

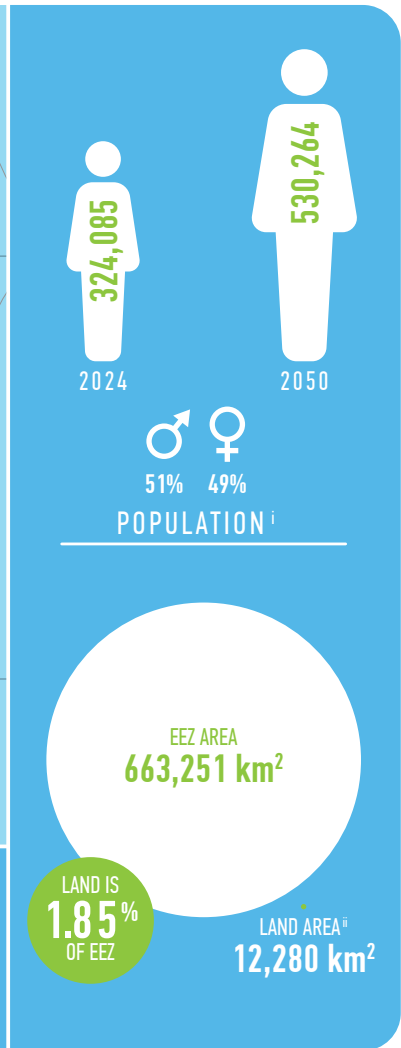
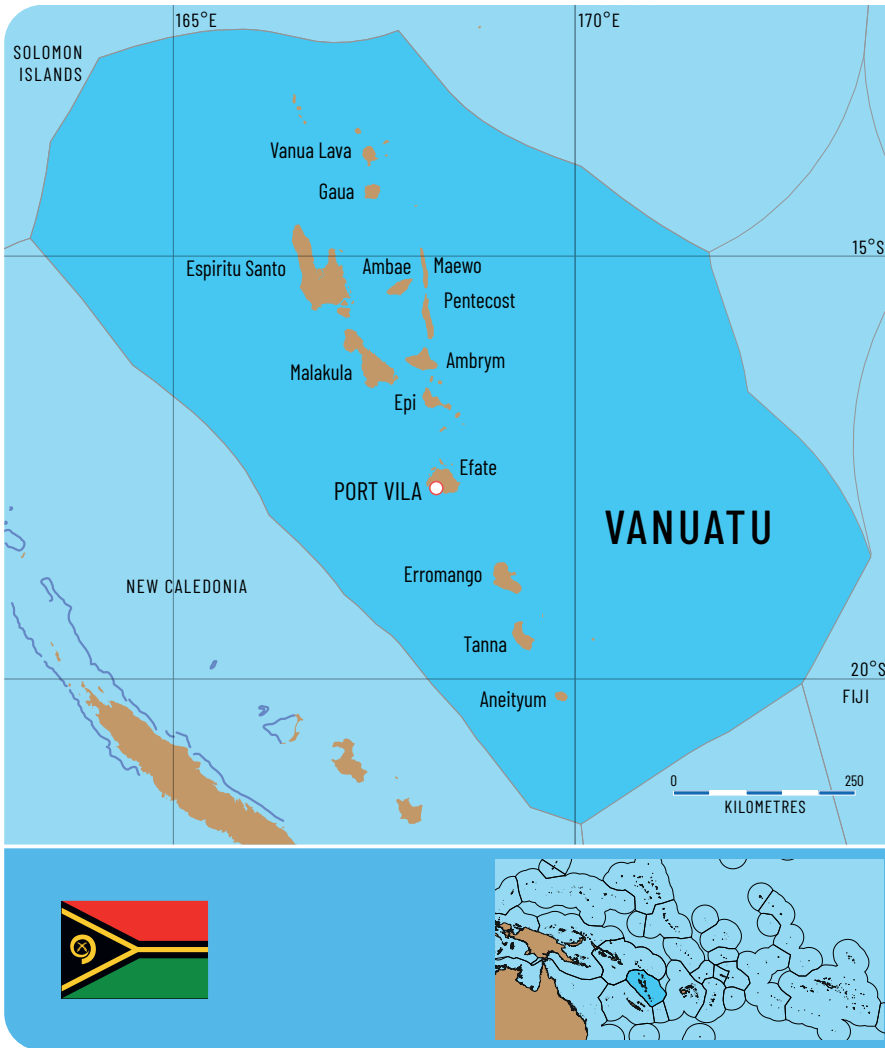


VANUATU





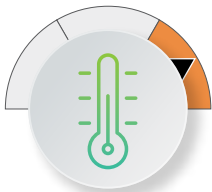
VANUATU



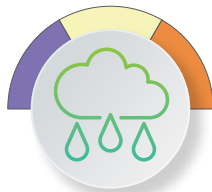
* Annual average using 2014–2024 data

SUMMARY OF CLIMATE CHANGE PROJECTIONS

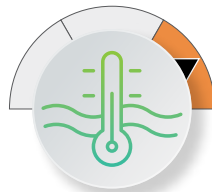
2050



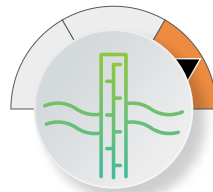
AIR TEMPERATURE



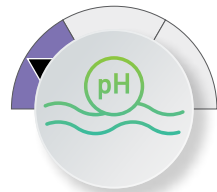
ANNUAL RAINFALL



SEA SURFACE TEMPERATURE

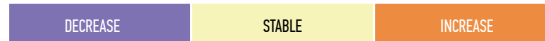


SEA LEVEL



OCEAN pH

CHANGE SCALE



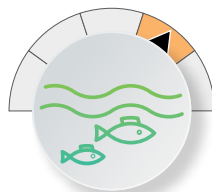
SUMMARY OF CLIMATE CHANGE IMPLICATIONSⁱⁱⁱ



