus creating a wide gender gap in the workforce (Abbott and Teti, 2017).

The gender gap participation rates in the labour force are especially stark in regions such as South Asia, and the Middle East and North Africa, which have some of the lowest labour force participation rates of women, at 24 percent and 20 percent per region, respectively (World Bank, 2020). The gender gap in African aquaculture is even wider than that of the average world global gap in the aquaculture workforce. Aquaculture has been promoted as a development strategy for women's empowerment, based in part on the assumption that it will reduce this gender gap since as an extension of their domestic tasks it will allow them to integrate fish-pond production with production activities, housework and childcare (Kelkar, 2001; Ramirez and Ruben, 2015; Sari *et al.*, 2017). However, these rates of women's labour force participation mask underlying challenges. During the same period, the unemployment rate for women aged 15 to 24 years was 1.26 times the rate faced by men. The differences in the constraints facing young women stem from differential access to key resources

which enable employment, such as skills, time and capital, as well as (and related to) underlying cultural norms and institutions that govern men's and women's economic and household roles (Chakravarty, Das and Vaillant, 2017).

Worldwide, women perform a high proportion (40–80 percent) of post-harvest and marketing activities (Lentisco and Lee, 2015; Harper *et al*., 2013; Lentisco and Alonso, 2012; Weeratunge, Snyder and Sze, 2010). Table 12 presents an overview of data on women's roles in aquaculture value chains from a variety of sources. The information shows the variation in the employment of women and men for some African countries at value chain nodes. It shows that gender imbalance exists throughout the aquaculture value chain in the selected African countries.

TABLE 12
Gender division of labour in aquaculture value chains in Egypt, Nigeria and Zambia

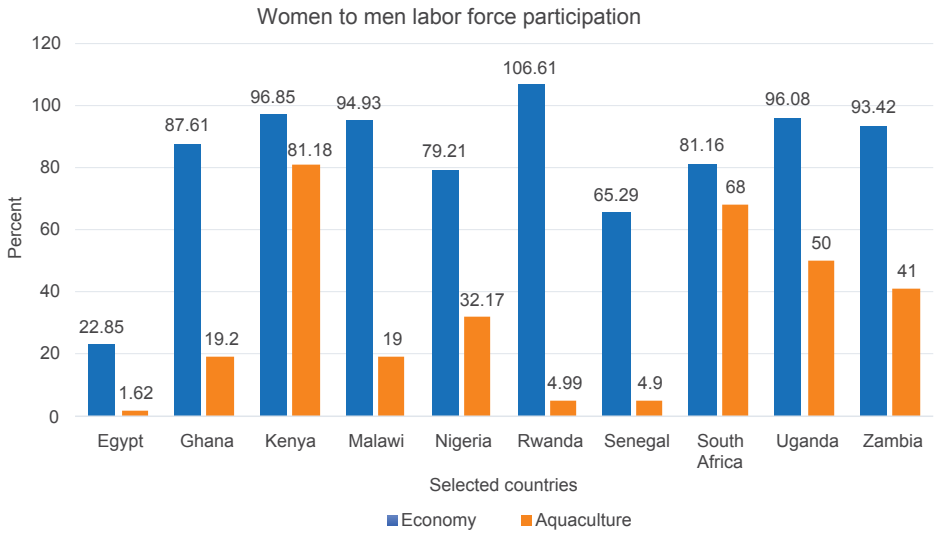
Region/country	Share of women	Specifics	Source
Farm ownership			
Nigeria	40%	Lagos State	Veliu *et al*., 2009
Pre-production inputs			
Nigeria, Lagos State	20% in inputs	Catfish inputs in Lagos State	Veliu *et al*., 2009
Aquaculture production			
Africa	20% of 230 000		FAO, 2014
Egypt	0%	In farming and transport of tilapia	Eltholth *et al*., 2015
Nigeria	40% pond ownership, 35% for earthen ponds, 11% for concrete ponds	Catfish farms in Lagos State	Veliu *et al*., 2009
Zambia	45% of 6 700–15 400	Mainly in subsistence farming	Phillips *et al*., 2016
Processing (both aquaculture and capture fisheries)			
Nigeria	99%	Catfish processing in Lagos State	Veliu *et al*., 2009
Trading and retail			
Egypt	38%	In farmed tilapia retailing	Eltholth *et al*., 2015
Nigeria	99% of wholesalers	In farmed catfish in Lagos State	Veliu, *et al*., 2009
Zambia	88%	In farmed fish trading	Phillips *et al*., 2016

Source: Kruijssen, McDougall and van Asseldonk, 2018; Veliu *et al*., 2009.

Figure 5 presents the ratio of women's participation in the economy relative to men's participation and also compares women's participation in the aquaculture sector to that of men's for the ten selected countries. Egypt shows a participation rate of less than 50 percent in the economy, while Senegal shows a percentage of 65.29. All the other countries have rates above 79 percent. When the ratio for aquaculture is compared to that of the whole economy, it shows that there is a huge gap between women's and men's participation in the economy and aquaculture. The largest gap is Rwanda (106.61) and the lowest is Egypt (22.85). Egypt ranks 135th out of 144 countries for gender equality in economic participation and opportunity (Schwab *et al*., 2017).

The highest ratio of women to men participating in the workforce and the economy is Kenya. The main reasons for women's participation in the workforce in many countries include education and experience, the opportunity cost of labour, the income of other wage earners in the household, the existence of taxes and subsidies, the presence of offspring or other children in the household, and the family life stage (Blundell and Stoker, 2007; Killingsworth and Heckman, 1986); however, the level of education and biases in employment seem to reduce women's participation in the aquaculture labour workforce. Hence, in terms of governance in employment, the countries have a major task in enforcing parity in women's employment.

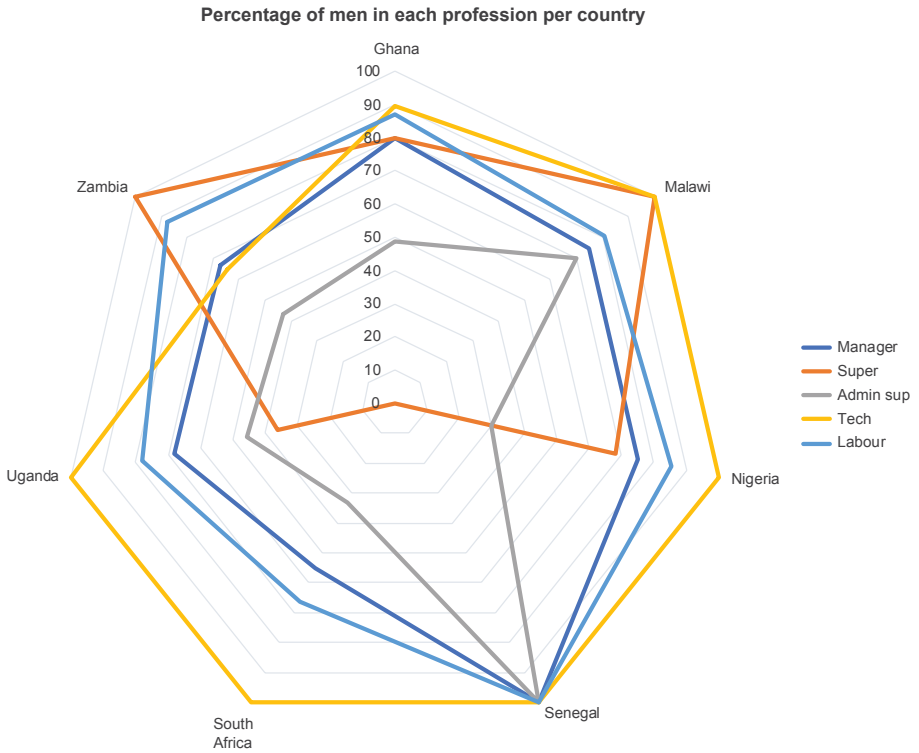
FIGURE 5
Women's participation in the economy and aquaculture relative to men's



Source: Data extracted from the World Bank, 2022. https://data.worldbank.org/indicator/SL.TLF.ACTI.FE.ZS

The survey results showed that men are the dominant group in the labour force in Ghana, Nigeria and Zambia (Figure 6), which is not surprising since they also dominate at both the first-degree and postgraduate levels of education (Table 13). It should be noted that women are less represented in managerial and supervisory roles, despite being equally qualified educationally as men.

