

Blue Economy:

Structural Transformation & Implications for Youth Employment

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Executive Summary

The 'blue economy' refers to economic activities that take place in the ocean and coastal areas and promote the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem. These activities include fisheries, aquaculture, and other related industries. Fisheries are a crucial component of the blue economy and provide a significant source of employment¹ throughout the value chain including harvesting, processing, and marketing. Although critical in supporting a country's structural transformation, sectors of the blue economy, including fisheries, are often undervalued and receive less attention by policymakers than primary activities like agriculture (Smith and Basurto, 2019; Bennett et al. 2021.) One reason contributing to this lack of attention is the lack of data and analysis on the economic impact of blue economy sectors, including their contribution to jobs and its role in structural transformation of countries.

National labor force and household surveys are valuable sources of information on employment trends, income levels, and demographic and geographic characteristics like age and subnational region. Despite some limitations, such as incomplete coverage of all sectors of the blue economy, these surveys have been underutilized in comprehending how blue economy sectors generate job opportunities for young people and contribute to a country's structural transformation. Using data from labor force surveys and household income and expenditure surveys for 18 countries, this Discussion Note explores the role of the 'blue economy', especially fisheries, as a source of productive and sustainable jobs for youth. The Note maps the blue economy along four dimensions of structural transformation (sectoral, spatial, organizational, occupational) to identify the subsectors of the Blue Economy that can provide more and better employment opportunities for young people. The analysis reveals that as countries develop, employment transitions from agriculture to fisheries. However, within the blue economy, employment shifts from fisheries to the manufacturing and services sectors, while also becoming more urban, capital-intensive, and skill intensive.

From a youth employment perspective, the Discussion Note highlights the importance of fisheries especially in low-income countries, given higher income levels from fisheries compared to agriculture. The Discussion Note also highlights the importance of the blue economy in many subnational contexts: evaluating the economic importance of the blue economy using national statistics may often mask the critical role that the blue economy plays in the specific subnational regions within the countries. The Note² also discusses the importance of understanding how the blue economy is changing in response to trends in technological innovation, environmental concerns, and the move towards a circular economy,³ which in turn affects the skills that youth would need to have in order to hold productive and meaningful jobs in the blue economy. Finally, the note discusses four main types of policy interventions that can help support job opportunities for youth in ocean-based industries: 1) deepening youth employment data analysis, 2) closing blue skills gaps, 3) improving the attractiveness and awareness of blue careers among youth; 4) promoting youth entrepreneurship and innovation in blue economy sectors.

This Discussion Note is part of the Solutions for Youth Employment (S4YE) Thematic Discussion Notes series that aims to promote discussion among policy makers and practitioners on opportunities to promote youth employment.⁴

¹ Estimated to exceed 68 million people worldwide (IHH, 2023)

² This Discussion Note was prepared by Gianluigi Nico (Jobs Group), Namita Datta (Program Manager, S4YE, Jobs Group) and Elena Mendoza (S4YE). The team received excellent comments and suggestions from Harrison Charo Karisa, Senior Fisheries Expert, ENB, World Bank, and Klas Sander, Senior Environmental Expert, ENB, World Bank. The team is grateful to Federica Saliola for her guidance.

³ See also S4YE's [Discussion](#) Note: The Circular Economy: Could it provide opportunities for better and greener jobs for youth? 2021

⁴ Solutions for Youth Employment (S4YE) is a multi-stakeholder global program that aims to identify, curate, and learn from innovations in youth employment programs. The S4YE Secretariat is housed in the Jobs Group of the Social Protection and Jobs Global Practice at the World Bank.

1. INTRODUCTION

Young people are disproportionately disadvantaged in the labor market than their adult counterparts.⁵ While the COVID-19 pandemic has aggravated the many challenges faced by young people in the labor market, a number of current and future labor market risk factors have already been identified, and projected to aggravate the ongoing youth employment crisis.⁶ These risks include, among others, geopolitical and macroeconomic risks, e.g. supply chain disruptions caused by conflicts in Ukraine and elsewhere, or the rising inflation that erodes the purchasing power of people and hampers future economic growth.

While addressing these global labor market challenges is key to achieving the SDG target 8.6 --reduce the proportion of young people not in employment, education, or training, longer-term objectives that support environmental sustainability and simultaneously promote inclusive economic growth for young people remain a key priority in the development agenda.

The process of structural transformation of the economy is key to creating important job opportunities for young people and ensuring a successful transition of young people from education to work. However, to ensure this transition, the transformation of economic structures must reconsider the dominant economic growth paradigm, which can no longer ignore existing interactions between economic growth and natural resource degradation. This implies expanding the growth capacity of economic sectors that are environmentally sustainable. Investing in the Blue Economy represents an opportunity to accelerate the process of structural transformation, while making labor market structure more sustainable and more inclusive for young people.

The Discussion Note is structured as follows. Sections 1.1 to 1.4 present some descriptive statistics on youth in the labor market (1.1), provide a definition of the Blue Economy (1.2), why the Blue Economy is important for development (1.3) and how it can be framed within the process of structural transformation. Section 2 discusses the results from the data analysis. In more detail, we present an analysis of the Blue Economy structural transformation (2.1) and on the role that this process can play in generating gainful employment opportunities for young people (2.2). Then, we provide an estimate of the number of jobs in the Blue Economy (2.3), and on the important role of the Blue Economy for local youth employment creation (2.4), with a focus on fisheries (2.5). We conclude this section by focusing on the greater poverty reducing power of fisheries, compared to agriculture (2.6). Section 3 highlights some of the emerging trends in the Blue Economy. Section 4 discusses how job opportunities in the Blue Economy can be scaled up.

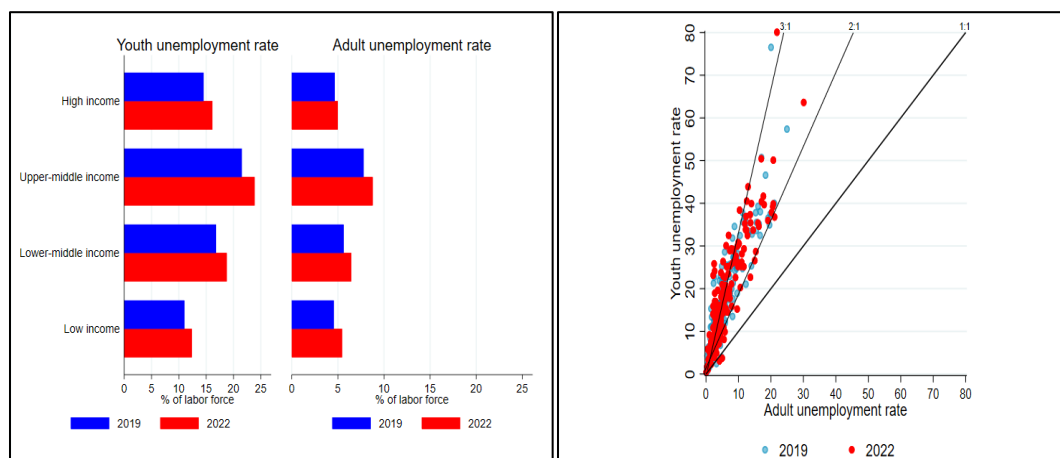
⁵ Youth is defined in this note as the age range between 15 to 29, used widely in global literature and by the World Bank when studying youth. However, some countries may use a different age range, such as 15 to 24 years old. While using the 15-24 age range can still capture young people's participation in the labor market in low-income countries, where young people typically enter the workforce at early ages, it underestimates young people's participation in high-income countries, where young people are often still in school or transitioning into the workforce. This is important for statistical purposes, as it ensures data comparability across countries and income groups.

⁶ ILO, 2022.

1.1 A PROLONGED YOUTH EMPLOYMENT CRISIS

The youth employment crisis has worsened during COVID. In 2018, before the outbreak of the COVID-19 pandemic, youth were 3.2 times more likely to be unemployed than adults. The COVID-19 pandemic has had a more negative impact on young people. In 2020, the youth unemployment rate rose by 2.4 percentage points, from 14% in 2018 to 16.4% in 2020. During that period, many young people also become discouraged and left the labor market (they stopped searching for a job because they thought no job was available). The inactivity rate rose sharply, from 58.6% in 2018 to 61.4% in 2020, increasing by 2.8 percentage points. Globally, the average youth unemployment rate stood at 16.4% before the Covid 19 pandemic, increasing by almost 2 percentage points (18.4%) in 2022⁷. Compared to the pre-covid rate, youth unemployment has increased 2.6 times as fast as the adult unemployment rate, across all income groups. Given a projected “jobs gap” of 28 million jobs annually in South Asia and Sub-Saharan Africa⁸, and about 75 million young people unemployed in 2021, the world is facing an unprecedented youth employment crisis. In addition, the high youth unemployment numbers do not fully convey the magnitude of the crisis, since in most low-income countries the challenge is not youth unemployment (12.4%), but informality, working poverty and underemployment.

Figure 1. Average youth and adult unemployment rate before and after the Covid 19 pandemic, by income groups (left-side panel) and Ratio youth-to-adult unemployment rate (right-side panel).



Source: own calculation based on ILOSTAT 2022

An immediate measure of the relative disadvantage young people face in the labor market is the ratio youth-to-adult unemployment rate. On average young people are almost three times more likely to be unemployed compared to adults, even in countries where the youth unemployment rate is relatively low (Figure 1). For instance, in South-East Asia and the Pacific the average youth unemployment rate is less than 13 %, almost 2.5 times lower than the youth unemployment rate in North Africa (32.1 %). But in the region, there are 4 young unemployed for every one adult jobseeker. In Sub-Sharan Africa, the average youth unemployment rate stood at 18.4% in 2022, 2.4 times higher than the average adult unemployment rate. Of the 189

⁷ ILOSTAT, 2022.

⁸ World Bank, 2019.

countries, only two countries had a lower youth unemployment rate compared to their adult counterpart (Liberia and Kazakhstan).

1.2 WHAT IS THE BLUE ECONOMY?

The ‘blue economy’ refers to the range of economic activities⁹ that promote the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem."¹⁰ To be considered part of the blue economy, maritime activities need to: “1) provide social and economic benefits for current and future generations; 2) restore, protect, and maintain the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems; and 3) be based on clean technologies, renewable energy, and circular material flows that will reduce waste and promote recycling of materials”.¹¹

Blue economy sectors include traditional maritime industries and emerging new ones. Traditional sectors involve activities like fisheries, tourism, and maritime transport, while emerging ones, cover ocean renewable energy, marine biotechnology, and offshore renewable energy. Although aquaculture is not a new sector, it is considered an emerging sector which has gradually expanded over the past two decades. For example, FAO data shows that global employment in aquaculture increased by almost 53% between 2000 and 2020, from 13.5 million to 20.6 million people. In comparison, the fisheries sector only experienced a 10% growth rate over the same period¹². One central characteristic of these sectors is that they contribute to the de-coupling of ocean-based socio-economic development from environmental degradation.¹³

For the data analysis in this Discussion Note, the employment sectors of the Blue Economy included are based on the International Classification of Economic Activity (ISIC) standards agreed for use by UN member states (UN, 2015) as a standard by which measures of economic activity can be compared in the System of National Accounts. However, some of the sectors or activities of the Blue Economy are not directly available in survey instruments because they are aggregated in broader economic sectors which are not strictly related to the Blue Economy¹⁴. Table 1 below sectors of the Blue Economy identified in survey instruments.

⁹There is no commonly accepted definition of the blue economy, and different organizations use their own terms and definitions. The terms are used interchangeably such as oceans economy, maritime economy, sustainable blue economy, blue growth, blue justice, blue biotrade. See Annex B.

¹⁰[World Bank, 2017](#) : Infographic What is the Blue Economy.

¹¹[World Bank, 2017](#): The Potential of the Blue Economy. Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries.

¹² [FAO, 2022](#): The State of World Fisheries and Aquaculture 2022

¹³[UNEP Blue Economy Concept Paper](#)

¹⁴ For example, the ISIC classification captures “maritime and coastal tourism”, one of the key sectors of the Blue Economy within the broad spectrum of economic activities related to “travel agency, tour operator, reservation service and related activities”. However, it does not include a specific sector for “maritime and coastal tourism”.

Table 1. Standard sectors of the Blue Economy and sectors of the Blue Economy available in survey instruments

Broad sector	ISIC code	Sector of the Blue Economy from survey instruments
Fishing and aquaculture	0311	Marine fishing
	0312	Freshwater fishing
	0321	Marine aquaculture
	0322	Freshwater aquaculture
Manufacture of food products	1020	Processing and preserving of fish
Water transport	5011	Sea and coastal passenger water transport
	5012	Sea and coastal freight water transport
	5021	Inland passenger water transport
	5022	Inland freight water transport
Warehousing and support activities for transportation	5222	Service activities incidental to water transportation
Water supply	3600	Water collection, treatment, and supply

1.3 WHY IS THE BLUE ECONOMY IMPORTANT FOR DEVELOPMENT?

Economically, a large number of countries depend on ocean-based industries for their gross domestic product, trade, and public revenues.¹⁵ Oceans generate between US\$3 and 6 trillion global revenues each year (or about 5 to 10 per cent of global GDP),¹⁶ and enable the transport of most of the goods (80 percent) traded worldwide.¹⁷ The contribution of ocean-based industries to the global economy is projected to grow rapidly and, if done sustainably, it could double by 2030.¹⁸ Among the main drivers of growth are the increasing demand for food and nutrition and alternative energy sources, as well as the global growth of tourism and research and development (R&D) activities in ocean technologies.¹⁹

Environmentally, healthy oceans provide essential ecosystem services for businesses and people to thrive. For example, oceans contribute to climate change mitigation, absorbing about 30 percent of total carbon dioxide produced by people.²⁰ Sustainable blue industries further support carbon capture by decarbonizing maritime transport, greening ports and supporting the energy transition with the production

¹⁵[World Bank, 2016](#): Oceans 2030. Financing the Blue Economy for Sustainable Development.