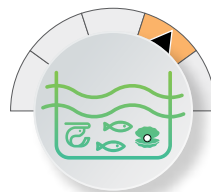
COASTAL FISHERIES



OCEANIC FISHERIES



FRESHWATER FISHERIES



AQUACULTURE

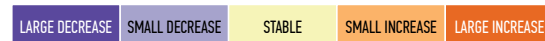


LIVELIHOODS AND ECONOMIES



FOOD SECURITY

CHANGE SCALE



ⁱ Data source: SPC Pacific Data Hub <https://pacificdata.org/population-dashboard>

ⁱⁱ Data source: SPC Statistics for Development Division <https://sdd.spc.int>

ⁱⁱⁱ Relative to the Reference Periods 2010–2020 for coastal fisheries and 1980–2010 for oceanic fisheries.

RECOMMENDED ADAPTATION ACTIONS

These recommended adaptations are based on the key vulnerabilities and implications of climate change for fisheries and aquaculture (further details in Chapter 10) and should be initiated or strengthened. A range of supporting policies are provided in Table 10.1 for decision-makers to select those that are most appropriate to their context and priorities. Central to all future adaptation are the following principles:

1. Improve fisheries data collection to inform management by establishing national data system and dedicate resources to support data collection and management for all fisheries and aquaculture.
2. Incorporate local knowledge in the context of coastal and freshwater ecosystems, food systems and protecting well-being, nutrition security, and cultural heritage. A core part of this is also ensuring equity (including gender equity) and social inclusion.
3. Implement effective governance and resources to support adaptations, with community-based management central to future approaches.



Food and nutrition security

Recommended adaptations

Food and Nutrition 1: Implement sustainable ecosystem-based approach to fisheries management

Food and Nutrition 2: Sustain the production of coastal fish and invertebrates through context-specific management

Food and Nutrition 3: Manage freshwater and estuarine fisheries to harness opportunities

Food and Nutrition 4: Diversify blue food production systems

Food and Nutrition 5: Promote the use of oceanic catches to fill the gap in aquatic resources needed for food and nutrition security

Food and Nutrition 6: Improve post-harvest preservation methods for fish and invertebrates to prepare for sudden shocks

Food and Nutrition 7: Promote education and awareness on the importance of protecting aquatic habitats, species and the foods they supply



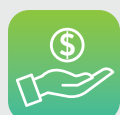
Sustainable livelihoods

Recommended adaptations

Livelihoods 1: Diversify aquaculture commodities and develop new farmed climate-resilient species, strains and varieties

Livelihoods 2: Apply innovative technologies and climate-smart tools for pond aquaculture and mariculture

Livelihoods 5: Develop sustainable marine and coastal tourism



Economies and government revenue

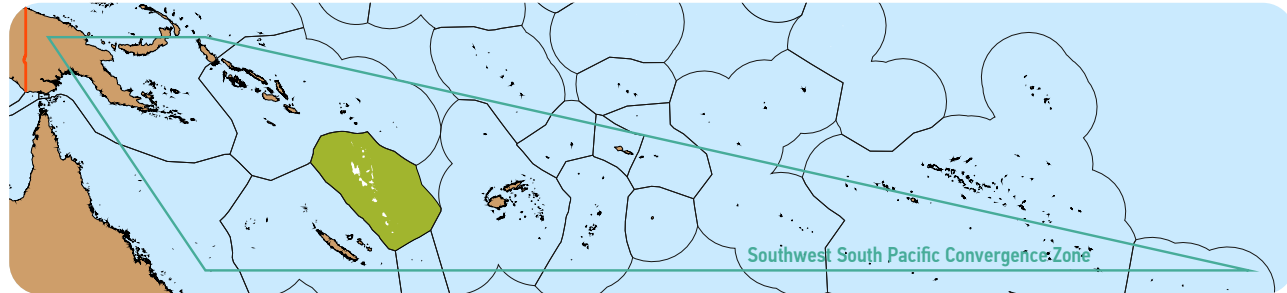
Recommended adaptations

Economic Revenue 3: Implement energy efficiency programs for fisheries and aquaculture

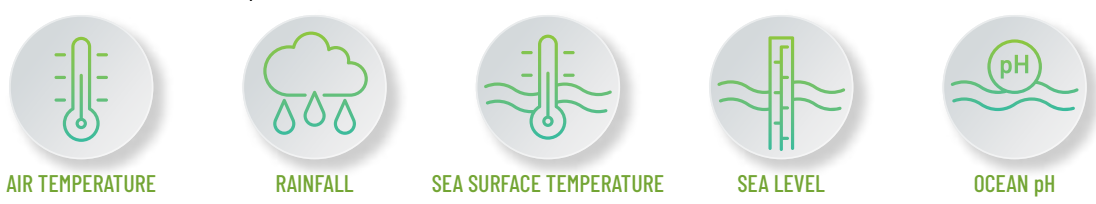
Economic Revenue 4: Promote improved safety at sea

Economic Revenue 6: Climate-proof infrastructure

Projected changes in atmospheric and oceanic climate



Vanuatu is in the Southwest Pacific Convergence climate zone and is expected to experience the following climate changes by 2050 under a medium greenhouse gas emissions scenario (SSP2-4.5) and a high emissions scenario (SSP5-8.5)^{iv}, relative to 1995–2014 baseline (further details in Chapter 2).