FIGURE 6
Average percentage of men in each profession in the labour force

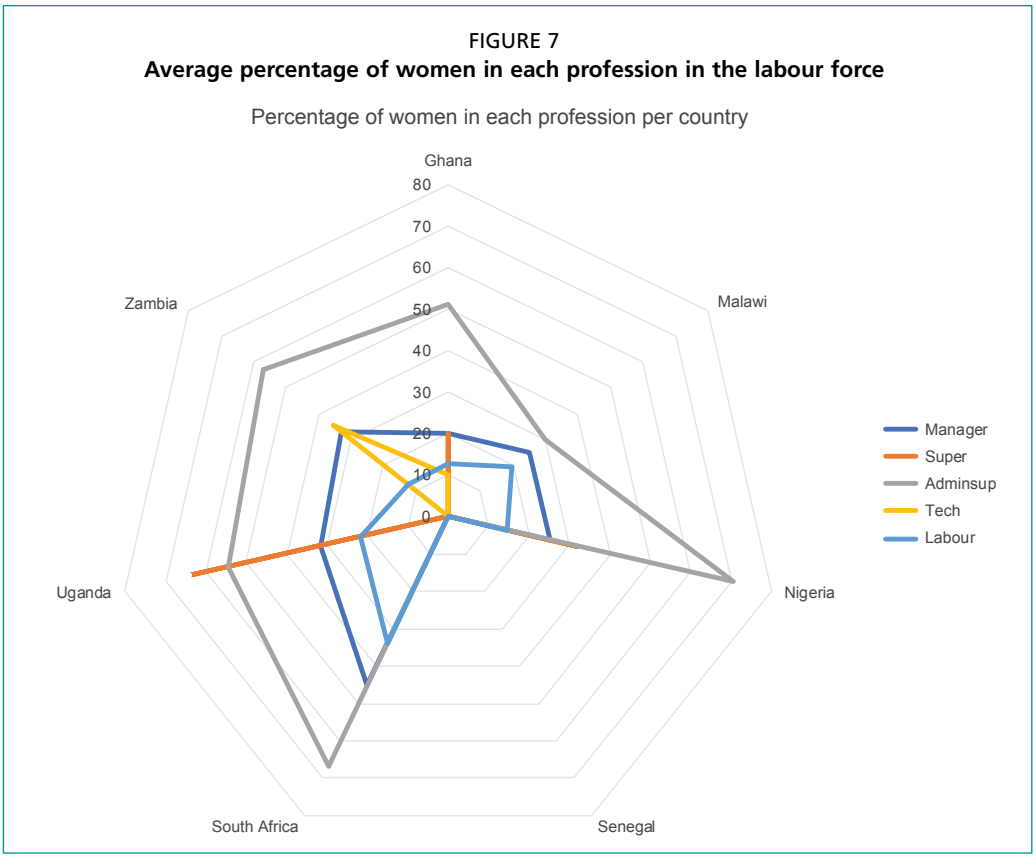


In administrative support, the ratio of men to women in 2022 was 52.8:47.2, which is close to a 50:50 split (Table 13). Men were far more dominant as technicians with a ratio of 93.5:6.5. It would be expected that women would dominate the labour classification since they are heavily recruited for processing and trade, but this was not the case since men also dominated the labour class at 83.6:16.4 (Table 13). Women dominated administrative support in Ghana, Nigeria, South Africa, Uganda and Zambia (Figure 7).

TABLE 13
Gender and job classifications for selected African countries, 2022

Profession	Managers		Supervisors		Administrative support		Technician		Labour	
Country	M	W	M	W	M	W	M	W	M	W
Ghana	80.00	20.00	80.00	20.00	48.57	51.43	89.68	10.32	87.21	12.79
Kenya	58.00	42.00	71.4	28.6	75.0	25.0	89.00	11.00	55.00	45.00
Malawi	75.00	25.00	100.00	0	70.00	30.00	100.00	0	80.58	19.42
Nigeria	75.00	25.00	68.18	31.82	29.62	70.38	100.00	0	85.62	14.38
Senegal	90.00	10.00			100.00	0	100.0	0	100.00	0
South Africa	55.00	45.00			33.00	67.00	100.00	0	66.20	33.80
Uganda	68.31	31.69	36.09	63.91	45.5	54.50	100.0	0	78.16	21.84
Zambia	67.00	33.00	100.0	0	42.86	57.14	64.52	35.48	87.50	12.50
Average	74.33	25.67	75.85	23.15	52.79	47.21	93.46	6.54	83.61	16.39

FIGURE 7
Average percentage of women in each profession in the labour force



Survey results revealed that men are the dominant gender in Egypt's aquaculture sector (98.4 percent), though with some slight exceptions, as women work in aquatic feed factories as accountants or as fish retail traders. Only 16 out of 873 employees in the sample of aquaculture enterprises are women. A project to increase employment for women that was undertaken in Egypt between 2011 and 2015 revealed that of the

10 000 jobs only 9 percent were occupied by women at the end of the project. Such strong gender disparities are a result of various factors, including social norms and attitudes, economic pressures, religious beliefs, access to finance and markets, and structural forces (Assaad and Krafft, 2017; Biltagy 2014; Nassar and Biltagy, 2017).

The lack of women's representation in hatcheries and fish farms is troubling, as some of these jobs are highly skilled and better paying (e.g. technical managers, feed formulation specialists, supervising engineers, quality control specialists). In Egypt, women in aquaculture are primarily employed as traders and receive fewer benefits since they are not directly involved in aquaculture value chains, especially in the production stages (Mula and Sarker, 2013; Arab Development Portal, 2015). However, women's participation in fish retailing is substantial, as high as 40 percent in some governorates, such as Fayoum (Nasr-Allah *et al.*, 2019). NasrAllah *et al.* (2019) expressed that the lack of representation of women at various stages in the aquaculture industry suggests the difficulty they face in career mobility. Barriers to training might have contributed to the current lack of women occupying skilled jobs in the production stages of the sector. Notably, however, research conducted by prominent Egyptian universities found that women of all ages currently occupy 34 percent of research positions at the Central Laboratory for Aquaculture Research and at the six companies surveyed. Although all surveyed companies employed a reasonable number of women, there were far fewer women than men in terms of numbers and types of positions occupied. Most managers believed that the imbalance might be linked to the remote nature of the aquaculture business.

In Ghana, evidence of the past two decades shows the intensification of vulnerability and exclusion among women and youth in certain jobs. Among several variables accounting for women's vulnerability to poverty are gender inequalities, which it is argued, undermines development and the prospects for improving standards of living (Awumbila, 2006). Although some women are active as owners and managers, and as labourers, especially in post-harvest stages, men still dominate aquaculture employment. Of a total of 45 fish farm owners or managers, 9 percent were women. On the other hand, aquaculture represents a development strategy for poor women in Ghana because they can combine household chores with farm operations (Ragasa *et al.*, 2022b). However, a huge gap exists in the men to women distribution in fish farming and trade in the country (Anokyewaa and Asiedu, 2019). Women dominate only in administrative support positions, with a ratio of 51.43 percent women to 48.57 percent men (Table 13). Figure 7 shows that men dominate in all job categories except for administrative support. The situation is similar in Senegal, where men dominate all four professions; only one woman is a manager.

Out of the 11 CEOs/farm managers/human resources managers in Ghana, all are men. Men outnumber women in managerial and supervisory positions in a ratio of 4:1 (80:20) (Table 13). They also dominate with university and postgraduate degrees (Table 11), where training at this level is also required to secure desired positions (Table 13).

In Kenya, Article 27 (3) of the Constitution, 2010 stipulates the right to equal treatment between men and women. Women generally play a major role in the production, processing and marketing of aquaculture products (Ndanga, Quagrainie and Dennis, 2013); however, women's representation is low (32 percent) compared to men's (68 percent) (Cecilia *et al.*, 2020). There were more men (261) than women (217) employed in Kenya, showing a 45–55 percent split, which is high compared to other African countries such as Egypt and Senegal. There was considerable gender and age differences for specific lines of duties in the country. Two farms (Farm A and Farm B) employed mostly men (ratio of men/women, 60/40 and 70/30), while a third farm employed 40 percent men and 60 percent women. Women were mainly deployed in the hatchery, feeding fish and processing fish for the market; 90 percent of the workers

were women and 10 percent were men. Men's work included transporting fingerlings, feeding fish in cages, maintaining equipment, transferring feeds, harvesting eggs in ponds, harvesting fish and operating farm equipment. In Kenya, men dominate in managerial and labour positions, but the figures are lower compared to other countries. The education participation rate for Kenyan women was about 78.53 percent at the secondary school attendance level and 79.99 percent at the university level. It is evident that education empowers women with knowledge and information to improve their economic well-being and their rights as provided by the Constitution of Kenya, 2010 (Government of Kenya, 2010).