¹⁶[UN Ocean Conference 2017](#)

¹⁷[UNCTAD, 2018](#): Review of Maritime Transport 2018

¹⁸[OECD \(2016\), The Ocean Economy in 2030](#)

¹⁹[World Bank, 2017](#): The Potential of the Blue Economy. Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries.

²⁰[UN Ocean Conference 2017](#)

of offshore renewable energy.²¹ The blue economy also offers an opportunity to accelerate action to tackle pollution,²² by for example, reducing pollution from fishing vessels through circular design of fishing gear and ship recycling,²³ as well as promoting sustainable tourism practices that reduce marine pollution both from land-based and ship-based sources.²⁴ Finally, sustainable blue economy industries support the conservation of marine biodiversity, which is vital for coastal economies that rely on large fish stocks,²⁵ and for tourism destinations that depend on the variety of marine life to attract visitors. Only in Europe, it is estimated that investing one euro in marine protected areas generate triple economic benefits for local economies.²⁶

Socially, millions of people depend on oceans for their livelihood. Nearly 40 percent of the global population lives close to the coast.²⁷ From poor fishing communities to the world's largest cruise port operators, more than 3 billion people — some among the poorest — are highly dependent on healthy oceans for jobs and food²⁸. The role of some of the sectors of the Blue Economy, such as fisheries, is highly relevant for local economies proximate to water bodies, where many people depend on ocean-dependent livelihoods.²⁹ According to some employment estimates, more than 350 million direct and indirect jobs across the globe are linked to oceans.³⁰ According to recent estimates (2018), the Blue Economy in Africa has generated almost US\$300 billion and has created jobs for at least 49 million people. Furthermore, it is projected that the Blue Economy in Africa will generate an additional 8 million jobs by 2050, helping to support the growing number of people entering the African labor market³¹. Though they receive less attention from policymakers than other primary activities like agriculture, the economic sectors of the Blue Economy can play a significant role in generating productive employment for young people and reducing within and between country inequalities.

1.4 FRAMING THE BLUE ECONOMY WITHIN THE PROCESS OF STRUCTURAL TRANSFORMATION

The conceptual framework underlying the process of economic transformation (Kuznets, 1977) suggests that as income increases, the labor market structure of a given country evolves along four complementary dimensions. The process of structural transformation takes place through a sectoral, spatial, occupational, and organizational shift of the employment composition. Empirically, data shows that as incomes increase, the employment distribution moves from low-productivity sectors (such as agriculture) to high-productivity sectors in the economy; economic activities and jobs move from rural and remote areas to towns and cities to benefit from agglomeration economies to reap benefits of scale; production becomes increasingly

²¹[European Commission, n.d.](#): Sustainable Blue Economy. A New Approach for a Sustainable Blue Economy in the EU.

²²[European Commission, 2021](#): Putting the Blue into the Green. Sustainable Blue Economy

²³[European Commission, n.d.](#): Sustainable Blue Economy. A New Approach for a Sustainable Blue Economy in the EU.

²⁴[World Bank, 2017](#): The Potential of the Blue Economy. Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries.

²⁵[European Commission, n.d.](#): Sustainable Blue Economy. A New Approach for a Sustainable Blue Economy in the EU.

²⁶[European Commission, 2021](#): Putting the Blue into the Green. Sustainable Blue Economy

²⁷[World Bank, 2016](#): Oceans 2030. Financing the Blue Economy for Sustainable Development.

²⁸[OECD, 2020](#): Sustainable Ocean for All: Harnessing the Benefits of Sustainable Ocean Economies for Developing Countries, The Development Dimension, Éditions OCDE, Paris.

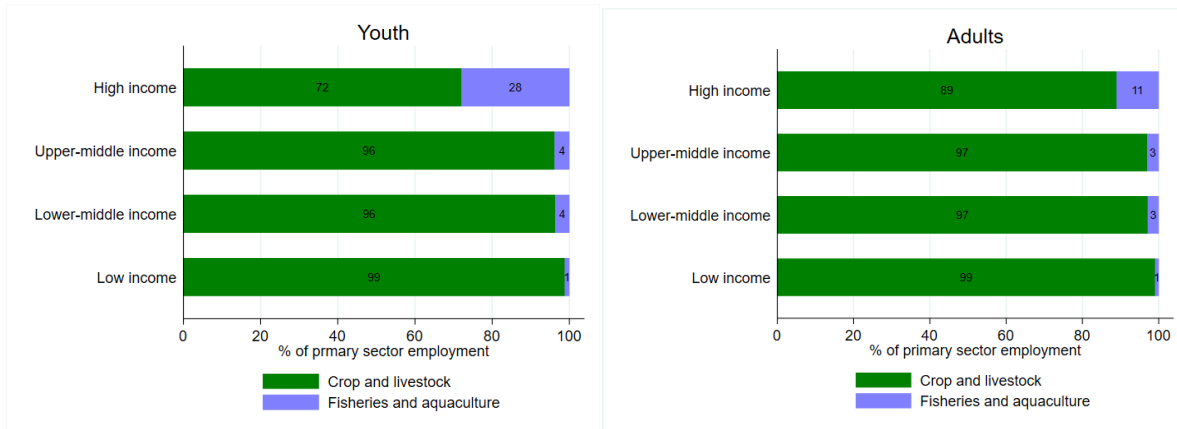
²⁹ Simmance et al., (2022).

³⁰[UNCTAD, 2016](#)

³¹[World Bank 2018](#): Jobs and Livelihoods in the Blue Economy

organized within firms, with jobs that move from capital thin self-employment to capital-deep wage employment in firms; the division of labor in firms allows workers to specialize in tasks that match their competencies, as firms diversify and implement new technologies to produce products that are more sophisticated, the task complexity of occupations in firms changes, leading to a substantial shift in the occupational composition of labor, which moves from lower to higher skills occupations. The process of structural transformation operates through wealth-based mechanisms through increased labor productivity growth to raise household incomes and increase in national and local economic. The importance of the Blue Economy in the process of structural transformation is evident in the distribution of employment within the primary food sector. Across 114 countries, data shows that while fisheries and aquaculture only account for 2% of total primary food sector employment (including crop, livestock, fisheries, and aquaculture), they become increasingly more important for employment creation as countries develop, given a gradual shift away from crop and livestock production. This trend is particularly important for young people. In high-income countries, fisheries and aquaculture provide over one-fourth (28%) of total youth employment in the primary food sector, compared to only 10% for adults (Figure 2). This shift away from crop and livestock production towards the fishery and aquaculture sector is also driven by the rising demand for more protein- and nutrient-rich food, including aquatic food products, as household incomes grow (Bennett’s Law). Consequently, the share of employment in the fishery and aquaculture sector increases. The growing importance of the fisheries and aquaculture sector for employment creation, particularly for young people, emphasizes the key role played by some segments of the Blue Economy in the process of structural transformation.

Figure 2. Youth and Adult Employment in primary food sector



Source: Team estimates based on ILOSTAT data for 114 countries

Broader structural change is needed for good job creation for young people. However, there exist important knowledge gaps about how the Blue Economy can promote a sustainable process of structural transformation for young people, through improved livelihoods and the creation of productive jobs. Using data extrapolated from labor force surveys and household income and expenditure surveys for eighteen countries, this Discussion Note provides empirical evidence on the job-creating potential of the Blue Economy for young people. This is done by mapping youth employment along the four dimensions of the structural transformation (sectoral, spatial, organizational, occupational), and by identifying the sectors of the Blue Economy that can provide more and better employment opportunities for young people. The methods and data used for the following analysis are presented in Annex A.

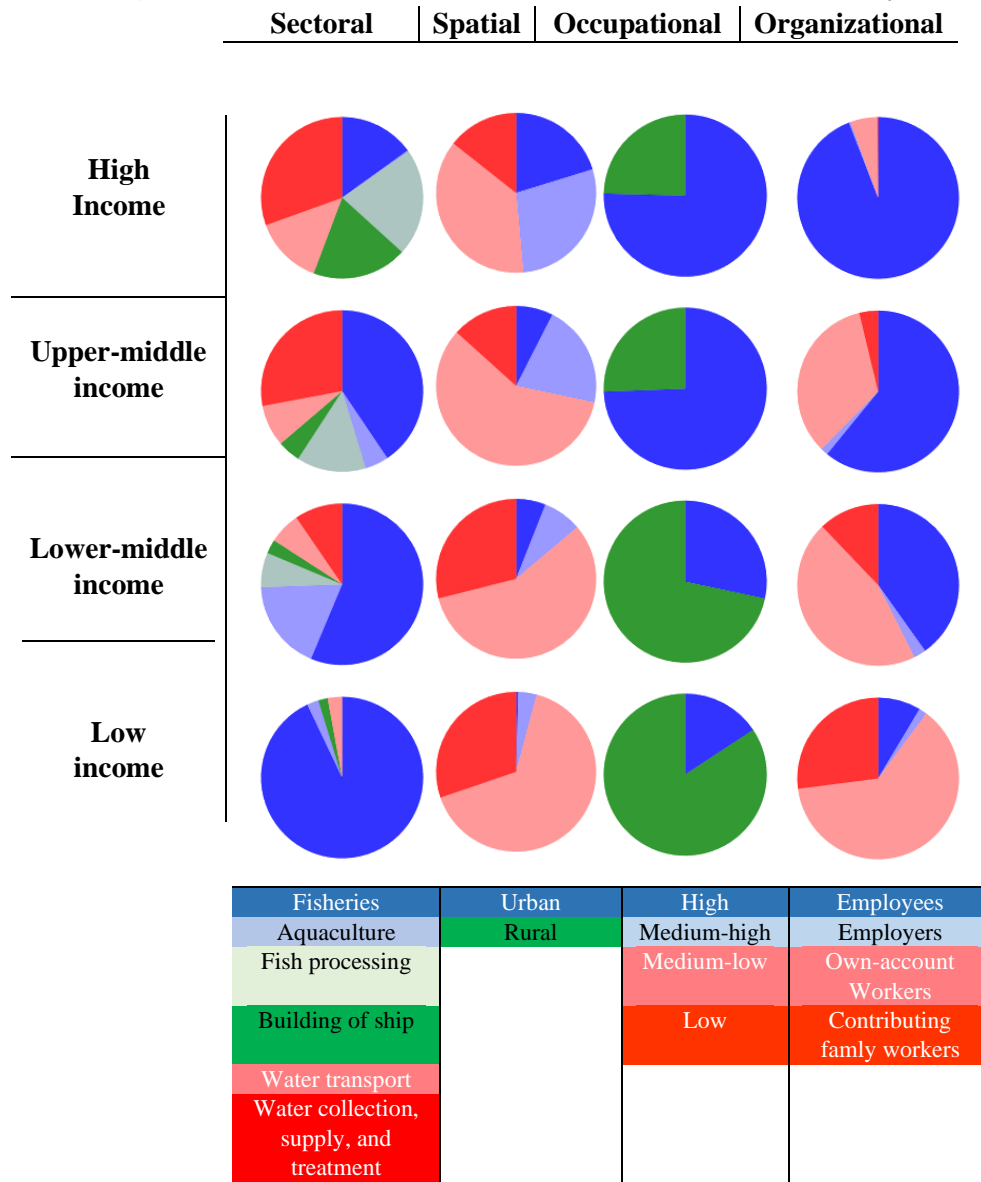
2. RESULTS

2.1 STRUCTURAL TRANSFORMATION IN THE BLUE ECONOMY

To fully appreciate the structural evolution of the Blue Economy it is important to understand the reallocation of labor and the reorganization of work and workers within the sectors of the Blue Economy, as countries develop. Here we attempt to provide a first quantification of the process of structural transformation within the Blue Economy. Figure 4 maps the employment structure of the Blue Economy along the four dimensions of the structural transformation (sectoral, spatial, organizational, occupational) using pooled cross-sectional data for 18 countries collected through labor force surveys and household income and expenditure survey in order to estimate the number of people employed in the subsectors of the Blue economy (i.e. fisheries, aquaculture, fish processing ; building of ships and other fisheries input, transport of goods and people through water channels and water collection, treatment and supply), whether people employed in the blue economy live in urban or rural areas, whether their occupation (i.e. tasks and duties that characterize their jobs) requires low, medium or high skills, and whether they are paid employees or self-employment. (See Figure 3).

As countries develop, employment shifts from fisheries towards the manufacture and service provision sectors of the Blue Economy. Growth in fishery productivity which occurs, for example, via technological innovation drives a substantial change in the sectoral distribution of employment within the Blue Economy. As fishery labor productivity increases, the sector provides more fish to be processed in the food processing sector while demanding more inputs from the manufacturing sector, (e.g. ships, boats and other floating structures for transportation or commercial purposes related to fisheries) to keep fishery catches moving efficiently. Higher levels of labor productivity in fisheries also drive an expansion in local and international trade of fish products, eventually leading to more employment opportunities in the service activities connected to fisheries, like sea, coastal and inland water transport. The process of structural transformation also drives an expansion of incidental activities for the transport of passengers or freight on vessels designed for operating on sea, coastal or inland waters. As a result, the share of employment in fisheries decreases for higher income levels, along with a corresponding increase in the share of employment in manufacturing and services of the Blue Economy (Figure 3, sectoral dimension).

Figure 3. Process of structural transformation in the Blue Economy



Source: Team estimates based on 18 HIES and LFS

Rising incomes drive a higher demand for more processed fish as well as service provision.