	AIR TEMPERATURE	RAINFALL	SEA SURFACE TEMPERATURE	SEA LEVEL	OCEAN pH	
2050	MEDIUM EMISSIONS (SSP2-4.5)	+0.7 to +1.1 °C	-2.3 to +5.5 %	+0.6 to +1.1 °C	+0.1 to +0.3 m	-0.1
	HIGH EMISSIONS (SSP5-8.5)	+0.9 to +1.6 °C	-2.8 to +6.4 %	+0.8 to +1.5 °C	+0.2 to +0.4 m	-0.1
	CONFIDENCE ^v	HIGH	LOW	VERY HIGH	MEDIUM	HIGH

Vanuatu is also expected to experience the following changes to regional climate processes by 2090 under a medium and high greenhouse gas emissions scenario, relative to 1995–2014 baseline.



	TROPICAL CYCLONES	EL NIÑO SOUTHERN OSCILLATION (ENSO)	MARINE HEATWAVES
2090	MEDIUM EMISSIONS (SSP2-4.5)	Decrease in frequency; Increase in intensity	2–9 times more frequent (global projection)
	HIGH EMISSIONS (SSP5-8.5)		3–15 times more frequent (global projection)
	CONFIDENCE ^v	LOW TO MEDIUM	LOW



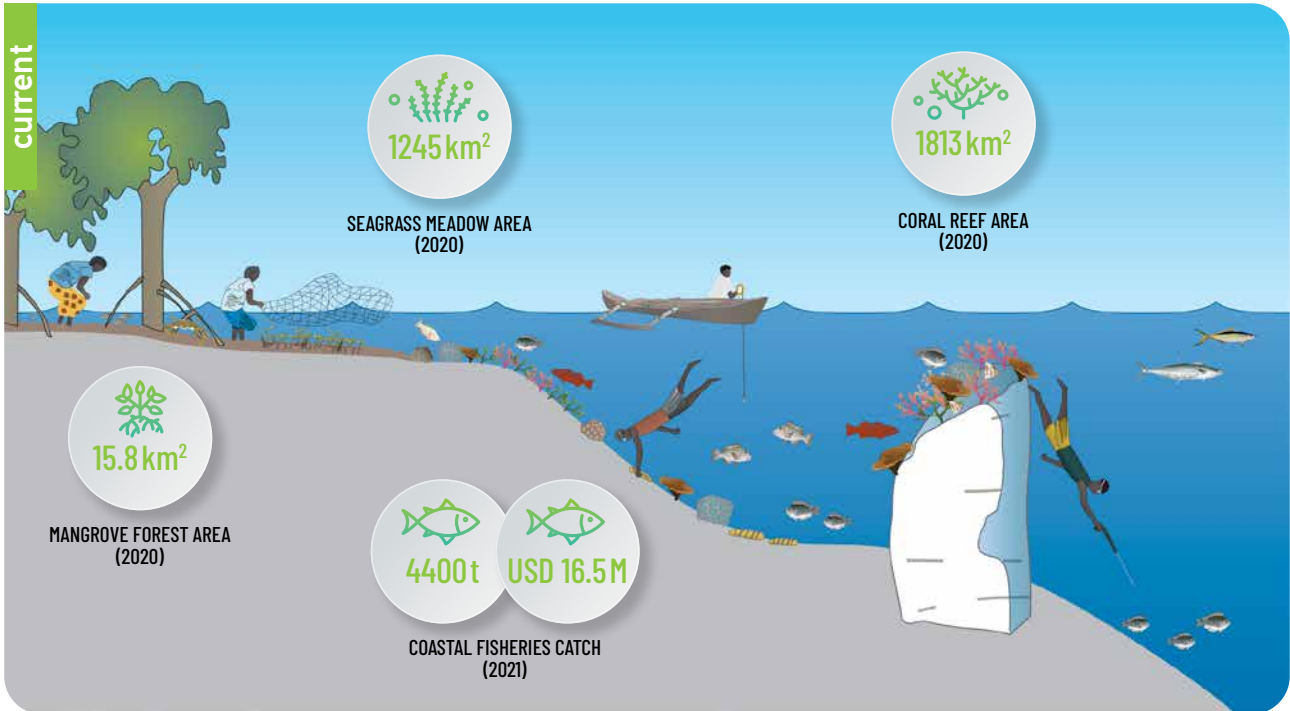
	OCEAN CIRCULATION	OCEAN STRATIFICATION	OCEAN OXYGEN CONTENT	NITRATE CONCENTRATION
2090	MEDIUM EMISSIONS (SSP2-4.5)	Intensification and poleward extension of northern and southern hemisphere subtropical gyres	-6.6 %	-0.60 mmol/m ³
	HIGH EMISSIONS (SSP5-8.5)		+0.58 kg/m ³ (between 0 and 200 m); Mixed layer depth shoals by 19.5 m (global)	-11.2 %
	CONFIDENCE ^v	MEDIUM	VERY HIGH	HIGH