Research by Simmance (2017) suggests that the homestead nature of aquaculture provides women in Malawi with opportunities to participate more actively in aquaculture, but gender norms influence the type of aquaculture activities carried out by women. Women predominantly reported to carrying out feeding of fish and were excluded from participating in physically intensive types of work, such as harvesting, water maintenance and guarding of fish at night. However, this study found that most women were employed as general labourers. The study also revealed that only 3 of the 12 managers were women, and that of the 3 supervisors and 11 technicians none of them were women. This confirms the findings by the National Labour Force survey of 2013, which showed that fewer women (0.2 percent) were employed as managers compared to men (1.2 percent). Figure 6 and Figure 7 show that men surpass women in all categories of employment along the supply chain. Castel, Phiri and Stampini (2010) reported that work and employment were related to an education gender gap at the secondary and post-secondary levels of education, which influenced employment. In Malawi, the ratio of secondary education of men to women employees is 91.86 to 8.13 (Table 11).

In the case study of Nigeria, as in other countries, the employees in hatcheries and grow-out farms were predominantly men, while those in processing and administration were women. In the northeast zone, less than 12 percent of women worked in the aquaculture sector. The other five zones recorded higher involvement of women (more than 20 percent), and a large processing farm in the southeast recorded more than 60 percent. However, on average, two-thirds of the workers on farms surveyed were men. In the south, women also dominated in wholesale purchasing of fish from farms and retailing to consumers in open fish markets. Generally, in the north, because of tradition and religious beliefs, young women usually do not work on farms. Jobs in aquaculture are widely perceived as being dangerous and uncomfortable for women, and therefore women's representation in the sector is low (12 percent of the aquaculture workforce); usually, women hold jobs of lower importance and often on a temporary basis (FAO, 2006; Dambatta *et al.*, 2016).

In Rwanda, in the three farms studied, two of the 23 positions are for general manager and production manager. These positions are both held by men, who also receive the highest salaries. At Frefish Ltd, top management consists of the managing director (owner), financial manager and administrative support, who are women, whereas the production manager, hatchery manager and farm technicians are men. At Frefish and Finefish, the general managers are the owners of the companies, and all are nationals. At Kivu Tilapia, the company owners are expatriate hires, as are the general manager, operations manager, hatchery manager and nutritionist, and all are men. Sixty percent of farms had only men occupying managerial positions; 20 percent had more men than women in managerial positions; and 20 percent had an equal number of men and women managers. Remuneration is based on qualifications and experience and not on gender, but there is a dominance of men because even the most available graduates from aquaculture and fisheries in Rwanda are men. More lucrative positions, such as manager and supervisor, were held by men; women held these positions on only a few farms. In contrast, CGE Farms in the southeast had only women occupying managerial

positions. Only men worked as technicians on farms across the different zones. CGE Farms, Okele AgroFarm and Aquatic Hub Farm employed only women in administrative positions. The majority of labourers were men, except on CGE Farms.

In Senegal, although laws strongly reference the equality of men and youth, there is no further evidence that women will play a significant role in the development of aquaculture. The SIA farm has only one woman working there. She is a production manager, who also manages all aspects related to administration and accounting. Her salary is high, appropriate for a manager, and thus far the farm has not had any issues regarding the principle of "equal employment, equal pay". The Mbawane Fish and Agricultural Farm (FPAM) has only two staff members; one is a technician in charge of production and the other a fieldworker, recruited on the recommendation of an agent of the National Aquaculture Agency (ANA). The farm employs only men, though the owner plans to recruit women specifically to work in fish processing/transformation of African catfish to improve the value chain.

Currently, the employees of Nattangue Pédagogique farm are only men. However, the farm manager does not rule out the idea of recruiting women based on their competencies. The Cabane Penchée farm employs two skilled workers, both men, recruited based on their experience in oyster farming. Contracts are approved by the labour inspectorate to serve as farm managers. At present, employees are only men, but the farm periodically receives women interns. The manager expressed openness to hiring women in the event of sustained market demand, and salaries would be the same for men and women.

The South African Employment Equity Act of 1998 is one of the most significant and contested pieces of legislation passed in the new democratic South Africa. Importantly, the Act recognizes South Africa's historical disparities in employment, occupation and income within the national labour market. In Section 27 of the Act, firms are required to report on the representation and remuneration of their workers by gender and population group.

In 2017, an Aquaculture Skills Inventory and Needs Analysis study conducted in South Africa found that 77 percent of farm managers were men and 23 percent were women (SAIMI, 2018). In the present study, the gender distribution among the various employment levels is consistent with the SAIMI (2018) findings. The study found that the positions in general labour (76 percent), technical (100 percent), supervisory (56 percent) and managerial (76 percent) were occupied mainly by men, while women employees were employed mainly in administrative positions (67 percent); the general labour category showed that only 38 percent of the workers were women. These findings indicate that the distribution of managerial positions by gender has remained relatively constant since 2017, and resembles those in the agricultural sector in South Africa (Loubser, 2020).

Regardless of age, men comprised the majority (62 percent) of the aquaculture labour force, with women accounting for 38 percent. Similarly, AgriSETA data from 2018 found that the aquaculture sector had more men employees (61 percent) than women employees (39 percent). These percentages are similar to the findings of Loubser (2020), who found that 66 percent of the agricultural labour force in South Africa were men, while 34 percent were women. Interestingly, the large mussel and oyster farms had more women workers than men. This is due, however, to the low labour requirements for growout operations on mussel and oyster farms (comprised largely of men) and the high labour requirements for processing operations (comprised largely of women). Small-scale mussel farms do not process their products; instead, they sell them directly to large mussel farms where processing takes place. In the present study, men between the ages of 20 and 39 years old made up the largest age group (45 percent) of aquaculture employees. Women in the same age group comprised the second largest group of employees (26 percent).

Analysis of the gender division of Ugandan labour in aquaculture revealed shared roles between men and women, though women predominated in pond maintenance work, fish feeding and general supervision activities carried out by employees (Atukunda *et al.* 2018). Women were represented at all stages of the supply chain regardless of the production level of the farm in question. Most of the workers were on contract and full time, with 20–30 percent of personnel regarded as casual or wage earners. These individuals are called in during times of peak labour requirements; seasonal labourers' work include grading and sorting fish, cleaning and repairing cage nets, and maintaining farm infrastructure. Figure 4 and Figure 5 show that the gender distribution in professions is more spread out.

Of the farms studied in Zambia, 98 percent of the workers were locally recruited, while only 2 percent (all men) were hired internationally. These were at the managerial and technical levels, with the latter being for specialized skills not available in the country. This is compliant with Section 14 of the Employment Code Act, No. 3 of 2019. Of the national employees, women accounted for 57.14 percent of the administrative support staff, 35.5 percent of the technicians, but only 12 percent of the general labour. While these numbers are not optimal, they are more favourable than any other of the selected countries. Women comprise 8 percent of the workforce in the value chain (Krishnan and Peterburs, 2017). All larger-scale producers indicated that their workforce were dominated by men, as they believed that farming fish requires a greater amount of physical strength, which they claimed men possess. This stance at a larger scale may potentially contravene the Gender Equity and Equality Act No. 22 of 2015, which provides under Section 31 that women are on an equal basis with men and have "the same right to access employment opportunities and work in all sectors of the economy". Women residing in urban areas are very active in the trading of farmed fish.

Globally, there is an absence of women in intermediate and high-level positions in the seafood industry. Contrary to what a few reports say about inequality in salaries between men and women, expatriates and internationals, all of the companies interviewed mentioned that there was no discrimination in terms of wages and salaries offered to employees in the aquaculture sector, as employment depended on the position and job description (equal job, equal pay principle). Salaries and wages in the sector were comparable to those in the livestock and crop subsector. Though, in Zambia, women receive 12 percent less pay than men for the same job performed in other sectors. In aquaculture, men and women receive the same pay for the same services, revealing that aquaculture is slowly gaining recognition as a new business area where equity is essential.

5.7 PART-TIME EMPLOYMENT

Part-time and casual employment plays an important role in aquaculture development in Africa. Although most of the companies follow the ILO and the governments' employment laws, most of their employees are permanent, but without signed contracts. There is no formal agreement for part-time workers or modes of treatment. In most cases, the casual part-time and casual workers activities and payments are not recorded by the companies involved. In Ghana, 220 employees, or 23 percent of total employees, were casual and contracted when needed, especially during the harvesting of fish and for gutting them for sale and storage. In Nigeria, there were 34 part-time workers; they were mostly part-time or casual workers who were also seasonal. Egypt registered 336 (38 percent) casual workers out of a total of 873 employees. Malawi had a total of 119 casual and seasonal workers, of which six were women. The question is: Are these casual or seasonal workers permanent if they are called upon for numerous working seasons?