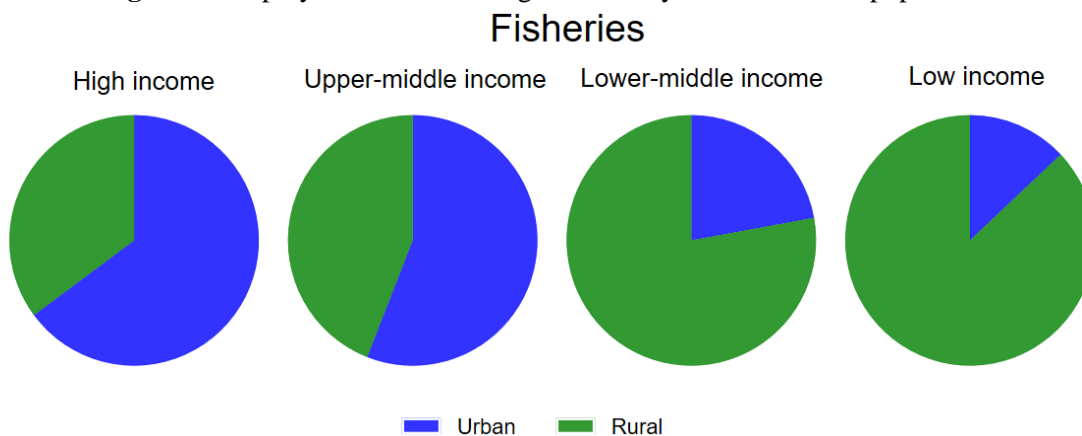
Productivity gains in fisheries drive income increases and a declining household food expenditure share (Engel’s Law). Food expenditures in absolute value still increase which eventually drive a higher demand for “more protein- and nutrient-rich, processed” food.³² The higher demand for processed food has implications on the job creation process along the segments of the Blue Economy. As the demand for food changes towards more processed fish, jobs are created in the processing, distribution, and service sectors of the fishery value chain (Figure 3). The absolute number of jobs in fishery reduces dramatically, although they become more productive and well paying. For example, data shows that in the three high income

³² Christiaensen et al., 2021

countries analyzed the share of employment in fisheries accounts for an estimated 15% of total employment in the blue economy, as compared to almost 93% in low-income countries. In high income countries more than half of total employment in the Blue Economy is concentrated in the manufacturing and service activities of the Blue Economy, which is almost 85% when we also include activities connected to water collection, treatment, and supply (Figure 4, sectoral dimension).

Employment in the Blue Economy gradually urbanizes, largely driven by the manufacturing and service sectors. In high income countries, even fishery employment becomes partly urban. The urbanization of the non-fishery sectors of the Blue Economy as they become more capital intensive, drives the gradual urbanization of employment in the Blue Economy. Urban areas favor the expansion of the manufacturing and services activities of the Blue Economy given agglomeration effects in towns and secondary cities and proximity to buyers and consumers. For example, in high income countries, more than three-quarter of total employment in the Blue Economy is in urban areas; in low-income countries the share of urban employment in the Blue Economy accounts for less 16% of total employment in the Blue Economy. Fishery employment remains mostly rural throughout, except in upper-middle and high-income countries where a large share of it becomes urban³³ (Figure 4)

Figure 4. Employment in harvesting fisheries by urban and rural population.



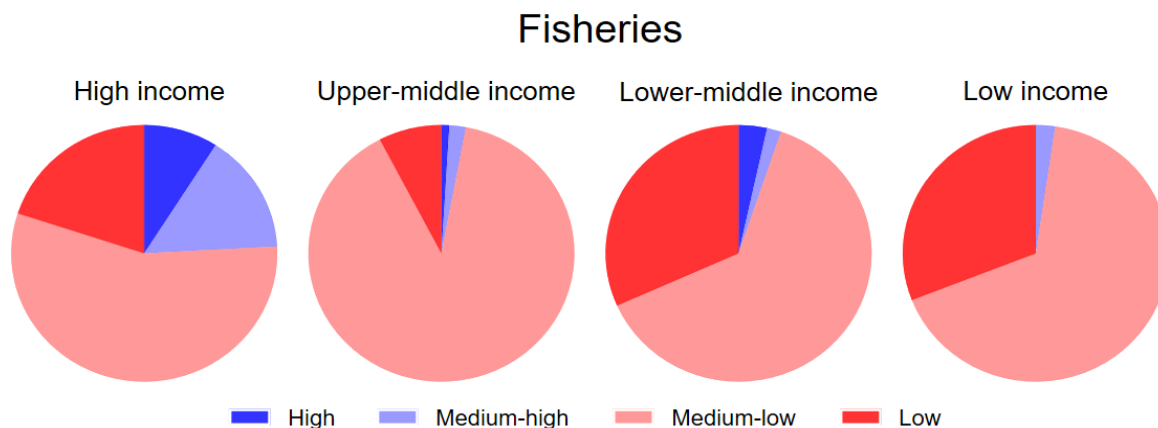
Source: own estimates based on LFSs and HIESs

Skill intensity in the Blue Economy increases as countries develop, both in fisheries and other subsectors. As income increases capital-intensive firms in the Blue Economy expand, both in fisheries and in other manufacturing and service sectors of the Blue Economy. Newly developed technologies also increase the demand for high and medium-high skilled workers (Figure 3, occupational dimension). The development process eventually induces a substantial change in the skills required to perform these jobs, as well as in the way the food production system is organized. For example, the use of machinery to transform raw fish into processed fish increases demand for high-skill jobs that include maintenance and repair technicians. Food scientists are also employed in the food industry for the development of new product lines or for establishing quality control measures. Given the higher degree of complexity in the division of labor, other jobs like office, bookkeeping, and managerial jobs are required. Consistently,

³³ This data only shows the distribution of employment in fish harvesting by rural and urban area. Data does not include fish processing activities

almost half of total jobs in the Blue Economy in high income countries require high or medium-high occupations. The fishery sector also becomes more skill intensive as countries develop. As capital intensity increases and fishery modernizes, the sector becomes more skill intensive, especially in high income countries. (Figure 5).

Figure 5. Distribution of employment in fisheries, by skills and income group



With better capitalized firms there is higher demand for paid employees and a corresponding decline in the share of own-account and contributing family workers. Given a larger share of better capitalized and market-oriented firms in the Blue Economy, the organizational dimension of the labor market is dominated by paid employees, and a reduction in the share of own-account and contributing family workers. In high-income countries, for example, the share of employees who hold a job in the Blue Economy account for an estimated 94% of total employment in the Blue Economy, as compared to only 9% in low-income countries (Figure 3, organizational).

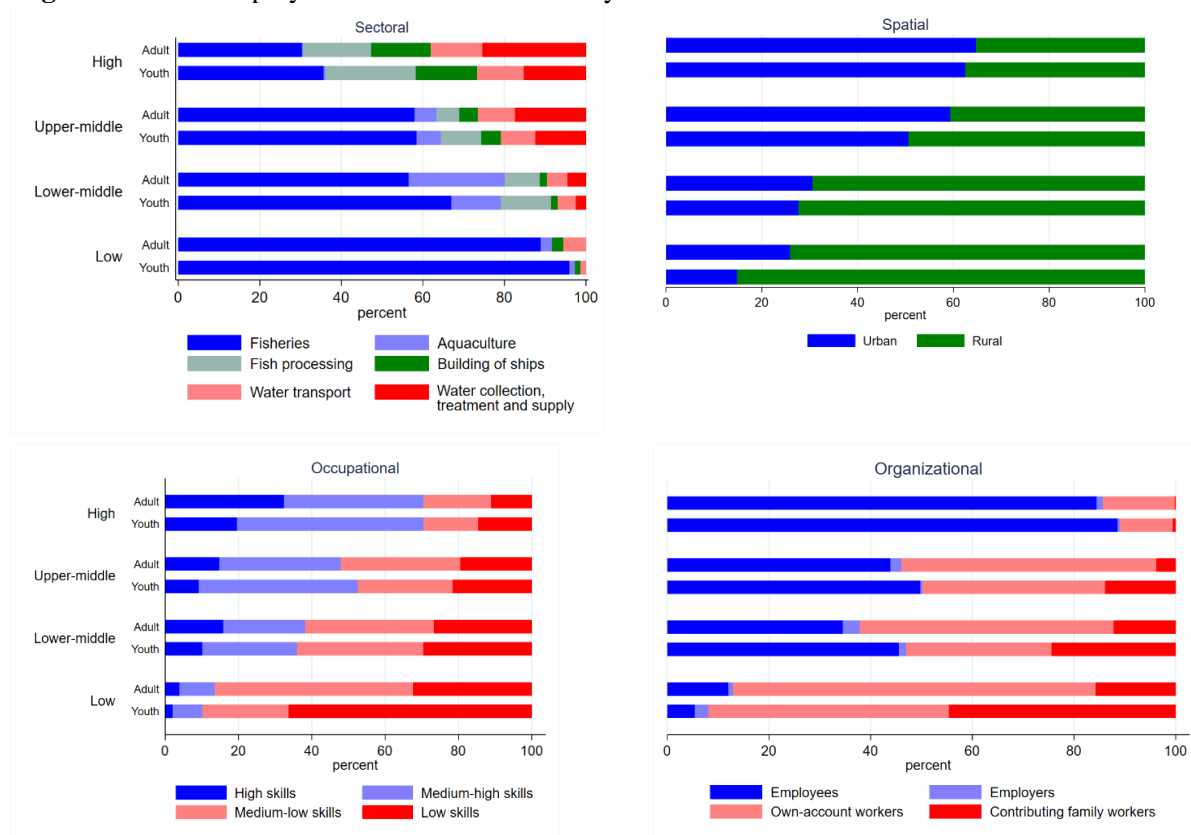
2.2 YOUNG PEOPLE IN THE BLUE ECONOMY

Fisheries is a key sub sector of the blue economy from a youth perspective. In addition to the capacity of the fishery sector to generate employment opportunities for an estimated 93% of the total employed population in the Blue Economy of low-income countries, the sector is also a dominant source of employment for young people (15-29), especially in low and lower-middle income countries. Firstly, according to data extracted from LFSs and HIESs, in low and lower-middle income countries the fishery sector absorbs respectively 96% and 67% of total young people employed in the Blue Economy, although participation in fisheries reduces dramatically in high-income countries (35.6 % of total youth employment in the Blue Economy). Secondly, compared to the adult population, young people have a higher likelihood of employment in the fisheries sector of the Blue Economy. For example, in high income countries, the share of young people employed in the fishery sector is 5.3 percentage points higher than the corresponding adult share in fisheries. In a similar vein, in low and lower-middle income countries the share of young people employed in fisheries (as a percentage of total young people employed in the Blue Economy) is respectively 7 and 10 percentage points higher than the adults' share, suggesting that young people have a relatively higher representation in fisheries than their adult counterpart (Figure 7, sectoral dimension).

The Blue Economy is also a dominant source of employment for rural young people who tend to be represented more than their adult counterparts. For example, regardless of the income group, the share of rural youth who engage in the Blue Economy is always higher compared to the corresponding share of adults, denoting the importance of the Blue Economy to absorb a relative higher share of the rural youth population (Figure 7, spatial dimension).

Young people show a higher likelihood to be represented in ‘elementary’ occupations of the Blue Economy. Compared to adults, youth employment in the Blue Economy is more likely to be concentrated in low-skills occupations, especially in low-income countries (Figure 6, occupational dimension). For example, in low-income countries nearly two-third of total jobs available for young people in the Blue Economy need low skills, down to 14% in high-income countries. In general, in low-income countries, the likelihood to engage in low-skill jobs of the Blue Economy is two times higher for young people than for adults, down to 1.3 times in high-income countries.

Figure 6. Youth employment in the Blue Economy on the four dimensions of structural transformation



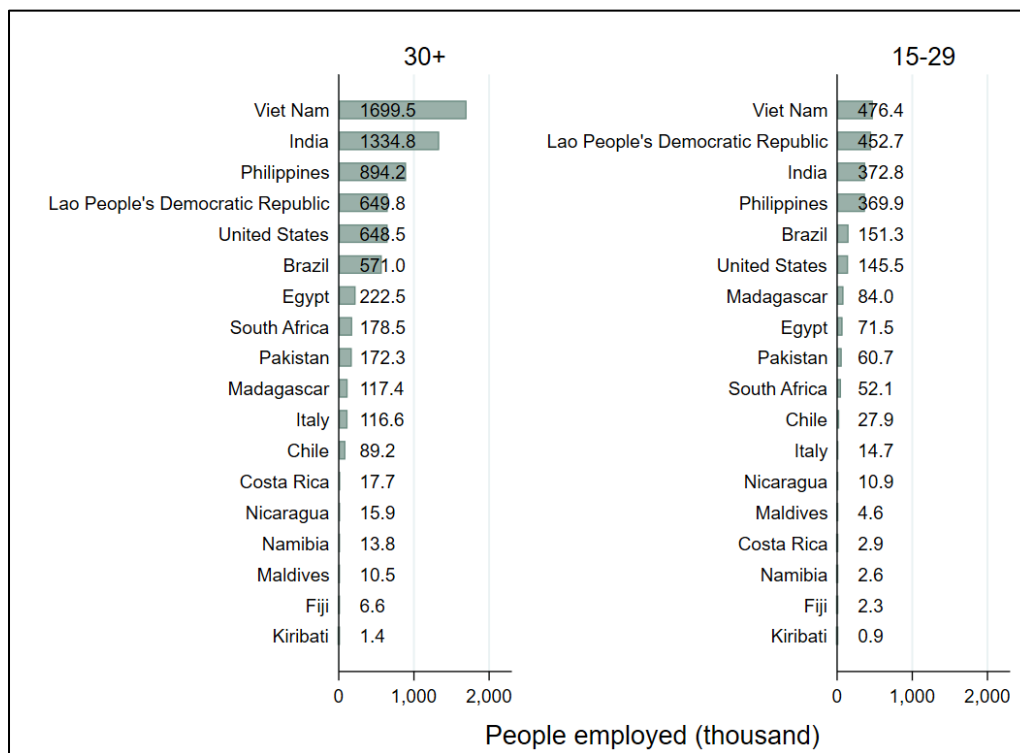
Source: own estimates based on LFSs and HIESs

2.3 HOW MANY PEOPLE WORK IN THE BLUE ECONOMY?

More than 9.1 million people of working-age are employed across the six sectors of the Blue Economy in the 18 low, lower-middle, upper-middle, and high-income countries that were studied. At the national level, just four countries in Asia (out of eighteen countries analyzed) are home to an estimated 69% of all people employed part or full-time in the Blue Economy. Countries with a significant number of people in the Blue Economy include Vietnam (2.2 million), India (1.7 million) Philippines (1.3) and Laos (1.1).