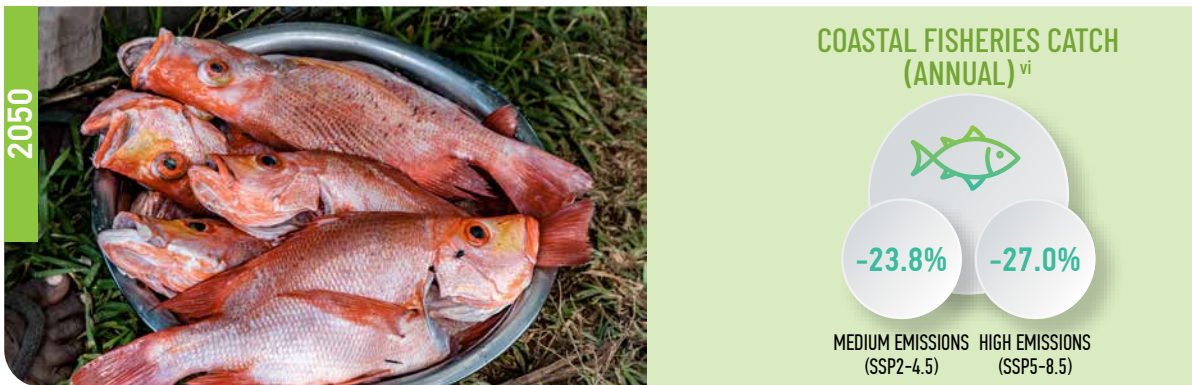
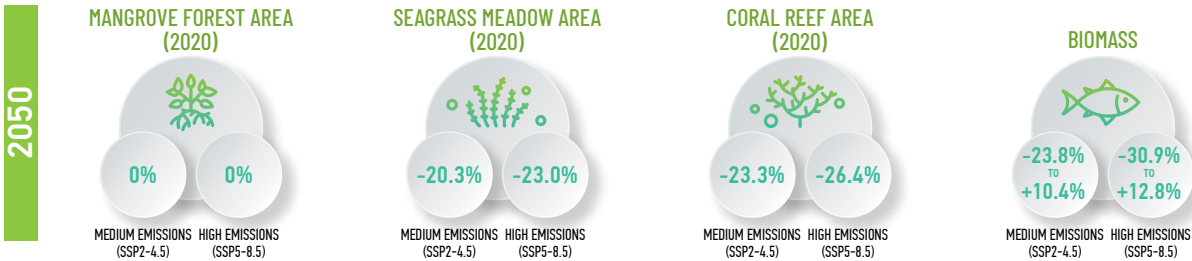
^{iv} The shared socioeconomic pathways (SSP) represent plausible futures of how society's choices might affect greenhouse gas emissions, and how those choices might influence climate change.
^v Confidence levels reflect uncertainty in attribution of the observed impact to climate change.

Coastal fisheries

Coastal fisheries in Vanuatu target demersal fish (including emperors, snappers, parrotfish and rabbitfish), invertebrates for export (e.g. sea cucumbers) and gleaned from intertidal habitats (e.g. giant clams), and nearshore pelagic fish (including trevally and barracuda) using a range of fishing methods. These species are critically important for food, local livelihoods and jobs (further details in Chapter 3).



Coastal fish and invertebrates are expected to be directly impacted by increasing sea surface temperature, ocean acidification (declining pH), and changing rainfall patterns, and indirectly impacted by declines in coastal habitats (coral reefs, seagrass meadows and mangroves) by 2050. This will drive changes in habitat area, fish biomass and coastal fisheries catches.