5.8 EXPATRIATE EMPLOYMENT

Employed expatriates are either part of the foreign investor's organization or employed as CEOs that are part of the managing team. Ghana has the largest contingent of expatriates, 13 expatriates, all men, occupying various top managerial positions, primarily on foreign-owned farms. Six of the 11 farms employed expatriates, with as low as 5 percent and as high as 20 percent on some of the farms. On these farms, most of the nationals are employed at the lower levels. Other farms that were not surveyed employed few expatriates, occupying about 5 percent or less of managerial positions. According to the survey, these expatriates received employment packages that allowed them to live in the country; the salaries and benefits did not exceed those of nationals, but they received cost of living adjustments and displacement charges.

In Nigeria, the surveys indicated that there were no expatriates working on the farms surveyed. However, two farms in the southwest, Aquatic Hub and Fishful Thinking Consult, each employed an expatriate, one from Benin and the other from Ghana; both countries are members of the Economic Community of West African States (ECOWAS). The expatriate from Ghana occupied the managerial position at Aquatic Hub, while the one from Benin worked as a labourer at Fishful Thinking Consult. In 2022, 80 percent of the farms surveyed had only Nigerian nationals as employees. Eneji, Mai-Lafia and Weiping (2013) suggest that Nigerian companies employ expatriates for specific job skills; their employment plays a complementary role in the economy, where there are no qualified Nigerians for such positions. In Uganda, workers were nationals apart from senior management and a few technical staff, which included expatriates from China, Kenya, Ukraine and Zimbabwe. All the foreign nationals were men and received full-time contracts.

In Rwanda, at Kivu Tilapia, the company owners are international; the general manager, operations manager, hatchery manager and nutritionist are internationally recruited, and all are men. The remuneration is based on qualifications and experience and not on gender. However, the company is dominated by men because most graduates available in the aquaculture and fisheries field in Rwanda are men.

In Zambia, only one expatriate manager and one technician are employed on a farm that is supported by foreign investment. The pay for foreign staff is often combined with that of the owners or top managers; the owners refused to divulge the terms of the agreements between the expatriates and the firms. However, they indicated that their salaries and allowances are competitive in the region. Generally, the salaries are comparable or better than those of other local production sectors that are equally intensive. Although this may be a testimony to the fact that aquaculture businesses are not engaging in social dumping, there is room for serious consideration of higher pay, especially with the opening of new firms.

6. Compliance, contracts and remuneration

6.1 COMPLIANCE WITH NATIONAL LABOUR LAWS

In the cases of the selected countries, employers generally comply with all rules and regulations for recruiting staff with high school diplomas, some high school education, or advanced education. Employers, however, face numerous constraints hiring staff due to the absence of documented instructions for achieving good governance in aquaculture. An absence of clarity in rules and regulations poses problems for industries that do not follow or attempt to avoid meeting all employment requirements. Difficulties in recruitment, weak state-of-the-art knowledge and agribusiness skills, including poor record-keeping, affect worker placement with the necessary skills in critical positions and stifle productivity and profits of small-scale fish-farm enterprises in Africa (Ragasa *et al*., 2022a, 2022b).

Almost all enterprises surveyed were compliant with most of the regulations in force by their governments. Ghanaian, Rwandan and Zambian firms follow government regulations. The information from the survey indicated that all firms respected the countries' labour laws in wage setting. Workers were paid for an eight-hour day and given time and a half or sometimes double pay for overtime work. There was no inequality in gender wages or salaries. Even with the employment of youth in Malawi, child labour exploitation was non-existent and there was no social dumping.

It is pertinent to discuss a case study on how an inadequate recruitment process for untrained workers may lead to a lack of compliance and almost sector failure due to poor practices in production and exports in Uganda.

Deficient hiring practices led to the prohibition of products from Uganda and other sub-Saharan countries, which hindered access to better markets with similar production conditions; this, in part, could have been remedied through education and skills acquired through training programmes (Bagumire *et al*., 2010). A low average compliance score was obtained for food safety training and skills of farm workers/managers during the evaluation of the firms' compliance with international recommendations. Recommendations to rectify the situation by Bagumire *et al*. (2009) included developing the capacity of inspection services through recruitment and training of adequate numbers of inspectors targeting basic aquaculture and food safety skills.

Governments have allowed the private sector to adopt and implement part or all the regulations related to aquaculture employment with certain degrees of variance. The Labour Law in Egypt is mainly regulated by Egyptian Labour Law No. 12, 2003 (as amended by law 180 of 2008), which aims at regulating the relationship between employers and employees in the private sector. The law is adaptable for aquaculture and provides clear provisions for establishing individual industry guidelines for employment. Egyptian fish farm workers are employed on private farms under the labour agreements established by the individual firms but are not covered by government insurance and medical health. Two Egyptian government authorities – the National Academy of Reference Standards and the Egyptian Union of Fishermen Cooperatives – have issued new employment laws to ensure that workers benefits are covered, but these regulations have not been enforced due to bureaucratic delays.

In Malawi and Nigeria, employers may not always follow strict hiring rules, and therefore they may not hire the most qualified candidate, given that job publicity is

done mainly through word of mouth. In Malawi, while the Employment Act stipulates that an employer and employee shall agree on a probation period that may not exceed a period of 12 months, with such type of recruitment, the employer and employee rarely agree on a probationary period except for managers, supervisors and administrative support at MALDECO and Chambo Fisheries. Based on the study results, it has been observed that all the farms in Malawi and Nigeria comply with minimum wage regulations by paying their employees at least the minimum wage or slightly above it. The study reported that almost all employers, with the exception of one, comply with annual leave and other types of leave in accordance with the Employment Act.

In Senegal, two of the aquaculture firms have longer working hours than those stipulated by local law. According to Besamusca and Tijdens (2015), the setting of working hours is a problem in French-speaking countries such as Senegal, where traditionally there is a two-hour siesta during the lunch period.

In South Africa, the fisheries and agriculture sectors are required to comply with minimum wage legislation. Wages within the agriculture and fisheries sectors vary widely, and it is difficult to compare with the aquaculture sector because of the vast number of farms in the country; fisheries often provide transport, accommodation and food to subsidize wages/salaries, with some fisheries having cash-based wages over and above a baseline salary. Aquaculture operations run 24/7 in South Africa, and it is therefore critical for employees and employers to understand and uphold the regulations of the Basic Conditions of Employment Act. Moreover, farms without a dedicated human resources department need to consciously ensure that there is adherence to the Act.

6.2 CONTRACTS AND COMPENSATION

A mixture of public and private sector governance provides guidelines for increasing the demand and training for skilled labour and have set the stage for work performance, remuneration and for the minimum wage for African aquaculture workers. Commercial aquaculture in Africa has the potential for increasing the demand for skilled labour (Finegold, 2009), which means an increase in wage income. However, Rwanda is the only country that reported having a labour inspector who assures that work contracts and conditions are satisfactory. The labour inspector in all districts conducts inspections of workplaces, investigates cases of breach of contract, arbitrates between workers and employers on unfavourable working conditions, and provides relevant technical advice. In all the other countries, work contracts were based on the laws adopted by the ministry of labour and accepted by the private sector.

Of the selected countries, Egypt, Ghana, Kenya and Malawi paid at least the minimum wage, while Rwanda, South Africa and Zambia paid comparable wages that were in line with those of competing industries or livestock industry employees. Nigeria, Senegal and Uganda paid above the minimum wage (Table 6). The average working hours in Ghana and most of the countries are eight hours a day, and employees are entitled to receive double pay for working on weekends and holidays. In Ghana, shifts that occur on holidays and weekends with their accompanying compensations vary from farm to farm. On average, workers on an aquaculture farm work between 8 and 9 hours a day or 40 hours per week. In Kenya, working conditions require that employees work throughout the week, with some working on shifts over the 24-hour cycle. The remuneration for the employees is based on the job performed and the minimum wage specified in the labour laws.

The case studies revealed that working hours across farms in Nigeria range from 6 to 8 hours a day. In hatcheries, as more attention may be needed at critical times, the number of working hours may increase to 9 hours a day. In such cases, workers are given meals or cash as an incentive for the extra hours worked. The hatchery staff generally work under different shifts, with each shift lasting 8 hours. The Zass and Sons

farm in the northeast stated that they had employed some high school students who work for a few hours after school as casual workers and received payment to support their education.

The average wage in Egypt varied across different nodes along the supply chain. Employees at the feed factory (USD 358.30/month) and traders (USD 330.00/month) received the highest wages, while those employed in fish farming in earthen ponds and cage culture (USD 230.10/month, USD 230.20/month or USD 220.00/month, respectively) received the lowest wages.