Young people in the Blue Economy account for an estimated 25% of total employment in the Blue Economy analyzed (2.3 million people) and, of the remainder, 6.8 million people are aged 30 years or above. In general, the number of adults employed in the Blue Economy is almost 3 times higher than the number of young people. This is not surprising as many young people are still in school and transitioning their way into the labor market, although in a few countries the number of young people employed in the Blue Economy is almost as high as their adult counterpart (e.g., in Madagascar, Laos and Nicaragua (Figure 7).

Figure 7. Number of people employed in the Blue Economy, by age group



Source: own estimates based on LFSs and HIESs.

While the total number of workers can indicate the importance of the Blue Economy for a country, it does not adequately convey the relative contribution of the Blue Economy in smaller countries. The employment

rate³⁴ provides a better measure of the contribution of the Blue Economy to employment creation for the total and youth population.

In general, the employment rate in the Blue Economy tends to be considerably lower compared to agriculture. Survey estimates also suggest that the contribution of the Blue Economy as well as agriculture to employment decreases as countries develop (Table 3).

Table 2. Total and Youth employment rates in the Blue Economy and agriculture

	Employment rate			
	15+		15-29	
	Blue Economy	Agriculture	Blue Economy	Agriculture
High income	0.32	1.25	0.25	0.98
Upper-middle income	0.48	4.59	0.33	3.52
Lower-middle income	0.61	19.09	0.43	11.14
Low income	1.55	63.20	1.52	60.07
Total	0.54	14.13	0.40	9.43

Source: Team estimates based on LFSs and HIESs

While in general the employment rate in the Blue Economy tends to be lower than the employment rate in agriculture, in some of the eighteen geographically diverse countries (Figure 8), the Blue Economy plays a significant role in employment for youth and adult alike. For example, in Laos the youth employment rate in the Blue Economy is 24.2 % (15-29), approximately 14.1 percentage points higher than the youth employment rate in agriculture (14.7%). Similarly, in the Maldives the youth employment rate of the Blue Economy is 4.2%, 1.6 percentage point higher than the youth employment rate in agriculture (2.8%).

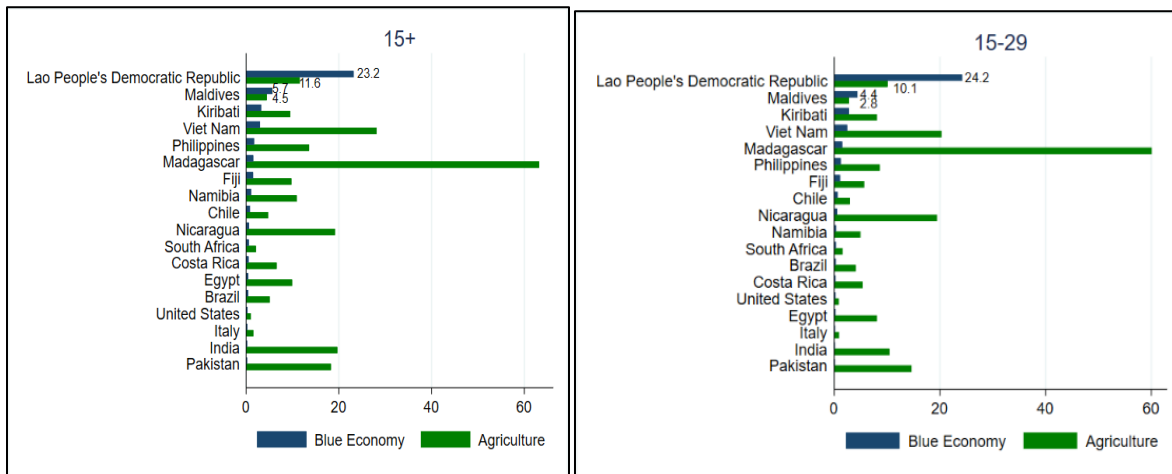
In many local contexts fisheries support more livelihoods than agriculture. In many countries, employment in the harvesting segment of fisheries is often concentrated in a few local areas close to inland or coastal water bodies. In some areas close to these water bodies, the subnational youth employment rate in the harvesting sector of fisheries tends to be much higher than the agriculture one.

For some of the administrative areas studied, for example in the Maldives, Laos, Kiribati and India, the number of young people employed in fisheries is between 6 and 66 times higher than the number of people who engage in agriculture. In general, data shows that in 23 out of 37³⁵ administrative areas employment in fisheries is higher than employment in agriculture (Figure 14).

³⁴ The total and youth employment rate in the Blue Economy are defined as the percentage of employed persons in the Blue Economy, in total and youth working-age population. The total working-age population comprises all persons aged 15 years old and above. The youth working-age population comprises all persons aged 15-29 years old.

³⁵ These 37 administrative areas were selected given the importance of fisheries for employment creation.

Figure 8. Employment in the Blue Economy as compared with Agriculture



Source: Team estimates based on LFSs and HIESs.

2.4 THE IMPORTANCE OF THE BLUE ECONOMY FOR LOCAL EMPLOYMENT CREATION

The Blue Economy plays a key role for local employment creation. As with any economic activity, the relative importance of the Blue Economy for youth employment creation depends, to some extent, upon the level at which this is measured (global, national, local, etc.). While employment in the Blue Economy may account for a relatively small fraction of national employment in a given country (see section 3.2), it may form a much larger share of employment for certain subnational areas. To illustrate this point, we calculated the subnational youth employment rates (at the regional, district or atoll level, depending on the country) and compared them with the corresponding national youth employment rates (Table 3).

Table 3. National and subnational youth employment rates in the Blue Economy

Country	Level	Adm Name	Youth employment rate
Kiribati	National	Kiribati	2.8
	<i>Subnational</i>	<i>Tereitannano</i>	62.7
Lao People's Democratic Republic	National	Lao People's Democratic Republic	24.2
	<i>Subnational</i>	<i>Saravane</i>	57.0
Maldives	National	Maldives	4.4
	<i>Subnational</i>	<i>Faafu Atoll</i>	18.6
Madagascar	National	Madagascar	1.5
	<i>Subnational</i>	<i>Boeny</i>	14.3
Fiji	National	Fiji	1.1
	<i>Subnational</i>	<i>Eastern</i>	7.1
Chile	National	Chile	0.7
	<i>Subnational</i>	<i>Región de los Lagos</i>	6.9
India	National	India	0.1
	<i>Subnational</i>	<i>Lakshadweep</i>	4.7
Viet Nam	National	Vietnam	2.5
	<i>Subnational</i>	<i>Red River Delta</i>	4.4
Philippines	National	Philippines	1.3

	<i>Subnational</i>	<i>Autonomous Region in Muslim Mindanao</i>	<i>4.4</i>
Egypt	National	Egypt	0.2
	<i>Subnational</i>	<i>North Sinai</i>	<i>4.1</i>
Namibia	National	Namibia	0.4
	<i>Subnational</i>	<i>Erongo</i>	<i>2.9</i>
United States	National	United States	0.2
	<i>Subnational</i>	<i>Maine</i>	<i>2.2</i>
Brazil	National	Brazil	0.3
	<i>Subnational</i>	<i>Pará</i>	<i>1.8</i>
Costa Rica	National	Costa Rica	0.2
	<i>Subnational</i>	<i>Pacífico central</i>	<i>1.7</i>
South Africa	National	South Africa	0.3
	<i>Subnational</i>	<i>Western Cape</i>	<i>1.1</i>
Italy	National	Italy	0.2
	<i>Subnational</i>	<i>Sardegna</i>	<i>0.9</i>
Pakistan	National	Pakistan	0.1
	<i>Subnational</i>	<i>Sindh</i>	<i>0.4</i>
Nicaragua	National	Nicaragua	0.6
	<i>N.A.</i>	<i>N.A.</i>	<i>N.A.</i>

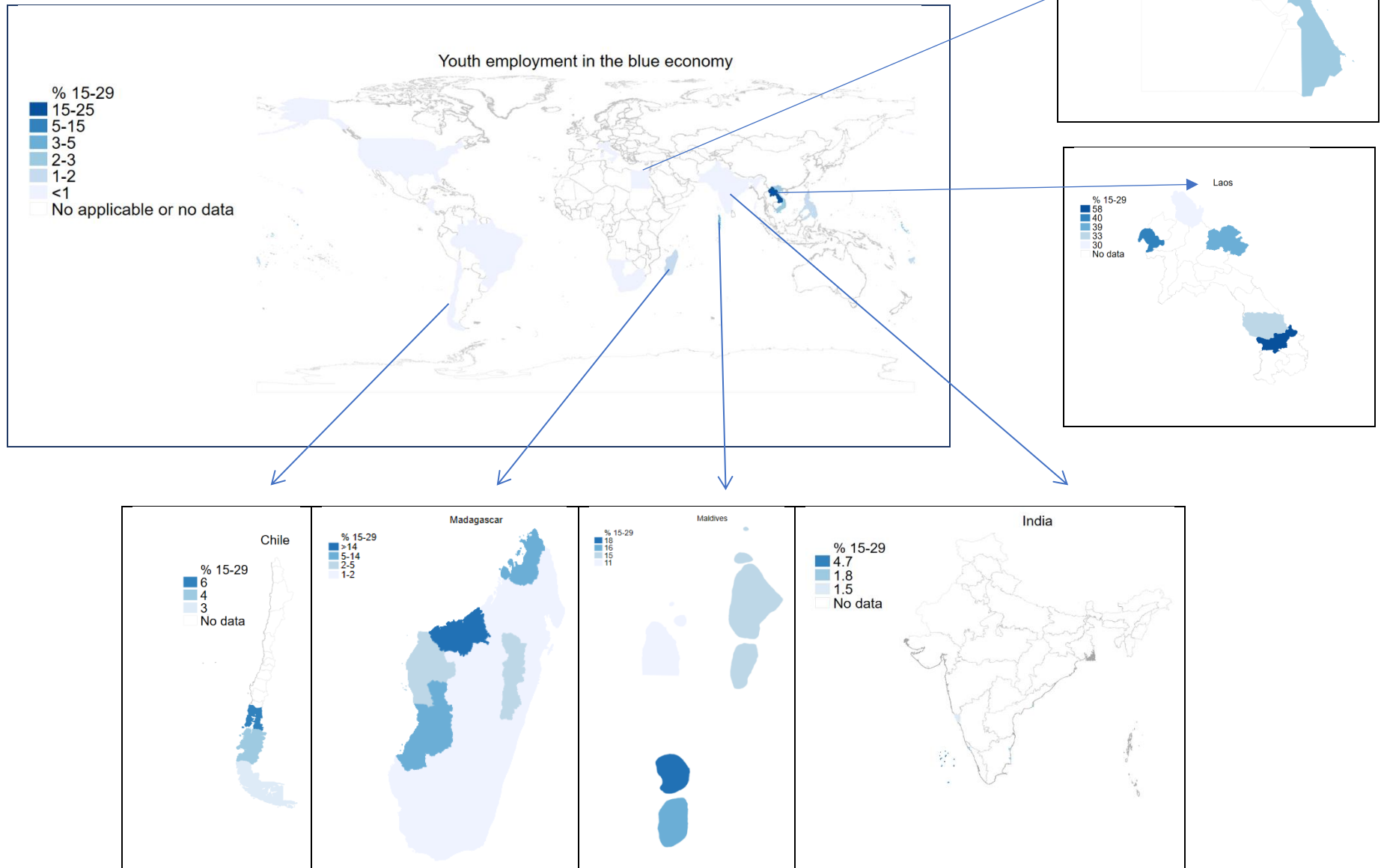
Source: Team estimates based on LFSs and HIESs

Across these eighteen countries, youth employment in the Blue Economy was an average 2.3%, but with substantial heterogeneity across countries, ranging from a minimum of 0.1 percent in India and Pakistan to a maximum of 24.2 percent in Laos. Yet, these national estimates mask the geographic concentration and local importance of the subsectors of the Blue Economy for employment creation. Indeed, across these eighteen countries, youth employment in the Blue Economy appears to often be concentrated in a few local areas, where the percentage of young people employed in any sector of the Blue Economy is much higher than the corresponding percentage at the national level (with the exception of high-income countries, such as Italy and the United States).

In some of these eighteen countries (see table 3 above), the Blue Economy subsectors have almost 50 percent of youth employment, for example in 2 administrative areas across Kiribati and Laos, where the youth employment rates are larger than their corresponding national rates. A closer look at the data suggests that approximately 6 out of 10 young people in the village of Tereitannano (located in Tabuaeran atoll in Kiribati), and in the Province of Savarane in Laos engage in the Blue Economy. In these two case studies, the subnational youth employment rates in the Blue Economy are, respectively, 44 and 2.5 times higher than their national rates. Again, in the atoll of Faafu (Maldives), the youth employment rate in the Blue Economy is about 18.6%, approximately 4.2 times higher than its national rate. Similarly, the youth employment rate in the Blue Economy in the Region of Boeny (Madagascar) is 14.2%, or 9 times higher than the national rate. For some of the administrative areas studied, for example in India, Chile, Egypt, and Namibia, where the national youth employment rates in the Blue Economy is negligible and close to 0%, the subnational youth employment rate was between 3% and 7%, much larger than the national rate (Figure 9 below).

While the total youth employment population of the administrative areas reviewed may not be large in absolute terms or relative to the national populations, these cases illustrate how sectors of the Blue Economy can be geographically concentrated within countries, and hence may play an outsized role at the local level for many coastal and riparian regions, even if not apparent in national measures (Figure 9).