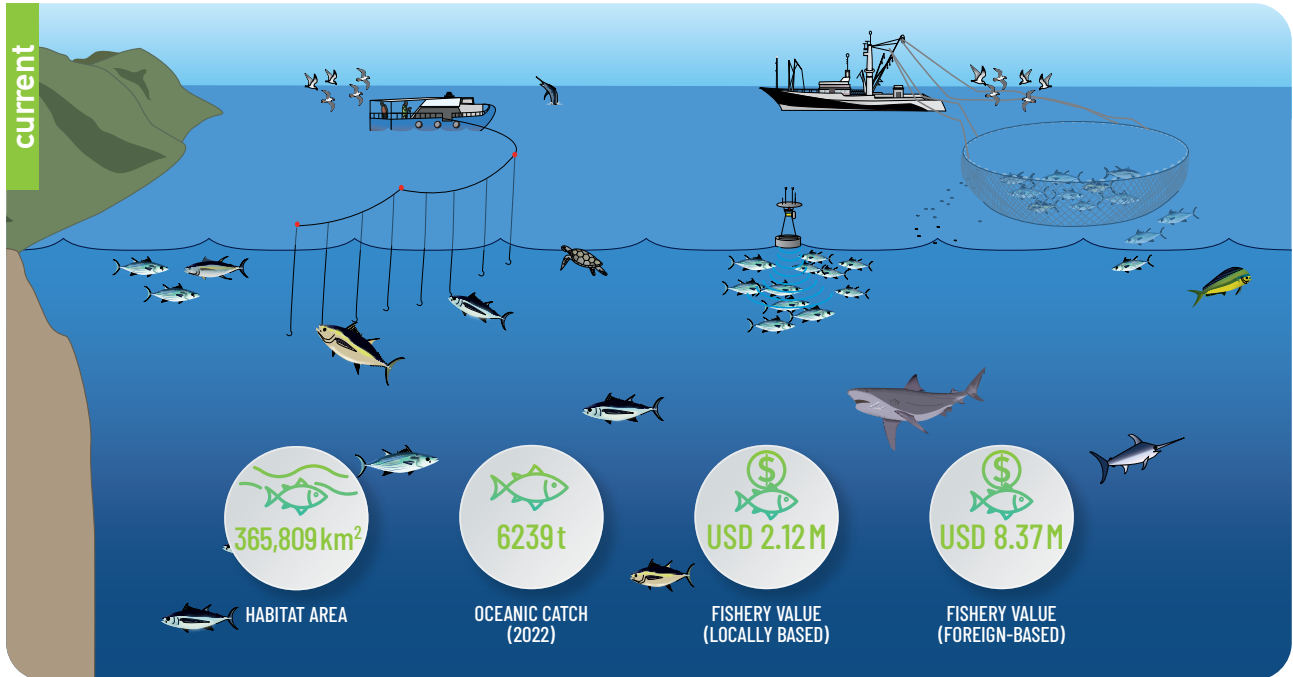


There is evidence that fishing rates may be too high. Better stock assessments are needed.

^{vi} Relative to the Reference Period 2010–2020.

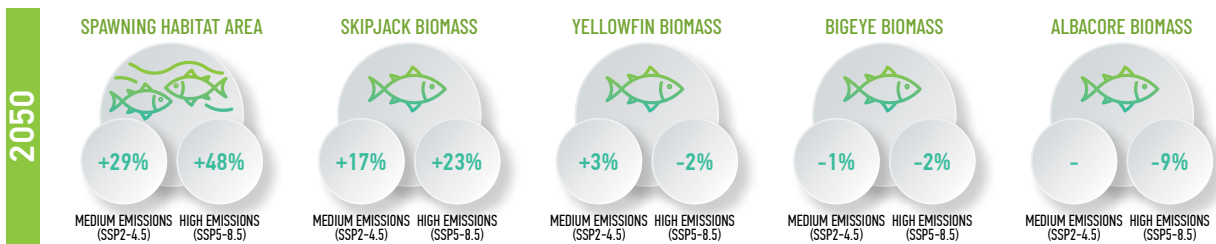
Oceanic fisheries

Offshore fisheries in Vanuatu target four species of tuna – skipjack, yellowfin, bigeye and albacore. In 2021, there were 84 active tuna vessels registered in Vanuatu (78 longliners, 6 purse seiners) although they rarely fished inside their exclusive economic zone (EEZ) or offload their catch in Vanuatu. The offshore foreign based fleet catches almost 2.5 times more tuna than the local fleet, but rarely lands the catch in Vanuatu^{vii}. The tuna fishery is important for government revenue and economic development (further details in Chapter 4).



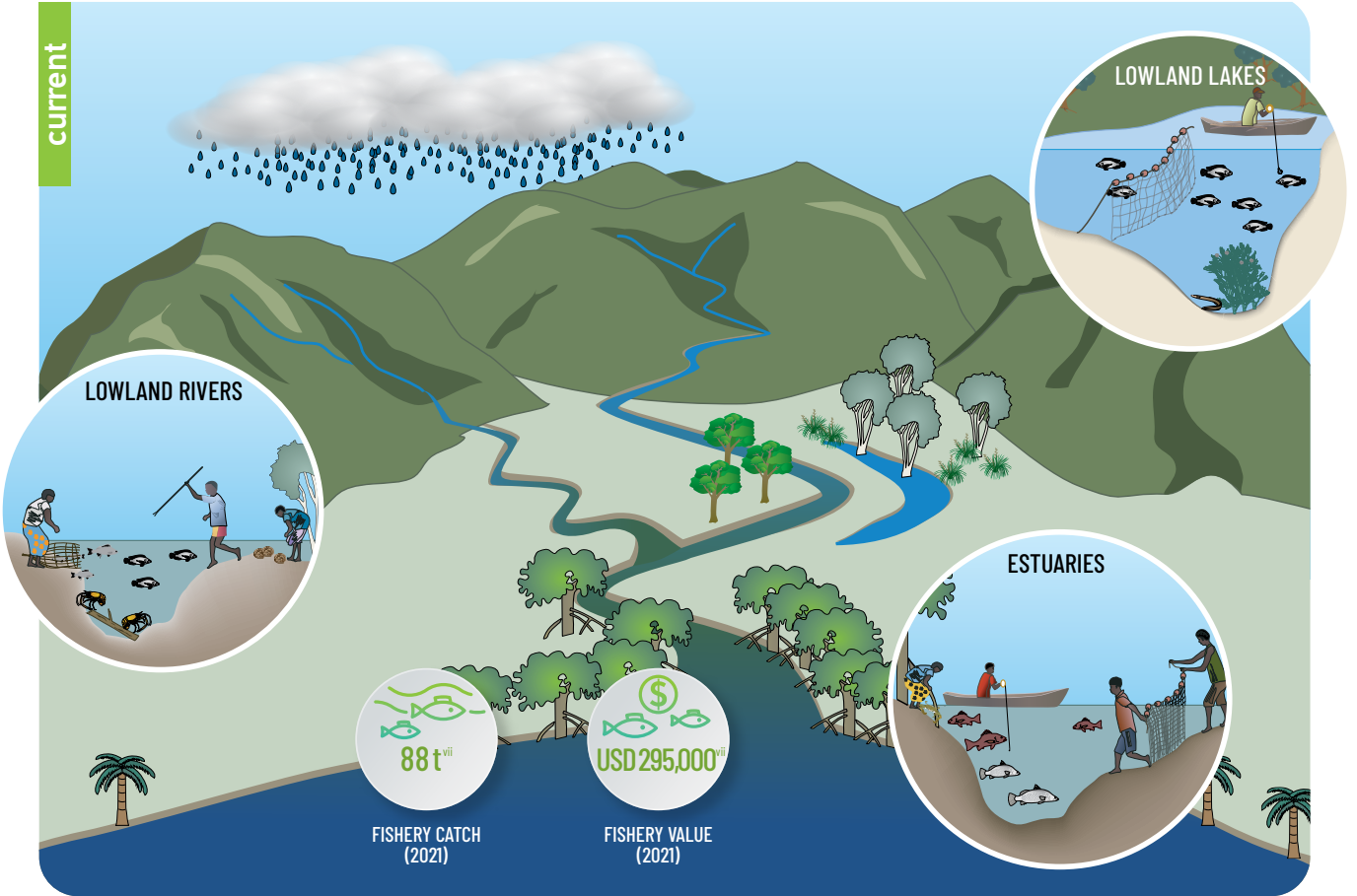
Offshore tuna are expected to be directly impacted by changes in ocean temperature, stratification and oxygen content, and indirectly impacted by changes in available spawning habitat area by 2050. This is expected to shift the distribution of tuna, with yellowfin, bigeye and albacore moving into high seas areas.