In Ghana, the principle of equal job and equal pay is practised at all sampled farms; workers, however, did not have formal contracts, and most farms employed casual staff instead of permanent staff. According to the farm representatives interviewed, salaries are not paid according to qualifications, skills and responsibilities. The current minimum wage is USD 50/month in the agriculture, fisheries and food sectors. The surveys suggest that most aquaculture farms pay their employees between USD 55 and USD 90 per month. Even when performing the same tasks at the same value chain node, women are often (but not always) paid less than their men counterparts. Women are in the minority in all areas of employment, but they are encouraged to apply for high-level positions.

In Kenya, employees work throughout the week with some working on shifts over the 24-hour cycle. The remuneration for employees is based on the job they do, and the minimum wage is set according to the labour laws in the country.

In Malawi, the Employment Act of 2000 provides employees with minimum wages. The wage is set through negotiations by the government (mostly represented by Ministry of Labour), the employers' organization (Employers' Consultative Association of Malawi) and the employees organization (Malawi Congress of Trade Unions). The current minimum wage that covers all sectors in the country, including the aquaculture sector, except for truck drivers and domestic workers, is USD 1.87 per day or from USD 48.71 to USD 77.94 per month. Overall, the monthly salaries range from USD 48.71 to USD 77.94 for general labourers and from USD 77.94 to USD 321.50 for supervisors. The monthly salary range for managers (inclusive senior managers) is between USD 146.14 and USD 5 845.50.

In Nigeria, all farms pay at least the minimum wage, though this may not be reflected in the monthly salary because of other benefits in kind or cash provided by employers. An exception to the rule in the National Minimum Wage Act 2019, however, permits companies with fewer than 25 employees (or agricultural farms) to pay their employees less than the minimum wage of USD 72 monthly. However, aquaculture workers on the farms surveyed across the six zones received the minimum wage. For instance, while Walik Fish Farm in the north-central zone paid managers a monthly salary of USD 330, their counterparts on Belem Fish Farm in the south received less than half of that amount as their monthly salary. The case studies revealed that working hours across farms in Nigeria were less than 8 hours per day. In hatcheries, as more attention may be needed at critical times, the number of working hours may increase to 9 hours per day. In such cases, workers are given meals or cash as an incentive for the extra hours worked. The hatchery staff generally work under different shifts, with each shift lasting 8 hours.

In Rwanda, the Labour Law of 2001 (MIFOTRA, 2012) sets industry-specific minimum wages in the small formal sector. However, consultations with relevant social actors (employers and employees) are necessary before issuance of an order.

The conditions of recruitment and work in Senegal do not comply with all the provisions of the Labour Code, except for working hours at the SIA farm and the Cabane Penchée farms. However, the wages given to workers are higher than the minimum wage. The minimum wage in Senegal is USD 66.43 per month. Senegal is an exception, where the work hours are from 7:00 to 17:30.

Salaries and wages are the same on the farms studied as those of the national minimum wage in South Africa. Aquaculture operations run 24/7 in South Africa, and it is therefore critical for employees and employers to understand and uphold the regulations of the Basic Conditions of Employment Act. Aquaculture enterprises in South Africa pay about 25 percent more than other fisheries and agriculture sectors and are nearly up to the level of agroprocessing and other light industries in the country. The survey data suggest that the lowest paid general worker on the six farms that were assessed earned more than the current minimum wage (minimum of 2.3 percent above minimum wage). A report by Visser and Ferrer (2015) suggests that the increase in the minimum wage rate has forced some farm owners in the agriculture sector to employ fewer workers. All farms have promotion and wage increase structures in place, which are equal across gender and nationality. Annual wage increases are relatively consistent among the farms. General labour either receives salary or wage adjustments based on the consumer price index or a negotiated increase based on engagement with the workers' union. Performance-based increases also apply in some instances.

Employees are compensated for overtime under the Basic Conditions of Employment Act and their earnings threshold. Employees earning below the income threshold (approximately USD 1 083 per month) are entitled to overtime pay. The overtime rate is 1.5 times the hourly rate during the week and double the hourly rate on Sundays and public holidays. Farms also implement rotational weekend duties to ensure that all employees have equal time off and equal opportunity to work overtime and earn extra money. In some cases, managerial or administrative staff are compensated with an allowance for overtime or night work. In addition, all employees are paid a night and inconvenience allowance where relevant. Some farms also provide the option to take leave in lieu of overtime pay.

With increased competition for skilled workers, countries such as Uganda, are trying to stem the flight of their experienced staff. Several companies indicated that they made payments that do not appear on their books but are negotiated with staff in order to retain the hardworking and experienced employees. In Uganda, compensation in commercial aquaculture businesses is much higher than in other fisheries and enterprises in the country. Although the surveyed enterprises are generally found to provide low compensation and poor benefits to their workers, these companies indicated that they have made substantial efforts to provide basic needs, such as meals at work, limited transport for workers, a hygienic working environment and timely payment of salaries and wages.

In most of the studied countries, wages are based on the minimum stipulated by the ministry of labour and there is parity in wages paid. In Egypt, however, the monthly remuneration for women workers is, in general, 10–16 percent lower than that of men who perform the same duties. Data disaggregated by farm and zone indicate that there is no unified structure for allocating wages and salaries across aquaculture farms in Nigeria. The data also indicate that women in the same job classification as men earn the same salary, which was clearly the case across the different zones. In Zambia, the salaries between the men and women are discriminatory across the sectors. In South Africa, men's salaries are 12 percent higher than those of women. This is contrary to what was observed in other sectors since all the companies mentioned that there was no discrimination in the salary offered to employees, as this depended on the position and job description (equal job, equal pay principle). The salaries and wages applied in the sector were comparable to those in the livestock and crop subsector. Salary scales do not differ between men and women employees across occupations, indicating that there is gender parity in the aquaculture sector. In addition, although there were very few international employees, there was no difference in the pay scale. In South Africa, managerial increases were the most varied. On some farms, pay increases are based on the equity growth of the business, while others are performance-based. The oyster

farm and both abalone farms indicated that some of their employees belonged to trade unions, which represent the rights of general labourers to lobby for or against wages, benefits and other relevant issues.

In Nigeria, payments for managers, supervisors, administrative staff and technicians vary across regions, based on the cost of living and the capacity of the companies. Rwandan wages and working conditions are like those of other sectors of the economy, but they also depend on the budget of companies. If the company revenue increases, it is likely to pay its employees more in salaries and wages. According to the Rwanda survey, the official pay structure and pay grades are relatively similar across the different companies, with only minor differences. Managers and owners revealed that non-disclosed payments included housing, transport and health allowances, and bonuses for the managerial and technical staff, whereas lower-level staff, such as fish feeders and those responsible for stocking, are given extra pay for successfully completed activities and/or bumper harvests.

In Rwanda, pay differences exist between nationals and internationals because of differences in experience and qualifications; the same holds true for agriculture companies. The salaries differ depending on the position and ranking of the employee. In general, the highest salary is for the general manager, followed by the production manager, hatchery manager and accountant. Salaries are not gender based in Rwanda.

In their study, Hishamunda *et al.* (2014) disclosed that salaries for managerial staff in aquaculture businesses are 10 to 20 times higher than those of the labourers working on farms. This was not found to be the case in the present study, where managers earn 2.5 to 5 times higher salaries than the labourers. According to a study by Berg (1966) in the United States of America, the ratio between the typical starting rate for a new university graduate and the national minimum wage is, in some cases, much more than 2:1, and since the actual wage of most unskilled workers is well above the statutory minimum, the true ratio is considerably lower. In African countries, this ratio ranges from 6:1 to 11:1, with 7:1 being the most common. Managers and owners surveyed indicated that non-disclosed payments were substantial. Lower-level staff, such as fish feeders and those responsible for stocking, are given extra pay for successfully completed tasks and/or bumper harvests. All enterprises provide meals during the day, as well as at night for staff on night duty.

6.3 OTHER BENEFITS

General

The governance and application of labour laws are essential for increasing worker productivity in aquaculture. According to Stone (2009), a standard labour law is essential not only to ensure labour rights, but also to create transparency and social enlightenment. Benefits and good governance promote social dignity and induce worker satisfaction and a willingness to work. Wage is a pecuniary benefit stipulated by law for work performed, but non-pecuniary benefits such as worker safety, pension schemes, accommodation, transportation, hygiene, working hours, holidays, food security, family care and conflict resolution are some of the benefits and bonuses that entice workers to increase their performance (Ferdous and Bhattacharjee, 2018). Interestingly, in this survey all the farms investigated comply with the equal job-equal pay principle, and discrimination does not exist between men and women or between Nigerian employees and employees from the ECOWAS subregion. All countries offered some non-pecuniary compensation, with some countries offering more than others (Table 5). Ghana, Malawi, South Africa and Zambia provide the most benefits to employees. Some of the specific benefits are:

- **Accommodation:** Responses to the survey regarding accommodation show that all Egyptian workers independently of their functions or responsibilities (managers,

technicians, engineers and labourers) have a reasonable accommodation. In Rwanda, as in Egypt, youth are encouraged to work on farms since the employers provide temporary and permanent lodging based on the jobs and responsibilities. Ghana, Malawi, Nigeria, South Africa and Zambia also provided accommodation.