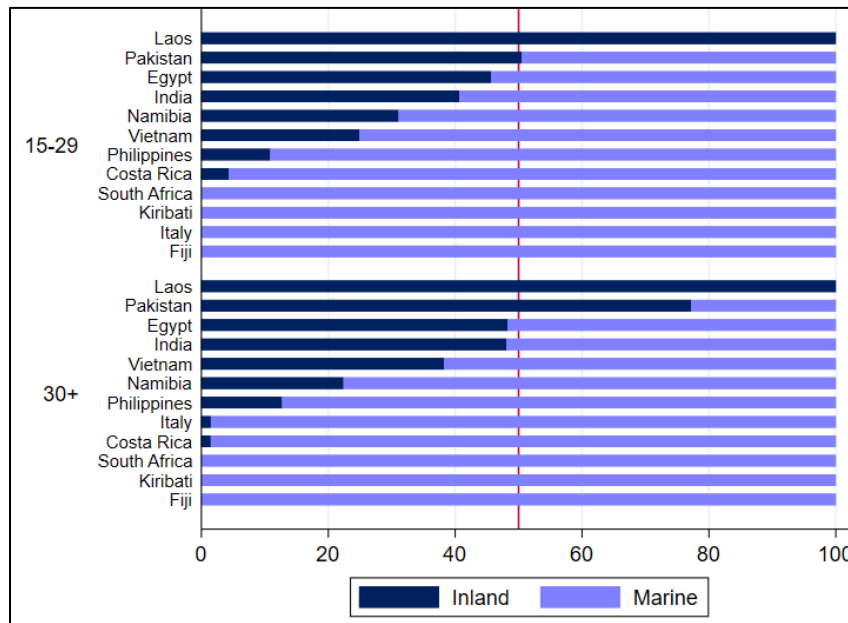
Figure 9. Youth Employment at National and Subnational level. *Source:* own estimates based on LFSs and HIESs.



2.5 THE IMPORTANCE OF FISHERIES FOR LOCAL YOUTH EMPLOYMENT CREATION

Local employment in the Blue Economy is largely driven by fisheries, especially in low and lower middle-income countries. This is especially important in subnational areas close to inland or coastal water bodies, where a high number of young people engage in either inland or marine fisheries.

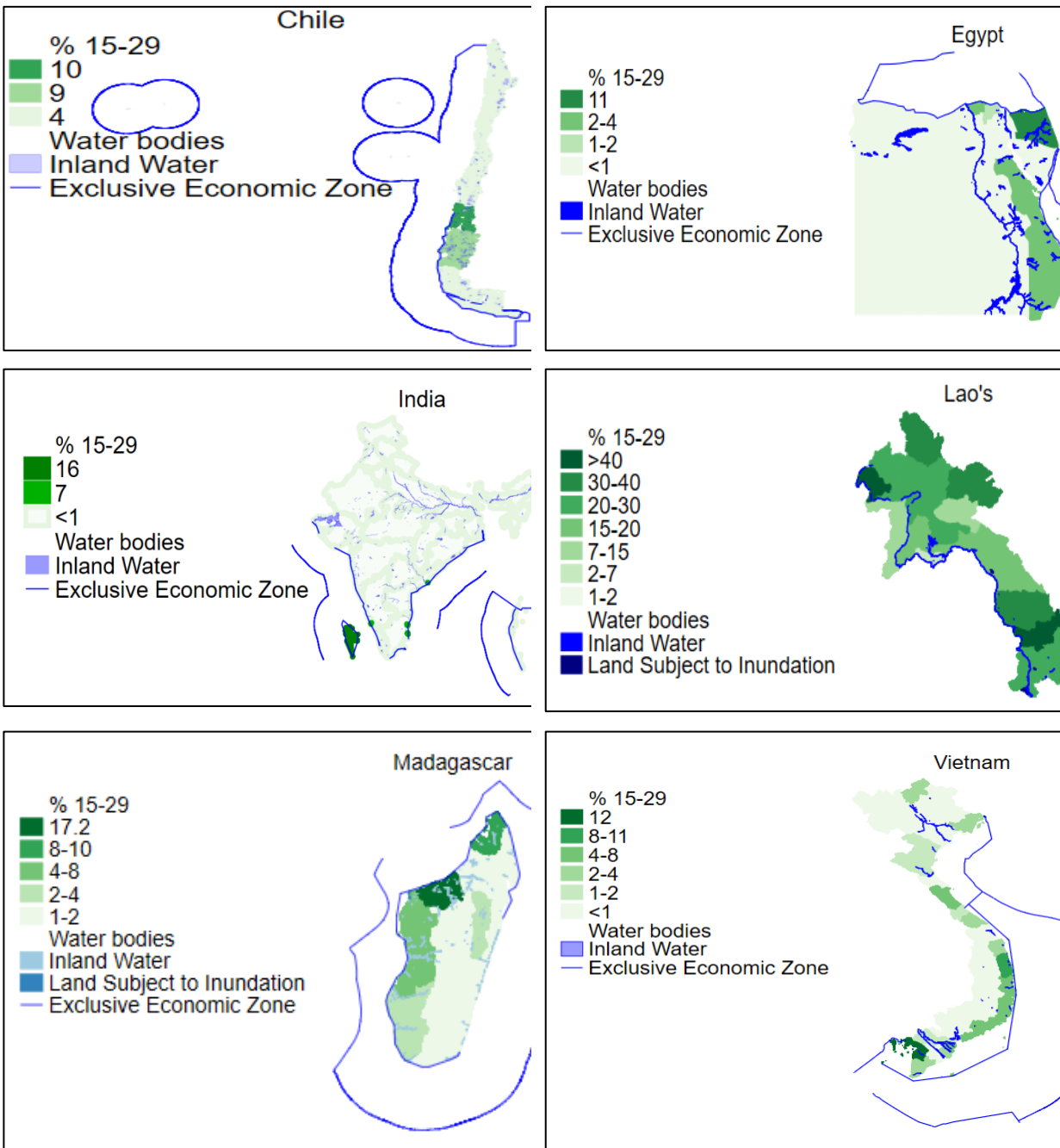
Figure 10. Share of total youth and adult employment in fisheries, by inland and marine fisheries



Source: Team estimates based on LFSs and HIESs

For some of the administrative areas studied (for example, in the Region of Los Lagos in Chile, the North Sinai governorate in Egypt, the territory of Lakshadweep in India, the province of Saravan in the Lao People’s Democratic Republic, the Region of Boeny in Madagascar and the province of Kien Giang in Vietnam) fisheries absorb a relatively large share of total youth employment. The case of the Laos illustrates this point: about 57 % of the total youth employed population in the province of Saravan engage in inland fisheries in the Mekong River. Similarly, marine fisheries in Boeny, Madagascar and in Lakshadweep, India provide employment to more than 15% of total young people employed (Figure 11).

Figure 11. Subnational share of youth employment engaged in fisheries.

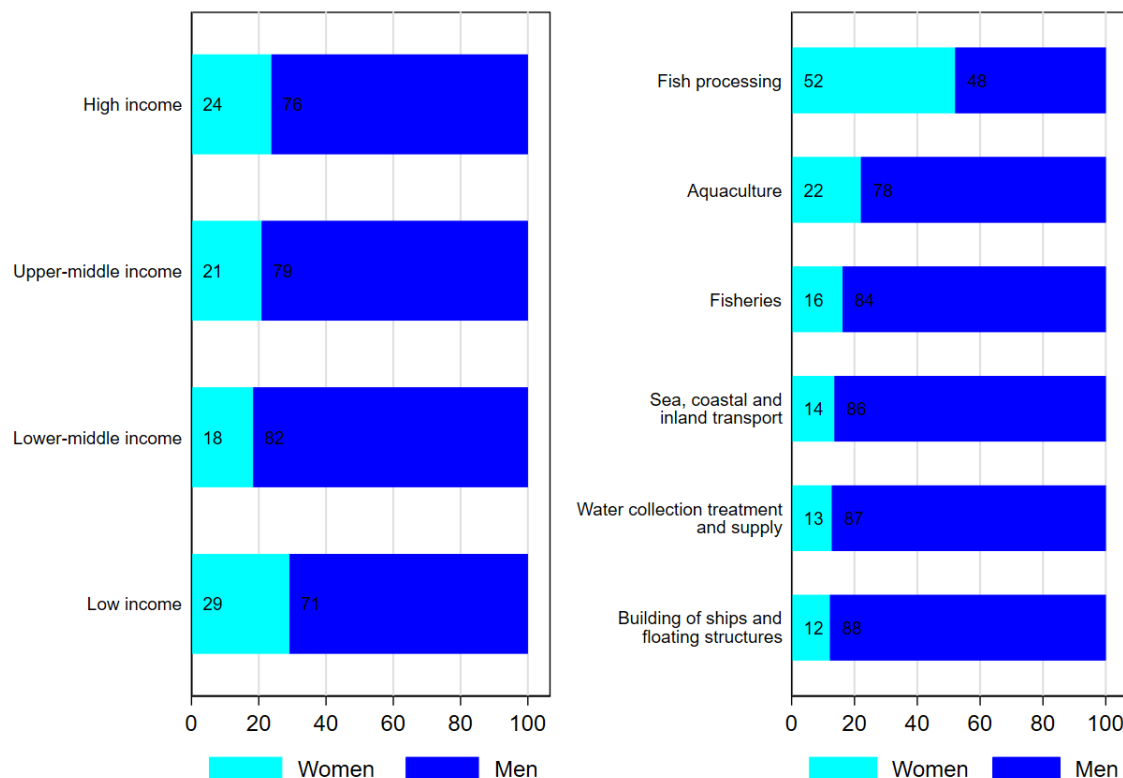


Source: Team estimates based on LFSs and HIESs

Participation of women in the Blue Economy is mostly concentrated in post-harvesting sectors of fisheries. Women are less likely than men to participate in the Blue Economy. Women represent only 20% of the total number of people employed in the Blue Economy. The proportion is slightly higher in low-income countries (29%). Nonetheless, women are more likely than men to be represented in the post-harvest segment of fisheries, particularly fish processing. Across the countries analysed, women form about 52 % of total employment in fish processing activities, but their participation in other sectors is much less. For example, women’s participation in services activities of the Blue Economy, such as water collection

treatment and supply, or sea, coastal and inland transport is less than 15% of total employment, and in aquaculture and fisheries is 22 % and 16% of total women and men employment in aquaculture and fisheries.

Figure 12. Employment distribution by gender in the Blue Economy



Source: Team estimates based on LFSs and HIESs

The share of women in the post-harvest segment of fisheries, such as fish processing, varies significantly by country. In some countries, e.g. Egypt, women’s participation in fish processing activities is much lower, reflecting the lower participation rates in the labour force more broadly in these countries.

However, women in Asian and African countries make up a much larger percentage of the population engaged in post-harvesting activities of fisheries than in any other region. In this context, even though it may be reported as employment, this activity by women may include post-harvest tasks carried out for the final consumption of the household, such as smoking and drying fish for household own consumption.

There is considerable seasonality in fisheries employment. Participation in fisheries varies significantly with seasons, and most young people engaged in the sector for only a fraction of the year. Like other primary economic activities (e.g., agriculture), employment in fisheries is often characterized as irregularity and seasonality, leading to a substantial variety of livelihoods involving multiple occupations, often characterized by vulnerability³⁶. As such, for many young people who engage in the sector, the definition of employment in fisheries does not conform to the typical concept of a “full-year” activity, particularly in inland fisheries where participation is mostly part time. For this reason, annual average estimates of youth employment in fisheries in the harvesting segment may mask the influx of participants that occurs during peak seasons.

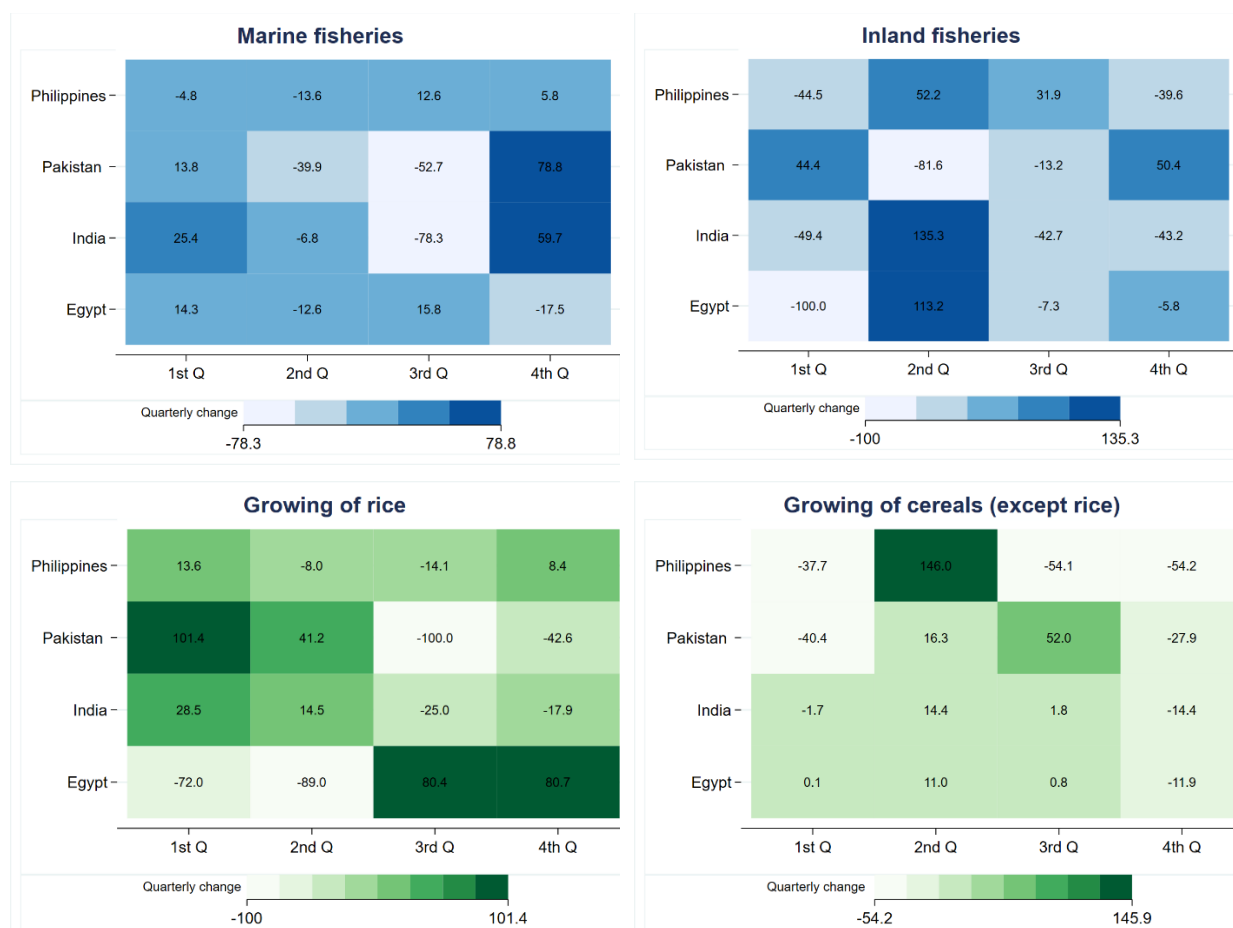
The employment estimates in the harvesting segment of fisheries presented in this study were calculated from national household-based surveys. These surveys are typically conducted quarterly and averaged over a year. The next paragraphs, however, show quarterly data to illustrate the seasonal variation (i.e., the percentage change with respect to the annual average) of employment in fisheries. The four countries selected, based on data availability, were India, Pakistan, Egypt, and Philippines. Data from these countries shows that youth employment in both marine and inland fisheries varies considerably throughout the years. For example, the number of young people who engage in marine fisheries in both Pakistan and India during the fourth quarter (that is from October to December) is nearly 79 and 60 percent higher than the annual average. Equally, the number of young people who engage in inland fisheries of India and Egypt increases by 135 and 113 percent, respectively, during the second quarter of the year. These quarterly variations in employment in fisheries show that youth employment in the sector tends to be largely underestimated during some quarters and overestimated during other quarters.