PROJECTED BIOMASS (WITHOUT FISHING) RELATIVE TO 2001–2010 REFERENCE PERIOD

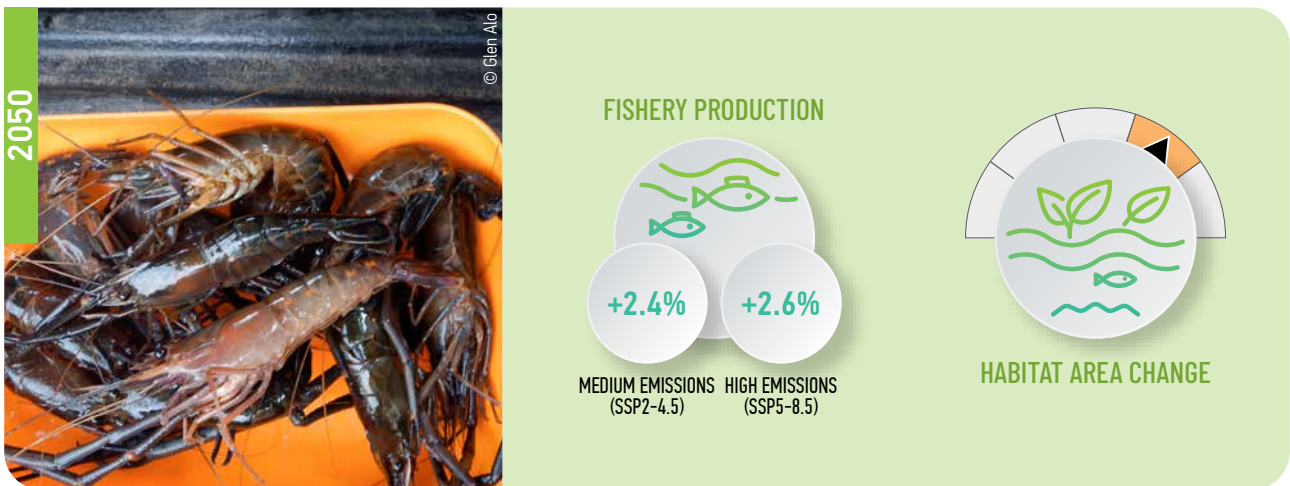


Freshwater and estuarine fisheries

Freshwater and estuarine fisheries in Vanuatu target freshwater prawns (*Macrobrachium* spp.), freshwater clams, and finfish (including flagtails, grunters, tropical snappers, silver biddies, silver moonfish, scads, mullet, carp, tilapia, eels). The main habitats are lowland lakes and rivers, and estuaries. Freshwater and estuarine fisheries are important for food and local livelihoods, particularly for inland communities (further details in Chapter 5).