- **Annual leave:** South Africa and Zambia are the only countries that allow annual leave.
- **Bonus pay:** Ghana, Kenya and Malawi are the only countries that offer bonus pay for employees.
- **Career development:** Kenya, Malawi, Rwanda, South Africa and Uganda assist individuals with career development.
- **Discount:** Ghana and Malawi are the only countries that provide employees with a discount on fish purchases.
- **Health insurance:** Ghana encourages employees to register in the National Health Insurance Scheme; Malawi, South Africa and Zambia offer employees health insurance. In Ghana, recruited workers must register with the National Health Insurance; the companies are responsible for any co-payments. Ghana provides medical coverage for national as well as international staff. Kenyan employees can obtain full coverage of both the National Hospital Insurance Fund and the National Social Security Fund. Nigeria has limited medical insurance coverage. Rwandan companies strongly support health insurance.
- **Maternity leave:** Only three countries, Ghana, South Africa and Zambia, grant maternity leave to employees. Ghana also provides paternity leave.
- **Nursing break:** South Africa is the only country to grant a mother a nursing break.
- **Pension:** Ghana, Kenya, one firm in Malawi, Rwanda, South Africa and Zambia have pension programmes. Ghana, Kenya, Malawi, Nigeria and Zambia have some form of gratuity.
- **Sick leave:** This benefit was not popular because only South Africa and Zambia could afford to have this type of benefit. An exception is in Malawi, where large companies, such as Maldeco, also offer sick leave and maternity leave.
- **Training:** Kenya, Malawi, Nigeria, Rwanda, South Africa and Uganda provide on-the-job training. Ghana provides training in aquaculture, communication, report writing and technical aspects (in-house and external), which are some examples given by a few managers of the farms. Two firms agreed to subsidize formal education training.
- **Transportation:** Most companies provide vehicles for on-the-job transportation and transportation for managers, CEOs and chief operations officers.

7. Weaknesses in governance and suggestions for improvement

1. Many researchers have identified aquaculture as a contributor to poverty alleviation (Murekezi, Martone and Menezes, 2020; Nguyen *et al*., 2016; Belton, Haque and Little, 2012; Allison, 2011). However, aquaculture development is hindered by the absence of strong and healthy human resources. The lack of strong, well-informed and empowered human capital results in poor planning and execution of programmes, results in:
   - a lack of consideration for the importance of governance in fostering farmer engagement, and the employment of labourers, technicians, support staff and supervisors working in aquaculture;
   - an absence of non-related policies for aquaculture employment governance, and a lack of integrated planning, communication, understanding of the interactions of organizational structures, inadequate research, extension and training;
   - a lack of a coherent set of rules for recruitment and employment procedures of nationals (full and part time) and expatriates;
   - insufficient information on compensation and remuneration for various tasks performed; and
   - failing to establish a monitoring system to generate information on how well the system is working. Only Rwanda has an inspector to examine working conditions.

2. There are numerous laws and codes of conduct based on the ILO Conventions that have been ratified and adopted by various government ministries and institutions. However, they have not been fully enforced in aquaculture governance for the following reasons:
   - There has been no critical examination or harmonization of these regulations into a unique compendium of regulations.
   - There has been an absence of verification to determine whether these laws or codes of conduct are appropriate for aquaculture.
   - There is a dearth of proper documentation of the regulations to serve as a collective guide to aquaculture employment governance.

3. Gender differences in employment practices are found across the world and in Africa and are based on survey data. Women do not always receive due consideration in employment at the highest level of the supply chain because of traditions and ingrained biases and therefore:
   - Employment of women is still strongest in administrative support in several countries, with little advancement to supervisory and management ranks.
   - There are gender differences in employment in some aquaculture units; men dominate in the hatchery and grow-out operations where salaries are high, while women tend to predominate in processing (Hishamunda *et al*., 2014).
   - The gap in gender employment stems from women's lack of education and the transition from training to employment, as well as placement at higher levels of the supply chain.
   - A solid proposal is lacking for increasing the employment of women at the nodes of the supply chain.

4. With their different systems, such as earthen semi-intensive ponds, fish cages and hatcheries, most fish farms have the potential to create unsafe conditions, which can expose workers to injuries. These are some observations:
   - Workers and tasks are not sorted by age and levels of vulnerability, respectively.
   - Workers are not under the umbrella of social and/or medical insurance. In Egypt, the results of the survey found that 65 percent of fish farm labourers do not receive coverage for social and medical insurance.
   - There is still a lack of protection for work injuries and disability and absence of workers' compensation.
   - In Ghana, Nigeria, Rwanda and South Africa, the burden of insurance is placed on the national insurance schemes.
   - All labourers working in aquatic feed factories have social and medical insurance in the National Organization for Social Insurance. It would not be difficult for fish farmers to receive the same benefits as workers in the capture fisheries industry.
   - Part time and casual workers, mostly seasonal workers, do not receive the same insurance benefits as permanent workers. These workers are protected by the labour laws of the selected countries.
   - Part-time workers do not have work contracts with fish farm owners. The Government of Rwanda adopted labour laws to promote decent work, provide conducive working conditions, improve productivity, and prevent accidents, occupational diseases and injuries at the workplace (MIFOTRA, 2012).

5. Pension schemes are essential to encourage longevity in the workplace by providing job security for workers who contribute to the pension fund. Hence, all companies must establish a pension fund that accumulates capital to be paid out as a pension for employees when they retire at the end of their careers. A pension fund represents an institutional investor that invests large pools of money into private and public companies. Pension funds are typically managed by companies (employers). Countries do not have a road map for working with start-up companies to develop and invest in pension funds. In most countries, companies work alone to establish pension schemes. The reasons are:
   - There is a lack of guidance in establishing and enforcing a pension scheme act in aquaculture.
   - There are few in-country investment opportunities for start-up companies to develop a pension scheme.
   - An umbrella effect for risk spreading does not exist, as in most countries only the managers, supervisors, administrative support staff and technicians are included in the pension scheme.
   - Labourers are not included in pension schemes, even though a monthly contributory pension is a good choice for aquaculture workers as it will enable them to save for retirement.

6. Workers' benefits, such as leave and workers' disability compensation, are not outlined in any document and there is:
   - lack of consistent information on sick leave and workers' compensation;
   - only three country programmes that allow maternity leave; and
   - no details on annual leave.

7. The governance literature focused on the role actors play in increasing performance efficiency at the workplace, but the increase in productivity is driven by the career advancement of workers. Although most of the surveyed farms provided training for workers, there is a lack of impetus for the acquisition of new skills. The two main reasons are:

- Organizations do not have mechanisms for promotions or a process for career development.
- The avenues for participation in the company's business by purchasing shares is not widely promoted, except for two countries. In Malawi, workers were invited to purchase shares in the company. In Ghana, though not directly related with company shares but more to do with participation, an employee was able to rise through the ranks over a six-year time frame from being a casual worker to feeder to team leader to supervisor to farm manager.

8. While laws and regulations detail the various codes of conduct for nationals, none are explicitly stated for expatriate employees:
   - Some of the expatriate hires, who are usually employed in managerial positions, have behaviours that may be interpreted as mistreating subordinates.
   - In many cases, there is lack of cultural sensitivity.
   - Cultural and diversity training as part of the recruitment programmes is absent.
   - Stated conditions under which nationals can be hired and fired have not been established.
   - Policies on codes of conduct and dismissal procedures are essential for the smooth operation of a farm. One of the policies is guided by the company's code on recruiting investors and hires.

9. Although most of the organizations have ratified and adopted ILO employment policies, unionization is not encouraged in some countries, and therefore:
   - There is much uncertainty about the need and penalties for unionization. Some farms had unionized staff, and engagement sessions were organized to listen to their grievances; afterwards, union leaders sent these issues to management.
   - Emerging diseases, such as COVID-19, resulted in some lay-offs and salary cuts that led to unionized strikes opposing the cuts. The lesson learned is that farms should prepare for and ensure that mitigation measures are in place in the case of a *force majeure* event.
   - Collective bargaining is not encouraged by firms during such events, but all parties are encouraged to have greater levels of understanding.