Both agriculture and fisheries appear to act as a safety net to fill “livelihood gaps” during the respective off-seasons³⁷ For example, during the fourth quarter of the year, the number of young workers who engage in rice production in Pakistan and India drop by an estimated 43% and 18% with respect to their annual average. However, job losses in rice production appear to be more than offset by an increase in the number of workers in marine fisheries. In a similar vein, job losses in the marine and inland fisheries of Egypt during the fourth quarter of the year are counterbalanced by employment creation in the rice sector, which increases by 80.7% with respect to its annual average.

³⁶ Davis, Di Giuseppe and Zezza, 2017; Oya, 2015)

³⁷ Béné and Friend, 2011; Mills et al., 2011

Figure 13. Quarterly percentage variation in youth employment with respect to the annual average, by key sectors



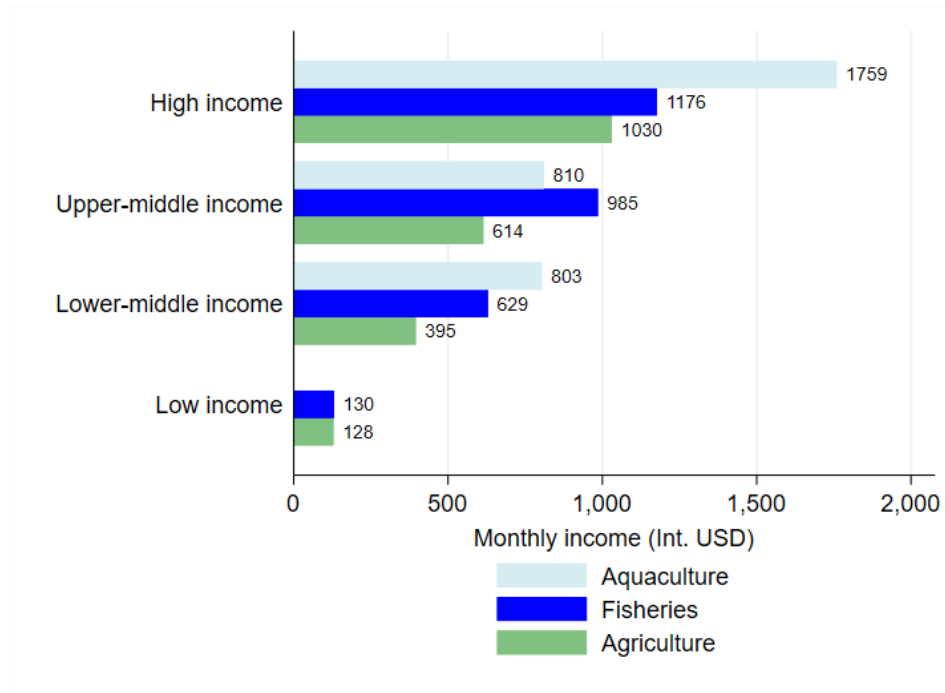
Source: Team estimates based on LFSs and HIESs

2.6 INCOME FROM FISHERY AND AQUACULTURE

In addition to its capacity to generate employment, especially at the local level, fisheries play an important role in supporting poverty reduction. Data suggests that the average (monthly) income generated from both fisheries and aquaculture and agriculture increase as countries develop, but regardless of the income group, the average fishery and aquaculture income is higher than the average agricultural income (Figure 14). For example, in high income countries the average monthly income from aquaculture is about USD729 higher than agricultural income (USD 1759 and USD 1030, respectively), while fishery income is USD146 higher than agriculture income (USD 1176 and USD 1030, respectively). In upper-middle income countries, the average fisheries income is approximately 60% higher than agricultural income (USD985 and USD614), surpassing the income generated from aquaculture. In low-income countries, the average fishery and agricultural income are on a similar scale, but people engaged in fisheries earn an income (USD130) which is slightly higher than their peers in agriculture (USD128)³⁸.

³⁸ Data on aquaculture income is not available for low-income countries

Figure 14. Average monthly income from fishery and agriculture.



Source: Team

estimates based on LFSs and HIESs

Young people who engage in fisheries or aquaculture earn a lower income than adults, but a higher income than their peers in agriculture. Survey estimates suggest that young people in fisheries or aquaculture earn, on average, lower incomes than adults (--18% and -15% respectively). The income gap between youth and adults in fisheries or aquaculture tends to be higher in low and lower-middle income countries (-30% and -23%, respectively for fisheries and -17% in lower-middle income countries for aquaculture). Although young people in fisheries and aquaculture earn lower incomes than adults, their average income is still 75% and 66% higher, respectively, than the average income earned by their peers in agriculture. The largest income gap between young people in fisheries and young people in agriculture is observed in lower-middle income countries, where young people in fishery and aquaculture earn, 1.9 and 2 times respectively, the income they would have earned in agriculture.

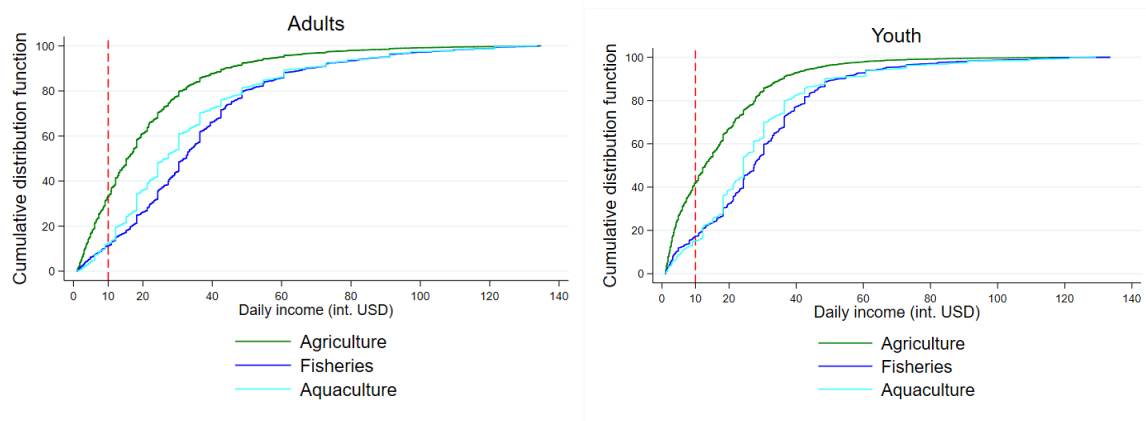
Figure 15 below shows the cumulative distribution functions of the mean daily income earned by workers in fisheries (blue line), workers in aquaculture (light blue line) and workers in agriculture (green line). On the y-axis, each point on the two curves measures the share of total workers in fisheries, aquaculture and agriculture (both total workers and youth 15-29) with a mean daily income equal or lesser than a given reference threshold.

The analysis of the CDFs suggests that the distribution of the mean daily income of those who engage in fisheries or aquaculture always lies to the left of those who engage in agriculture. This implies that the distributions of the daily income of fishery and aquaculture workers displays first order stochastic dominance over the distribution of agricultural workers. Consistently, for any level of daily income taken

as a reference point, the share of agricultural workers who earn less than the reference threshold is always higher compared to the share of fishery workers. Take, for example, the threshold of international USD1.9, which corresponds to the extreme poverty line. Across the analyzed countries, the share of young workers in fisheries and aquaculture with a mean daily income lower or equal to the threshold of extreme poverty line is 3% and 2.3%, respectively. This share rises to 7.8% for young people in agriculture. Although coarse, this simple analysis suggests that young people in agriculture are 2.5 times more likely to live in extreme poverty than their peers in fisheries, and 3.4 times more likely than their peers in aquaculture. If the threshold is increased to 10 USD per day, the share of youth in agriculture who earn less than that threshold (41.9%) is 24.6 percentage points and 26.7 percentage points higher than the share of youth in fisheries and aquaculture (17.3% and 15.2%, respectively).

This simple analysis suggests that advancing in the process of structural transformation through higher productivity levels in fisheries may support poverty reduction efforts in developing countries.

Figure 15. Cumulative Distribution Function of mean daily income from fishery and agriculture



Source: Team estimates based on LFSs and HIESs

3. SOME EMERGING TRENDS AND OPPORTUNITIES

Digitalization, technological innovation, and circular economy are radically changing the demand for skills in traditional and emerging blue sectors.³⁹ For example, in Mediterranean ports the largest share of employment vacancies are linked to professions like data analyst, cybersecurity manager, cold supply chain expert, energy transition manager, onshore-power-supply manager and circular economy manager.⁴⁰

While digital technologies create new employment opportunities for youth, many young people struggle to meet the qualifications demanded by companies in ocean-based industries. For instance, about 30 % of businesses in the offshore renewable energy industry report to have difficulties in

³⁹ [European Commission, 2021](#): The EU Blue Economy Report 2021

⁴⁰ [DocksTheFuture, 2020](#): Ports' Relationship in the Mediterranean region: future cooperation, competences and competitions

hiring employees with the required skill set, or can only find a limited number of adequately-skilled staff within the workforce.⁴¹

Upskilling (improving existing skills) and reskilling (training in new skills)⁴² of youth is crucial to realize the full employment potential of the blue economy for all youth. Skill shortages among youth is a barrier for youth to connect with high skilled well-paid jobs in blue economy labor markets. Often young people lack technical skills demanded by companies in blue industries (e.g. digital skills like computer science, big data analytics, robotics, etc.; engineering skills like 3D design; project management skills -project managers, offshore financial officers; etc.). Young people also often lack relevant soft skills gained through work experience such as teamwork, collaboration, communication, problem-solving, leadership, creative thinking, time management, etc.⁴³

Technical and Vocational Education and Training (TVET) can address skill shortages among youth, but there are some challenges that need to be tackled. One issue relates to the number of TVET institutions, which in some developing countries like Jamaica tends to be too small to respond to the demand for specialized skills demanded in blue economy sectors.⁴⁴ In Zambia the limited supply of youth employment training programs forces companies in the aquaculture sector to bring skilled workers from abroad (e.g., South Africa and the Philippines) to meet address the skill gap in local labor markets.⁴⁵

There is a mismatch between the training offered by TVET organizations and the skills demanded in blue economy labor markets. Youth that graduate from TVET programs struggle to find a job because most of the available TVET programs in traditional sectors like shipbuilding do not deliver industry-vetted skill sets that would enable youth to immediately land a job in the shipping sector.⁴⁶ In emerging blue sectors like offshore renewable energy, there are also important shortages in specialized TVET supply.⁴⁷ For example, it is estimated that barely 5% of existing TVET programs directly focus on offshore renewable energy, and only 35% of the professional profiles demanded are adequately covered through existing specialized TVET programs.⁴⁸ In some SIDs like Barbados, Jamaica and Trinidad and Tobago there is inadequate capacity to survey the occupational skills demanded by firms in blue industries.⁴⁹ This results in outdated curricula that cannot address the growing occupational skill gaps in the blue economy. Also, access to TVET isn't always equitable. For example, youth living in rural communities in Jamaica face higher constraints in access to trainings than their urban counterparts.⁵⁰ For youth with disabilities access is even more restricted, especially if they are also rural female youth. Although young females appear to

⁴¹ [European Commission, 2022](#): The EU Blue Economy Report 2022

⁴² [European Commission, 2021](#): The EU Blue Economy Report 2021

⁴³ Ibid.

⁴⁴ [ILO, n.d.](#): The Challenge of Youth Unemployment in the Caribbean: the Role of Youth Employment Training Programmes

⁴⁵ [World Fish, 2020](#): Youth participation in small-scale fisheries, aquaculture and value chains in Africa and the Asia-Pacific

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ Ibid.