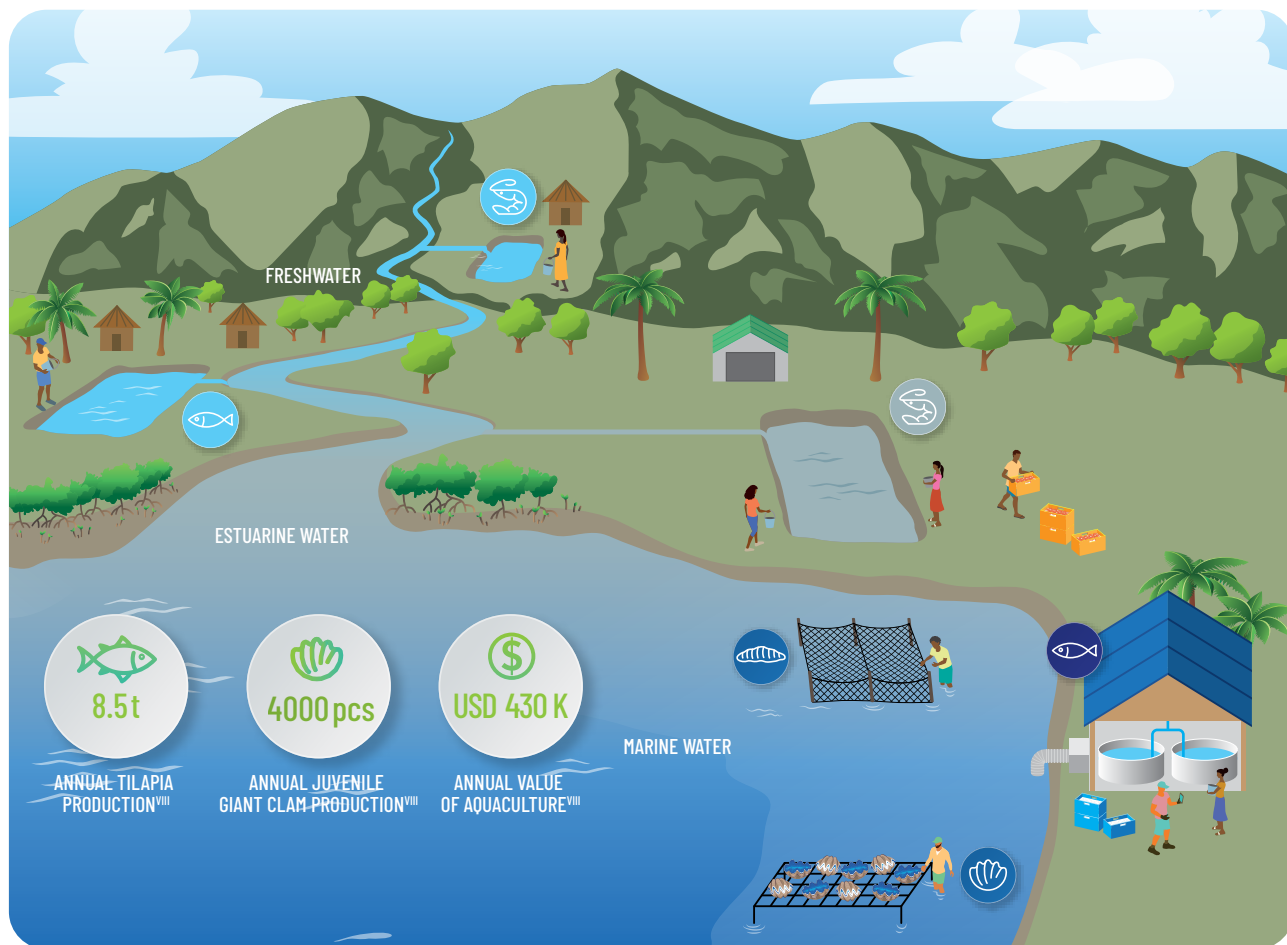
Freshwater and estuarine fish are expected to be directly affected by changes in rainfall patterns that drive river flow, and indirectly affected by increased duration of river flows and habitat accessibility by 2050. This is expected to provide opportunities for the expansion of fisheries and increased production.



viii Fishery catch and value are likely to be underestimates due to unreported catches.

Aquaculture

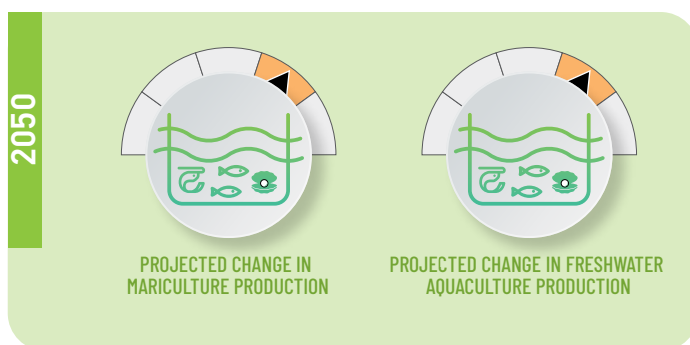
The main commodities farmed in Vanuatu are freshwater prawns (*Macrobrachium* spp.), tilapia, marine shrimp (minor), sea cucumbers and giant clams (ranching for wild restocking). These species provide food, local livelihoods and jobs (further details in Chapter 6).



- Marine shrimp (paeneid)
- Freshwater shrimp (*Macrobrachium*)
- Sea cucumbers
- Hatchery for giant clams, freshwater prawns and tilapia
- Tilapia
- Giant clams