10. Musinguzi *et al.* (2019) show evidence of spatial expansion of cage aquaculture on African inland waters and verified the changing magnitude of systems of cage culture across and within waterbodies and partial adherence to best practices. Cage aquaculture was confirmed in 18 waterbodies, which together share 263 installations with more than 20 000 cages. Lakes Victoria, Kariba and Volta and the Volta River host 82.9 percent of cage aquaculture installations in African inland waters and are major areas for cage aquaculture. Cage culture shows promise for farmed fish growth and development, but with looming environmental problems and a lack of human capital. The following are some concerns:
    - There is lack of coherent policies in site leases in inland waterbodies.
    - Cage farming operations in Lake Victoria, Lake Volta, Lake Kivu and other major waterbodies require a broad range of technical skills, ranging from hatchery production and management to fish feed and feeding to harvesting technology and related operation techniques.
    - Women and youth lack the necessary skills and knowledge to engage in cage culture activities and may have limited access to training and extension services, which can make it difficult to acquire the necessary skills to work in cage culture production.

- Cage culture is an activity dominated by men; women and youth face legal, cultural or social barriers that prevent them from owning or accessing cages, which is necessary for cage aquaculture activities.
- Large cage culture farms require a higher level of production management, which must be acquired for future development of aquaculture.
- Institutions in Ghana, Kenya, Rwanda and Uganda that develop training in aquaculture may need to reorient their curricula to develop demand-driven courses, which will prepare workers for the job market. Specifically, the majority (80 percent) of those involved in cage farming have primary, secondary and some college level education, but lack the necessary aquaculture training.
- Public institutions and agencies responsible for formulating relevant policies and laws seem to operate in isolation or function in a disconnected manner.
- Aquaculture businesses are left to navigate through sometimes conflicting policies and regulations, which comes at great costs, and in many cases serves as a hindrance to aquaculture operations.
- The industry has several pieces of legislation with which to comply, and that means funds must be spent to get necessary licences and permits. For example, the environmental management act should be complied with in relation to the environmental impact assessment when establishing the farm or expanding the same.
- Water permits should be paid. The Fisheries Act No. 22 of 2011 requires payment of aquaculture licence fees. The Employment Code Act, No. 3 of 2019 (Zambia), which protects employees, must be complied with.

11. Excessive red tape regarding access to public services needed for establishing and operating an aquaculture production and marketing business results in delayed project implementation. The practitioners reported that:
    - The processes and requirements for addressing concerns in planning and execution of operations consume too much time.
    - The initiation of a business requires many steps and visits to different offices. For example, obtaining a certificate for a commercial aquaculture enterprise requires a formal application, site survey and assessment, development and approval of a technical plan, environmental clearance, waste discharge permit and water abstraction permit, all of which are found in different offices and agencies.
    - The process discourages investors and thus lowers the chances of increased employment from aquaculture.

7.1 SUGGESTED IMPROVEMENTS IN GOVERNANCE OF AQUACULTURE EMPLOYMENT

1. The governments of Africa have identified aquaculture as one of the main drivers for the future employment of youth and women. The private sector must play a prominent role in investment and employment for the attainment of this public goal. To stimulate and protect private-sector investment and ensure sustainability of the sector, employment governance should prevail throughout the industry and therefore these steps should be considered:
    - A universal set of laws and policies should be established to outline recruitment, contracting, employment, compensation procedures and the protection of employees.
    - Procedures should be established for institutionalizing and enforcement of regulations governing the employment and compensation of full-time, part-time or seasonal workers.
    - African countries require enabling policies and high-level support to encourage the employment of women and youth in the industry.

- Government authorities must enforce existing regulations, invest in infrastructure and support institutional innovations.
- Potential policy pathways are needed to improve access to, and affordability of, inputs and productive assets for feed and fish production (Chan *et al*., 2021). All these are possible with planning and good governance.

2. The industry needs a framework of employment governance to guide the growth of the industry and thus requires:

- a general overhauling of traditional regulatory structures and relationships with the private sector to establish good governance in aquaculture employment;
- enhancing the skills and education of workers of the entire aquaculture industry in all countries;
- organizing a national drive to train graduates with practical experience to service fish farms by the government or concerned aquaculture organizations;
- bridging the gap in education of women and men at the secondary and post-secondary levels of education so that women can accept employment at all nodes of the supply chain; and
- making deliberate efforts to remove barriers that hinder women's employment in senior positions.

3. Zambia has developed its training capacity over the years. A degree in sustainable aquaculture is offered by Copperbelt University. Within the Southern African Development Committee region, the concept of TVET incorporates entrepreneurial skills and hence becomes technical, entrepreneurial, vocational education and training (TEVET) (TEVETA Malawi, 2009). There are many institutions in Malawi that can provide the necessary skills to develop the aquaculture industry in Africa (Chimpololo, 2017).

These institutions should prepare training programmes to:

- improve the specific skills of workers in aquaculture, particularly in training on the job;
- provide a broad range of technical skills to increase productivity, safety in work, personal satisfaction, and well-being in land and water-based farming operations in Lake Victoria and other lakes, ranging from seed-hatchery production and management to fish feed and feeding to harvesting technology and related operation techniques;
- introduce new aquaculture techniques to increase cage culture production and productivity by persons employed while reducing environmental damage;
- provide training, including on employment provisions, in local languages and dialects for better understanding and include various expertise based on the need of the workers on each farm, if possible; and
- conduct training in the region that emphasizes farming systems within ecosystems-based management. Education is vital to the success of good aquaculture practices in general and to improve the governance of employment in the sector.

4. Regulations for the protection of workers in aquaculture are not well defined. Workers are usually temporary and do not have insurance. Hence, workers should be protected while working on the farms:

- Workers in this industry should be mandated to use personal protective equipment, such as coveralls and life jackets.
- Use of safe practices should be taught at some training programmes.
- External training can also be held at farms that have achieved great successes in best management practices.

- Mandatory requirement that all farm workers receive swimming lessons and be provided with swimming gear should be introduced.

5. The study also revealed that most employees are not members of trade unions, and this limits their ability to bargain and seek improved conditions for workers. Therefore, it is suggested to:
   - raise awareness among employees about their rights to freedom of association and collective bargaining;
   - encourage workers to unionize and participate in union activities; and
   - remove barriers for workers to unionize.

6. Information transfer and data sharing can assist and be interactive in the solution of problems usually encountered by the most resource poor farmers or small-scale farmers in employment of workers. These farm operators lack network or platforms to source information to improve employment and therefore:
   - improve communication of ideas to advance the monitoring and reporting of the functioning of employment practices; and
   - persuade the ministry of labour to encourage stakeholders to be proactive in coming up with legislation with respect to improving monitoring and enforcement, licence issuing and withdrawal.

7. The reduction of time in soliciting public administrative support to obtain licences and permits is necessary for the advancement of the aquaculture industry in Africa. As a proposed solution from the engagement with aquaculture companies, it was suggested:
   - A "one-stop" shop or coordinating centre should be set up with public technical support services to aid the firms seeking public services.
   - A governmental-wide harmonization and streamlining of the different provisions for regulating and guiding aquaculture businesses should be undertaken as part of the one-stop shop.

8. Discussion

Many researchers and policymakers have identified aquaculture as a contributor to poverty alleviation (Nguyen *et al*., 2016; Belton, Haque and Little, 2012; Allison, 2011). However, aquaculture's contribution to alleviating rural poverty is impossible without the recruitment of capable and satisfied workers participating in the operation of the supply chain. Workers should be selected and initiated in the workforce with the assistance of training and employment programmes to guide the process of establishing good employment governance. Governance in aquaculture employment in Africa requires serious attention, especially in terms of upgrading employer/employee relationships, skills and education of workers of the entire aquaculture industry. An aim should be to prepare workers and high school and college graduates with specialized, practical training to service fish farms. Accountability, transparency, equity and increasing the capacity of institutions to respond to gender-specific needs are important and must be at the forefront of training to improve employment governance.

The present study documents several ownerships, production and human resources recruitment practices in aquaculture employment in the selected African countries, with the findings suggesting that laws and regulations adapted from more developed countries are present. These laws and regulations are scattered among ministries and departments of the government, and there is a lack of legislative enforcement. Numerous departments, ministries and agencies are responsible to guide the governance of aquaculture, but there are no signs of coherency, collaboration or consolidation by a specific appointed body to assist the ministries responsible in planning and decision-making. Each of the associated ministries operates independently. Despite the widespread diffusion of policies among governments, the central government decides on the future direction of aquaculture growth with varying levels of public participation. Olivier de Sardan (2011) recognized eight forms of governance in existence in West African States, which included collective action, authority and regulation associated with the state.