⁴⁹ ILO, n.d.: The Challenge of Youth Unemployment in the Caribbean: The Role of Youth Employment Training Programmes

⁵⁰ Ibid.

have better access to available YETP, this does not necessarily translate into more and better jobs in ocean-based industries.⁵¹

Blue economy careers are unattractive to young people. In some European countries sectors like shipbuilding already have an ageing workforce (average age above 45),⁵² while in many developing countries youth are moving away from traditional blue sectors like artisanal fishing. These jobs are unappealing for young people, as youth perceive them as traditional and labor-intensive activities that generate lower profits.⁵³ The increased subcontracting and temporary nature of blue jobs make young people reluctant to further engage in blue industries.⁵⁴

There is a need to raise awareness about youth employment opportunities in blue sectors. Often youth are unfamiliar with the large variety of career opportunities in traditional and emerging blue economy sectors.⁵⁵ Governments need to design policies to inspire and attract youth to pursue careers in ocean-based industries. For example, many European countries are planning to increase the level of ocean literacy,⁵⁶ as a strategy to raise awareness among youth on job opportunities in the blue economy and attract them to engage in ocean-related careers.⁵⁷

Blue entrepreneurship can be a powerful tool for employment creation among youth. Some Caribbean countries have the potential to become hubs for entrepreneurial activity, however enabling conditions for doing business need to be created in blue industries. Although there are some institutions like the Branson Centre of Entrepreneurship, more incubators and R&D institutions would strengthen the blue economy entrepreneurial ecosystem in the Caribbean region.⁵⁸ Lack of access to financial services limits blue entrepreneurship activities among youth. Some gaps persist in many Caribbean countries in terms of access to risk-tolerant financing products for youth-led SMEs⁵⁹ in ocean-based enterprises. The financial sector needs to adopt blue investment principles that facilitate the development of innovative products.⁶⁰

Figure 16. Barriers to Youth Employment in the Blue Economy



There is little official data that capture the participation of youth in the Blue Economy

⁵¹ Ibid.

⁵² [European Commission, 2021](#): The EU Blue Economy Report 2021.

⁵³ [World Fish, 2021](#): Breaking barriers to youth engagement in aquatic food systems.

⁵⁴ [European Commission, 2021](#): The EU Blue Economy Report 2021.

⁵⁵ [Caribbean Development Bank, 2018](#): The Blue Economy: A Caribbean Youth Employment Opportunity.

⁵⁶ Ocean literacy is defined as “an understanding of the ocean’s influence on you and your influence on the ocean”. The IOC is working to support ocean research institutions around the world to strengthen public engagement and build greater ocean literacy so we can all have a greater understanding of what we can do to protect the health of our ocean. ([UNESCO, n.d.](#))

⁵⁷ [European Commission, 2021](#): The EU Blue Economy Report 2021.

⁵⁸ Ibid.

⁵⁹ [UNDP, 2020](#): Youth Entrepreneurs Engaging in the Digital Economy: The Next Generation.

⁶⁰ [World Bank, 2021](#): Riding the Blue Wave. Applying the Blue Economy Approach to World Bank Operations.



TVET institutions do not sufficiently provide youth with the skills for high skilled jobs in traditional and new blue economy sectors.



Youth are often unaware of the broad range of career opportunities in coastal and ocean-based industries.



A difficult environment for doing business is one of the factors stifling innovation and entrepreneurship.

Source: Authors with inputs from [Caribbean Development Bank, 2018](#)

4. THE WAY FORWARD: HOW CAN WE SCALE UP JOB OPPORTUNITIES FOR YOUTH IN THE BLUE ECONOMY?

A sustainable blue economy should support and advance the economic well-being of youth and the most vulnerable, by serving as a driver of jobs and livelihoods, as well as a means to preserve healthy oceans. To help guide policy efforts to promote youth employment in blue economy, we suggest the following four recommendations.

4.1 DEEPENING YOUTH EMPLOYMENT DATA ANALYSIS

Improving of national employment statistics on youth participation in traditional and emerging blue economy industries is essential in the design of youth- and gender-sensitive policies. Data collection should also track employment that is seasonal, sporadic or informal in a way that disaggregated by age group, sex, and disability. Global databases can facilitate comparative analyses of trends and could strengthen ongoing experimental work on blue economy indicators. For instance, in Europe there is an online dashboard that provides blue indicators for six sectors: coastal tourism, marine living resources, marine non-living resources, port activities, shipbuilding and repair, and maritime transport.⁶¹ The OECD is also conducting experimental work on employment indicators in different regions for marine fishing, marine aquaculture, marine fish processing, shipbuilding, maritime passenger transport and maritime freight transport.⁶² In tourism sector the United Nations World Tourism Organization (UNWTO) and International Labor Organization (ILO) are working on data on employment.⁶³ Food and Agriculture

⁶¹ [European Commission, n.d.](#): Blue indicators online dashboard

⁶² [OECD, 2020](#): Sustainable Ocean for All: Harnessing the Benefits of Sustainable Ocean Economies for Developing Countries

⁶³ [UNWTO, n.d.](#): ILO-UNWTO Joint Project

Organization (FAO) and WorldFish provide regular updates on the state of fisheries and aquaculture with disaggregated data on youth and gender.⁶⁴ Additional data analysis is needed to track the working conditions and quality of jobs in blue sectors.

4.2 CLOSING BLUE SKILLS GAP

Upskilling and reskilling are key policy measures to scale up job opportunities for youth in blue economy. To keep up with the fast-paced changes due to digital technologies and circular economy in blue industries, policy makers need to adapt labor market policies to align skills in traditional and emerging blue sectors. Strengthening TVET institutions may be especially relevant for Caribbean countries, where often there are only a few TVET centers offering training opportunities for young people to learn new skills for the blue economy. In the case of Jamaica for example, one agency -the Human Employment and Resource Training Trust/National Training Agency (HEART/NTA) is the main provider of training programs and the principal source of curricula for the island. Although in Barbados there are eight major TVETs providing employable skills, there is a need to integrate highly specialized skills for youth to engage in emerging blue sectors.⁶⁵ Collaborative partnerships between TVET providers and blue economy companies is crucial to deliver curricula that responds to industry-vetted skills demanded in blue labor markets. For instance, in the Mediterranean the YEP MED project– Youth Employment in Ports of the Mediterranean- is facilitating partnerships between TVET centers, port-logistics associations and operators to develop port-logistics training and vocational curricula that provides youth with the skills demanded in the ports sector.⁶⁶ The Atlantic Maritime Ecosystem Network (MareNET) project is supporting stronger collaboration among training centers and representatives of port industries in Ireland, France and Spain. The main goals of the project are that maritime companies collaborate with TVET centers to identify skills gaps in maritime curricula, and support the development of updated skill-oriented training programs.⁶⁷ Integrating apprenticeships and mentoring programs in TVET curricula is also key. For example, as part of the Spanish Youth Guarantee System, the Balearic Islands Employment Service (SOIB) is offering youth (aged 16- 29) the opportunity to engage in a dual training program with focus in blue skills, like nautical maintenance, engineering, painting, and maritime carpentry. The dual training program offers young people apprenticeship contracts that have resulted from partnerships between local companies working in blue sectors and TVET centers.⁶⁸ Similarly, in Seychelles young people (aged 16- 29) are placed during three-weeks in a company or organization working in a blue sector (e.g. Ocean Tuna Ltd, the Seychelles Coast Guard, Seychelles Ports Authority, etc.).⁶⁹ Modular flexible TVET programs -rather than fixed ones- might better engage youth in upskilling/ reskilling activities. The format and length of TVET programs need to better accommodate for flexible trainings that allow youth to generate income while investing in

⁶⁴ [FAO, Duke University and WorldFish, 2022](#): Small-scale fisheries and sustainable development: Key findings from the Illuminating Hidden Harvests report; [FAO, 2022](#): The State of Fisheries and Aquaculture in 2022; [World Fish, 2020](#): Youth participation in small-scale fisheries, aquaculture and value chains in Africa and the Asia-Pacific;

⁶⁵ [ILO, n.d.](#): The Challenge of Youth Unemployment in the Caribbean: the Role of Youth Employment Training Programmes

⁶⁶ [Fundación Valenciaport, 2020](#): YEP MED- Youth Employment in Ports of the Mediterranean.

⁶⁷ [European Commission, 2021](#): The EU Blue Economy Report 2021.

⁶⁸ [Balearic Islands Employment Service \(SOIB\), n.d.](#): Connecting Blue Skills and Dual Training Programs Through Youth Guarantee System.

⁶⁹ [Seychelles Nation, 2016](#): New project to promote sustainable development opportunities for youth in the Blue Economy

strengthening their skill base.⁷⁰ This is particularly relevant for emerging sectors like renewable offshore energy, where training offer tends to be provided mainly as a specialization (44% of educational programs comprised Master Degrees and only a few TVET provided specialized technical skills).⁷¹ Training institutions should address the needs of marginalized groups e.g. rural youth, young women, youth with disabilities, migrants, etc. For instance, training programs should train young artisanal fishers in best fishing practices for sustainable management of marine resources.⁷² These trainings can allow youth to have better incomes if youth learn practices to increase their catch, better handling of the catch, fish in a more sustainable manner, avoid waste and improve processing of fish products.⁷³ Specialized curricula could cover topics like circular economy practices (by-products, waste exchanges for materials, etc.), added value (labeling, organic, etc.), recycling marine waste (fishing nets, fishing gear, recycling facilities, etc.), digitalization (navigational or fish-tracking equipment, etc.), etc.⁷⁴

4.3 IMPROVING THE ATTRACTIVENESS AND AWARENESS OF BLUE CAREERS

Initiatives that inspire and create awareness about blue career opportunities for youth should be stepped up. A big challenge for attracting the future workforce of blue industries is that blue careers are often unappealing jobs for youth, as they are perceived as traditional labor-intensive activities that generate low wages. **Improving** familiarity with ocean literacy can help young people to have a better understanding on how ocean's influence them and their influence on the ocean.⁷⁵ **Governments should work with research organizations, higher education institutions and non-governmental bodies to raise awareness.** For example, Intergovernmental Oceanographic Commission (IOC) is working to create greater ocean literacy among youth through its Ocean Literacy Portal, which is a global one-stop shop that gives access to resources and content to help to improve ocean culture worldwide.⁷⁶ The European Ocean Literacy Coalition (EU4Ocean) is promoting ocean literacy through various initiatives (e.g. EU4Ocean Platform, Youth4Ocean Forum, Network of European Blue Schools, European Atlas of the Seas, and Hack4Oceans).⁷⁷ In Canada, the Imagine Marine Youth Movement and 'Be a Seafarer' campaign, are among the initiatives to promote career opportunities in the marine transport sector.⁷⁸ In Seychelles, the project 'Prosperity & Environment: promoting sustainable development opportunities for youth in the Blue Economy' is promoting study visits for youths to learn about ocean NGOs, such as the National Oceanographic Institute, Eco-Sud, WISEOCEANS and the SIDS Youth AIMS Hub – Mauritius.⁷⁹ In Europe, the Blue Generation Project is an initiative that brings together youth organizations and blue economy experts to foster promotional activities that attract and engage young people between 15 and 29

⁷⁰ Ibid.

⁷¹ [European Commission, 2021](#): The EU Blue Economy Report 2021.

⁷² [UNDP, n.d.](#): Supporting the Economic Empowerment of the Artisanal Fishing Community of the Republic of Mauritius.

⁷³ [European Union, 2021](#): Supporting the Capacity of Guinea's Artisanal Fishing Communities.

⁷⁴ [FARNET, n.d.](#): Focus Group on Artisanal fishers in future FLAGS

⁷⁵ [UNESCO, n.d.](#): Ocean Literacy.

⁷⁶ [UNESCO, n.d.](#): Ocean Literacy.

⁷⁷ [European Commission, 2021](#): Oceans and fisheries. Skills and career development.

⁷⁸ [Government of Canada, 2022](#): Engaging on Canada's Blue Economy Strategy - What we heard.

⁷⁹ [Seychelles Nation, 2016](#): New project to promote sustainable development opportunities for youth in the Blue Economy.

years in blue careers in Greece, Spain, Portugal, Bulgaria and Poland.⁸⁰ For instance, the project organizes info-days about blue career prospects in high schools, adult education centers, NGOs. The project offers a Blue Career Guide with relevant information on job opportunities in blue economy sectors, and provides free training and mentoring programs via a blue career MOOC (Massive Open Online Courses) Platform. The Blue Generation Project also facilitates mobility exchanges through study visits, so that young people have the opportunity to gain on the job experience.⁸¹ **Blue career job platforms are important tools to connect young people on job opportunities in ocean-based industries.** For example, in the Caribbean, the American Caribbean Maritime Foundation has launched a jobs platform - the Caribbean Maritime Career Exchange (CAREX)- to help connect young graduates from maritime careers with job opportunities in ocean-based industries.⁸² In Canada, the SOI (Students on Ice) Foundation has created the Portal for Opportunities, Resources and Talent (PORT), which serves as a digital one-stop shop to connect youth across Canada with education, employment and funding opportunities in the blue economy.⁸³ In Europe, the Blue Career Job Platform was launched to provide information on blue job positions and training opportunities across Europe.

4.4 PROMOTING YOUTH ENTREPRENEURSHIP AND INNOVATION IN BLUE ECONOMY SECTORS

Entrepreneurship can be a promising opportunity for youth to participate in income-generating activities in blue sectors. Some Caribbean countries have the potential to become hubs for entrepreneurial activity, however enabling conditions for doing business need to be created. Creating a Business Enabling Environment (BEE)⁸⁴ for young entrepreneurs to thrive in blue markets. Governments can help stimulate blue entrepreneurship by designing business regulations that strengthen blue entrepreneurial ecosystems (e.g. shortening business registration timelines, simplifying procedures, establishing “one-stop shops” to help new blue entrepreneurs save time and money, etc.) and by investing in infrastructure to modernize and dynamize blue sectors.⁸⁵ Policies can also strengthen SMEs competitiveness by creating and/or enforcing Government-backed standards for monitoring and labeling of blue products and services.⁸⁶ Nurturing blue entrepreneurs with the necessary skills and tools to turn their business ideas into market products and services. Governments could support incubators and accelerators offering blue entrepreneurial and business training for young entrepreneurs.⁸⁷ For instance, the Blue Entrepreneurship Program launched by the European Project MARENET in 2021 provides training, mentoring and first-hand experience to young entrepreneurs with potential business ideas related to the

⁸⁰ [Blue Generation Project, n.d.](#): Blue Generation Project.

⁸¹ Ibid.

⁸² [Caribbean Employment, n.d.](#): ACMF Launches Maritime Jobs Platform for Young Caribbean Graduates.

⁸³ [SOI, n.d.](#): Blue Futures Pathways.

⁸⁴ [World Bank, 2022](#): Business Enabling Environment (BEE).

⁸⁵ [McKinsey, 2019](#): Pakistan’s start-up landscape: Three ways to energize entrepreneurship.

⁸⁶ [Dijkstra; Beukeringa; and Brouwerb, 2022](#): Marine plastic entrepreneurship; Exploring drivers, barriers and value creation in the blue economy.

⁸⁷ [Dijkstra; Beukeringa; and Brouwerb, 2022](#): Marine plastic entrepreneurship; Exploring drivers, barriers and value creation in the blue economy.

marine environment.⁸⁸ In the US the venture accelerator Blue Startups is providing young entrepreneurs from Hawaii with mentorship, access to business expertise, product testing, peer review, pitch development, introductions to investors, and seed funding.⁸⁹ In the Southern Mediterranean region (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine, and Tunisia) the EYESONBLUE competition gives the opportunity to young blue entrepreneurs to develop and showcase innovative projects in water-related sectors.⁹⁰ In Japan the Blue Economy Challenge is strengthening the blue entrepreneurial ecosystem in Okinawa by creating opportunities for youth to build their skills through mentoring and hands-on experience, and to expand their network among ocean industry organizations.⁹¹ Creating financial ecosystems to facilitate access to finance to young blue entrepreneurs is key. Blue investment platforms can serve as drivers of collaboration between impact investors and young entrepreneurs. For example, in 2019 the European Commission launched the ‘BlueInvest’ platform to support entrepreneurs to reach out to investors and corporates, and to facilitate matchmaking and investment-readiness advice.⁹² Blue bonds can be used to raise capital from impact investors to finance earmarked projects that are ocean-friendly.⁹³ For example, in 2018 the World Bank helped the Government of Seychelles to design the world’s first blue bond raising a total of \$15 million from international investors to support projects in blue economy sectors.⁹⁴ Similarly, the Nordic Investment Bank (NIB) launched a 2 billion blue bond to support banks that are lending to ocean projects in the Baltic Sea.⁹⁵ Debt-for-nature swaps (DNS) are financial instruments that can help Governments to mobilize resources for protecting oceans while reducing the debt of countries. For example, in 2015 the Government of Seychelles together with The Nature Conservancy (TNC) created the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT), a debt-for-nature swap that allowed the island to restructure \$21.6 million debt.⁹⁶ As part of SeyCCAT, the Development Bank of Seychelles is offering grants to impactful Seychellois-led projects through the Blue Grants Fund and the Blue Investment Fund.⁹⁷ SeyCCAT is directly supporting blue entrepreneurship through The Guy Morel Institute (TGMI) Blue Economy accelerator program. The program involves local partners (e.g. Enterprise Seychelles Agency, Seychelles Fishing Authority, Seychelles National Youth Council, and National Institute for Science Technology and Innovation) to support young entrepreneurs incubate and accelerate business ideas in relevant fields of the blue economy, like fisheries, waste processing ocean pollution, aquaculture, fish processing, and any other innovation supporting healthy oceans.⁹⁸

⁸⁸ [BlueGrowth, 2021](#): The European Project MARENET Launches the Blue Entrepreneurship Program 2021.

⁸⁹ [Blue Startups](#), n.d.: A venture Accelerator in Hawaii.

⁹⁰ [SwitchMed, 2022](#): EYESONBLUE Competition.

⁹¹ [InnoDays 2022](#): Blue Economy Challenge.

⁹² [European Commission, 2022](#): The EU Blue Economy Report 2022.

⁹³ [World Bank, 2018](#): Sovereign Blue Bond Issuance: Frequently Asked Questions.

⁹⁴ [WEF, 2019](#): Blue bonds: What they are, and how they can help the oceans.

⁹⁵ [Nasdaq, 2021](#): What Are Blue Bonds?

⁹⁶ Ibid.

⁹⁷ [SeyCCAT, 2022](#): Blue Grants Fund.

⁹⁸ [SeyCCAT, 2019](#): TGMI Blue Economy accelerator program.

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ANNEX A:

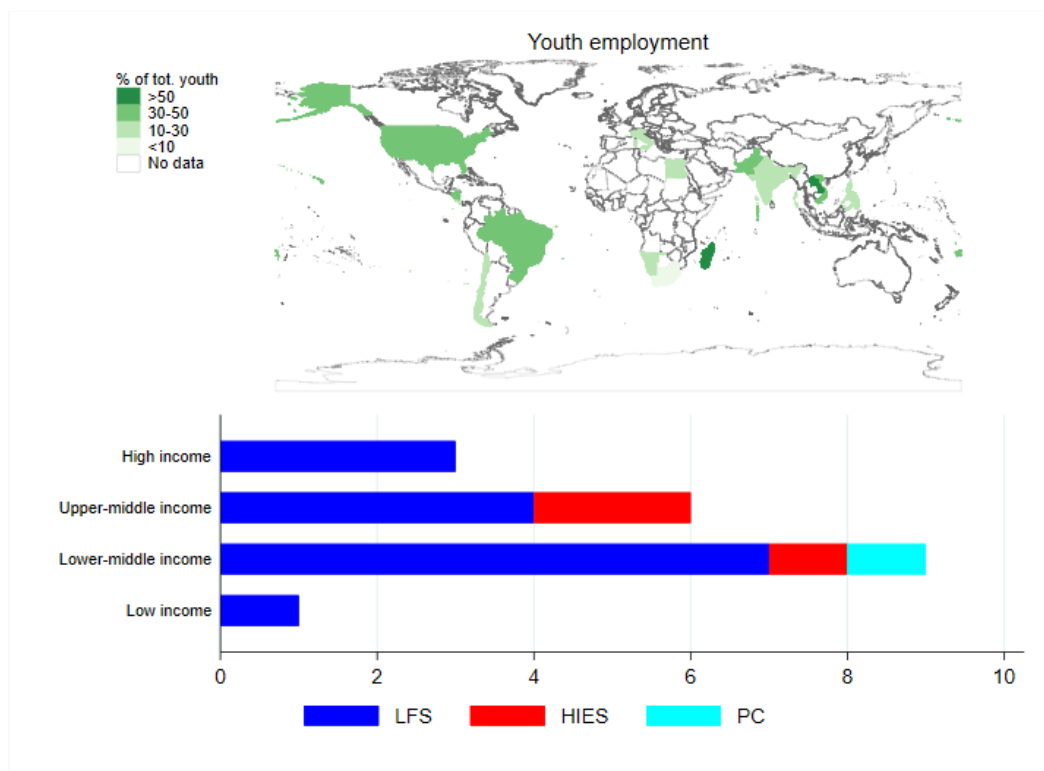
Methods and data

Sources of data. For this study, three different types of large-scale and standardized household survey instruments provided a previously unused source of data on employment in the Blue Economy: population censuses (PCs), labor force surveys (LFS) and household income and expenditure surveys (HIES) conducted by governments' national statistics agencies.

The final list of surveys with at least basic information on the sector of employment considered for the analysis includes 14 LFS, 3 HIES and 1 PC; These surveys represented more than 2 billion people and 464 million young people. Overall, they cover one-third of the total World population in 2022, including an estimated 939,8 million people employed (28.6 % of world employed population), and 113.1 million young people employed (27.8% of global youth employment).

Survey data were analyzed for 18 countries spanning North and Latin America (5), Southern and South-Eastern Asia and the Pacific (7), North and Sub-Saharan Africa (5) and Europe, and representing high, middle-upper, middle-lower and low-income countries. The final list of countries includes Brazil, Chile, Costa Rica, Egypt, Fiji, India, Italy, Kiribati, Lao People's Democratic Republic, Madagascar, Maldives, Namibia, Nicaragua, Pakistan, Philippines, Viet Nam, South Africa and USA. Figure 19 below shows the country's share of youth employment covered in each survey. The bottom panel of Figure 19 show the distribution of surveys used for the analysis, by income group and type of survey.

Figure 17. Share of youth employment by country and types of survey used for the analysis, by income group



Defining and operationalizing employment in the Blue Economy. Concepts for employment were defined by the 19th International Conference of Labor Statisticians (ICLS, 2013) as all persons of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit. These persons comprise: employed persons “at work”, i.e., who worked in a job for at least one hour during the reference period; and employed persons “not at work” due to temporary absence from a job, or to working-time arrangements (such as shifts in work, flextime, and compensatory leave for overtime).⁹⁹

Data collected in the surveys was classified according to common standards that allowed for cross-country comparison, based on the type of activity undertaken as defined by the International Classification of Economic Activity. Accordingly, employment is classified as related to sectors of the Blue Economy based on definitions used in the International Classification of Economic Activity (ISIC) standards agreed for use by UN member states (UN, 2015) as a standard by which measures of economic activity can be compared (in the System of National Accounts¹⁰⁰).

⁹⁹ ICLS resolution (2013) available at https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/normativeinstrument/wcms_230304.pdf.

¹⁰⁰ <https://unstats.un.org/unsd/nationalaccount/sna.asp>

In addition to the category of “fishing activities” related to the harvesting stage (divided between marine and inland fisheries by the codes 0311 and 0312 respectively), persons employed in the Blue Economy are classified by different codes for activities related to pre- and post-harvest stages of fish production.

Persons employed in the Blue Economy also include those who reported to work in aquaculture (marine and inland), building of ships and floating structures (including pleasure and sporting boat), coastal and inland transport or other water transportation support activities, and water collection, treatment and supply. The final list of sectors includes a total of 13 detailed sectors of the Blue Economy, presented in Table 4 below.

Table 4. ISIC codes to identify employment in the Blue Economy

Production stage	Aggregate sector	-ISIC code- Detailed sector
Fish harvesting (Primary sector)	Fisheries	0311 - Marine fishing 0312 - Freshwater fishing
	Aquaculture	0321 - Marine aquaculture 0322 - Freshwater aquaculture
Fish processing (Industry sector)	Fisheries	1020 - Processing and preserving of
Manufacture of transport equipment (Industry sector)	Building of ships and boats	3011 - Building of ships and floating structures 3012 - Building of pleasure and sporting boats
Water transport (Service sector)	Sea and coastal water transport	5011 - Sea and coastal passenger wat 5012 - Sea and coastal freight water
	Inland water transport	5021 - Inland passenger water trans 5022 - Inland freight water transport
	support activities for transportation	5222 - Service activities incidental
Water supply (Service sector)	Water supply	3600 - Water collection, treatment

Survey harmonization and analysis. To provide a complete picture of the contribution of the blue economy to the country’s process of structural transformation, including how the Blue Economy can contribute to a process of structural transformation that is also beneficial for young people, we harmonized a total of 23 variables from different types of surveys (for details see Section on sources of data). The harmonization process allowed constructing a final dataset with a total 7,79 million individual-level observations, organized across 18 countries. The final list of harmonized variables includes 1) geographic-related variables (i.e. variables that capture the subnational location where individuals reside), 2) demographic and educational variables (e.g sex, age and level of education attainment of each individual) and 3) labor market-related variables (i.e. whether the sample individuals are employed or not, their status in employment, the economic sector of employment, the detailed economic sector of the Blue Economy, the status in employment (based on the ICSE classification), the type of occupation performed (defined according the ISCO classification), as well as earnings and usual hours worked). Annex 1 present the final list of harmonized variables in each of the 18 countries analyzed.

ANNEX B:

Definitions of the Blue Economy

Organization	Definition
World Bank (WB)	the blue economy is the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem." (World Bank, 2017)
European Commission (EC)	<p>“the maritime economy consists of all the sectoral and cross-sectoral economic activities related to the oceans, seas and coasts. This includes the closest direct and indirect supporting activities necessary for the functioning of these economic sectors, which can be located anywhere, including in landlocked countries.” (European Commission, 2012).</p> <p>Blue Growth is defined as "smart, sustainable and inclusive economic and employment growth from the oceans, seas and coasts" (European Commission, 2012).</p>
United Nations Conference on Trade and Development (UNCTAD)	The oceans economy has been defined as a vehicle toward a greener and more sustainable and inclusive economic paths on the marine and coastal environment (UNCTAD, 2016). UNCTAD's Oceans Economy pillars include Economic and Trade, Environmental, Social, Scientific and Technology, and Governance.
United Nations Development Programme (UNDP)	the blue economy is “the utilization of ocean resources for human benefit in a manner that sustains the overall ocean resource base into perpetuity” (UNDP, 2018)
Organization for Economic Co-operation and Development (OECD)	“the sum of the economic activities of ocean-based industries, together with the assets, goods and services provided by marine ecosystems. These two pillars are interdependent, in that much activity associated with ocean-based industry is derived from marine ecosystems, while industrial activity often impacts marine ecosystems.” (OECD, n.d.)
United Nations Environmental Programme (UNEP)	a sustainable blue economy “aims to facilitate sustainable ocean-based economic, social and environmental benefits within the planetary boundaries of oceans and coasts.” UNEP’s Sustainable Blue Economy Initiative

World Wide Fund for Nature (WWF)	<p>A sustainable blue economy is a marine-based economy that ...</p> <p>“• Provides social and economic benefits for current and future generations, by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity, and political stability.</p> <ul style="list-style-type: none"> • Restores, protects and maintains the diversity, productivity, resilience, core functions, and intrinsic value of marine ecosystems – the natural capital upon which its prosperity depends. • Is based on clean technologies, renewable energy, and circular material flows to secure economic and social stability over time, while keeping within the limits of one planet.” <p>(WWF, 2015)</p>
Commonwealth of Nations	"an emerging concept which encourages better stewardship of our ocean or 'blue' resources." (The Commonwealth of Nations.n.d)
Conservation International	"blue economy also includes economic benefits that may not be marketed, such as carbon storage, coastal protection, cultural values and biodiversity."
Center for the Blue Economy	"it is now a widely used term around the world with three related but distinct meanings- the overall contribution of the oceans to economies, the need to address the environmental and ecological sustainability of the oceans, and the ocean economy as a growth opportunity for both developed and developing countries."

Source: Own elaboration with inputs from [United Nations Division for Oceans Affairs and Law of the Sea, n.d.](#)