The types of governance observed in the survey vary from country to country, with hierarchical governance predominating at the public level. Some countries exhibited multiple combinations: for example, Egypt is hierarchical and command and control; Senegal is hierarchical and decentralized; and Zambia is participatory and collective. Hope and Chikulo (2000) observed the need for policy reform, reflecting a movement away from the old values and norms of public sector administration to a concept of decentralization. There are three cases of hierarchical types of governance at the private sector level: Ghana, Malawi and Nigeria. Most of the firms in the countries exhibited participatory forms of governance: Kenya, Malawi, Rwanda, Senegal, South Africa, Uganda and Zambia. Three exhibited market governance, Malawi, Nigeria and Zambia; three employed collective action, and two others market types of governance. Ugandan firms showed collective action, while firms in Senegal demonstrated cooperative behaviour. The type and nature of governance adhered to are influenced by the political system in place and the complexity of the supply chain.

The employee age profile showed that the aquaculture labour force comprises predominantly youth individuals, with 75.4 percent workers aged between 20 and 39 years. Only 1.5 percent are younger than 20 years, 17.82 percent are between 40 and 49 years of age, 4.92 percent are between 50 and 64 years of age, and 0.32 percent are older than 65 years. This means that the age group targeted in aquaculture is ideal for future aquaculture expansion. Hishamunda *et al.* (2014) found the same range in employee

hires. Kaunda and Chimatiro (2015) also stated that approximately 60 percent of the African population is younger than 35 years of age, which makes it the "youngest" continent; consequently, gender and youth considerations should be emphasized in aquaculture policy formulation.

African countries must solve the pressing problems of hiring well-trained and skilful individuals to achieve the production targets in their national plans. Achieving the targets is only possible with the practice of good employment governance. The lack of trained staff, especially women and youth, is one of the major constraints to aquaculture development in Africa. While large-scale farms usually have access to trained workers, small-scale farmers often lack training in production practices and are unable to effectively participate in the governance of the industry. Education for small-scale farmers will help improve their skills and teach them how to use technologies to improve their farm productivity; this will also provide opportunities for youth and women to engage in appropriate technologies, which will increase their participation in dynamic governance. Most of the farms provide on-the-job training, but others do not. Training in aquaculture, communication, report writing and technical aspects (in-house and external) are examples given by some farm managers. The industry lacks a skills pool, whereby any farm manager can employ a worker with a specific skill when it is urgently needed.

Limited availability of skilled labour is an ongoing challenge for aquaculture firms. A lack of state-of-the-art knowledge and agribusiness skills, including poor record-keeping, sanitation, stocking, feeding and water management practices, stifles productivity and profits of small-scale fish-farm enterprises. Therefore, governments in sub-Saharan Africa must invest in capacity strengthening for aquaculture-extension workers and fish-farmer associations to facilitate training and expand good aquaculture practices. Farmer training conducted in Egypt and Ghana improved technology adoption and productivity among small-scale farmers (Dickson *et al*., 2016), and technology transfer programmes such as the Technologies for African Agricultural Transformation Aquaculture Compact (now available in over ten countries) show promising results (Dickson *et al*., 2016).

Despite gender having been on the development agenda for many years, gender inequalities continue to hamper sustainable aquaculture development (Kaunda and Chimatiro, 2015). High school diploma recipients or attendees among the women employed were low and slowed their progress in acquiring marketable skills after employment. Evidence suggests that countries that have improved gender equity have reached higher levels of economic growth and social well-being (Weeratunge, Snyder and Sze, 2010; World Economic Forum, 2006; Pigman, 2007).

While several reports state that there is no problem with gender equity, and the level of employment is oriented towards the younger generation, the statistical information supplied show that the employment of women is still less than desired and particularly low in Egypt and Senegal. Women are under-represented at the higher nodes of the supply chain, and the divulged reason is lack of education. A study by Ogunmefun and Achike (2017) suggested that high literacy level in fish farming enhances the management of fish farms through the adoption of improved farming practices (Rajaratnam and MacDougall, 2016). The belief is that men will continue to dominate the aquaculture value chain as more men than women gain access to education, production and marketing resources. The future of women employment balance in high-level aquaculture jobs is expected to diminish with decreases in the ratio of education between men and women. Unfortunately, the outcome depends on the growth in women registered at institutions of higher learning (Rajaratnam and MacDougall, 2016). The acquisition of training directed at improving basic skills results in the advancement of aquaculture and the improvement of food security, nutrition, economic growth and employment in Africa.

The CEO and managers of aquaculture enterprises occupied the highest positions. The numbers in each category depended on the size of farm, the number of species and the complexity of the operation. However, almost all farms adopted the same structure for operation. The expatriates employed were part of the foreign investor's organization and employed as a CEO but were part of the managing team and contributed specific expertise. The problem with foreign direct investment projects is that they must attract competent personnel and working in an international milieu, and the salaries and fees they pay must reflect the international market rates for the related skill levels (Stirrat, 2008). Not surprisingly, the scale of fees varies with speciality, just as it does for jobs in any other industry, and from the little information from the reports, the revelation is that the pay differences reflected cost of living and displacement allowances; there was no information on the expatriate competency or skill and whether the skill was available at the local level. It is interesting to note that all the farms comply with equal job-equal pay, and there was no discrimination among men and women or between Nigerian employees and employees from the ECOWAS subregion. According to Eneji, Mai-Lafia and Weiping (2013), the employment of expatriates in technological and professional jobs is not the cause of unemployment in Nigeria, but rather their employment plays a complementary role in the economy, where there are no qualified Nigerians for such positions. No instance of social dumping was observed. Berg (1966) suggests that there are differences between African countries and that everywhere the gap between wages of unskilled labour and university graduate remuneration is far greater than is found in advanced industrial countries. Hishamunda *et al.* (2014) disclosed that wages for managerial staff in aquaculture businesses are 10 to 20 times more than the labourers working on the farm. This is not the case in the present study, where managers earn 2.5 to 5 times higher salaries than the labourers. It should be remarked that women are less represented in managerial and supervisory roles, though they are as qualified educationally as men.

Almost all enterprises surveyed were compliant with most of the regulations in force. However, employers face numerous constraints hiring staff when the need for basic education may be a step in the right direction to achieving good governance in aquaculture employment. Compliance with minimum wage legislation should not be celebrated since only a small fraction of the total workforce is employed in aquaculture (Rani *et al.*, 2013), and aquaculture tasks require a certain amount of devotion. In the cases of the selected countries, most employers comply with all rules and regulations, recruiting staff with high school diplomas, some high school education or advanced education. In many countries, the issue of enforcement presents a serious challenge due to lack of transparency and communication, insufficiently staffed labour inspectorates, weak sanctions, restrictions on freedom of association and/or weak trade unions (Ghosheh, 2013; Benassi, 2011). All the companies mentioned that there was no discrimination in the amount of money offered to employees as this depends on the position and job description (equal job, equal pay principle) each individual holds. The salaries and wages in the sector were comparable to those in the livestock and crop subsector.

The aquaculture wage rates received in most of the selected countries are equal to or above those received in similar agricultural enterprises. However, the total benefit packages might not be the same. There is unevenness in the types of benefits received by employees engaged in aquacultural enterprises. Furthermore, there is a lack of consideration for employees engaged at various rungs of the supply chain (ILO, 2021). The benefit packages received by the various firms depend on the whims and fancies of the companies and the workers ability to negotiate. Attracting young men and women to the sector requires an increase in awareness of worker rights to access social security, including health care and paid sick leave, maternity and paternity leave, promotion and participation in pension schemes and other benefits, to induce worker self-worth and the willingness to participate in aquaculture programmes (ILO, 2021).

With the anticipated growth in the aquaculture industry, countries should begin to examine their recruitment and employment governance since a large percentage of the present and future workforce will be between the ages of 20 and 39 years old, and they will enter the labour force with higher levels of education and skills. The present set of legislations, which are often distributed at the levels of various ministries and departments, are often overly burdensome and cumbersome for small enterprises (Bhorat and van der Westhuizen, 2009). To further stimulate and protect private-sector investment and ensure sustainability of the sector, countries in Africa need to promote policies and solicit high-level support, as well as enforce regulations governing employment to enhance worker productivity (Chan *et al*., 2021). A general overhauling, especially in terms of enhancing the skills and education of workers, particularly those of women, and of the entire aquaculture industry in Africa is highly recommended. Governments must attempt to put in place a guide for the recruitment and employment of workers in the aquaculture industry.

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This study evaluates the nature of existing governance of employment from ten case studies of major and emerging aquaculture countries in Africa. The evaluation provides an in-depth analysis of gender equity and equality, occupation types, education and training, among other topics, through direct interviews with the managers and farmers of small, medium and large enterprises. The purpose was to assess employment governance in the aquaculture sector and to use the acquired knowledge to inform policymakers and industry leaders on the status of governance in employment and its implications for the development and sustainability of the sector in the continent. FAO encourages members to develop specific guidelines on labour employment in aquaculture.

ISBN 978-92-5-138715-3 ISSN 2070-7010

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CD0424EN/1/04.24