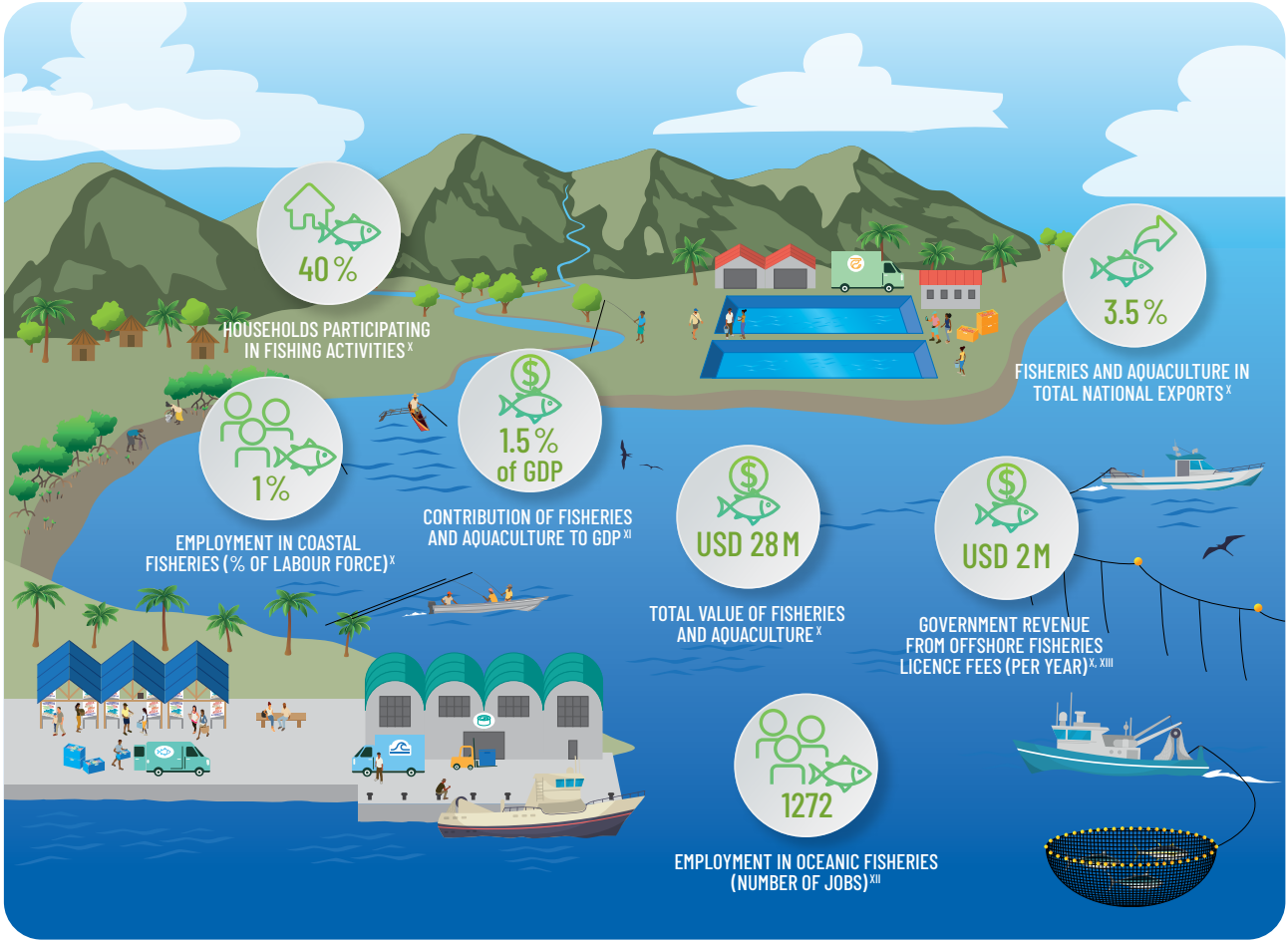
Mariculture is expected to be directly impacted by increasing sea surface temperature, ocean acidification (declining pH), and more intense storms.

Freshwater pond aquaculture is expected to benefit from increases in freshwater habitat but be impacted by increasing temperatures and disease, changing rainfall, storms and sea level rise. This will have implications for aquaculture production by 2050.



Livelihoods and economies

Fisheries and aquaculture are important for local culture and trade, and providing household income, livelihoods and jobs in Vanuatu (further details in Chapter 7).



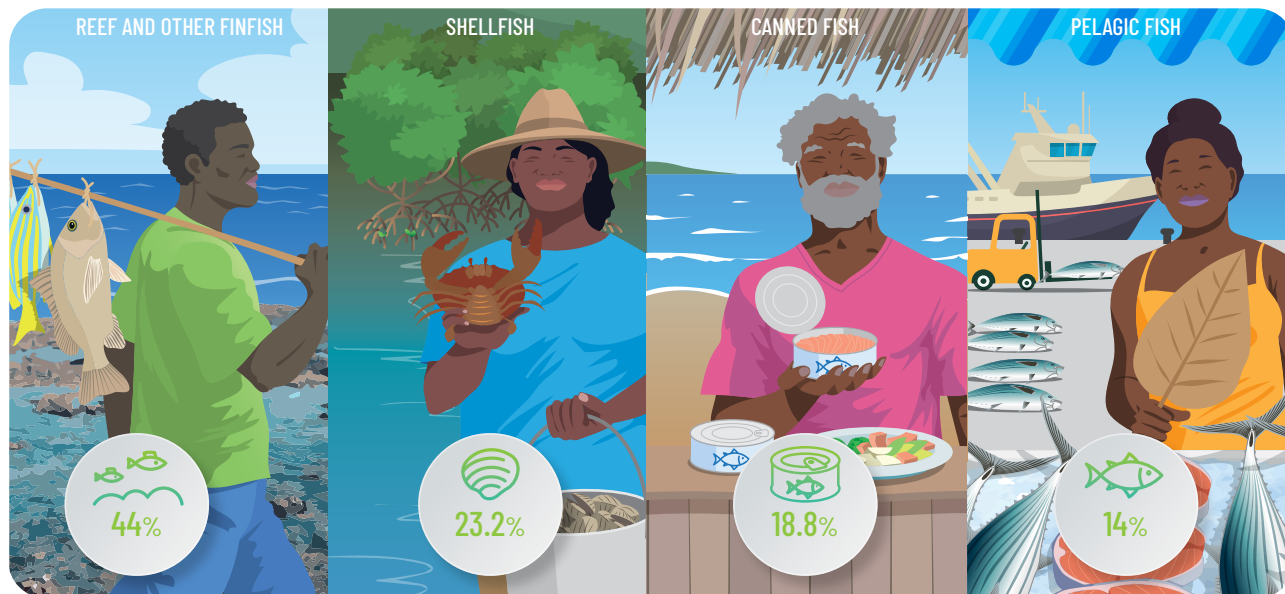
No significant impacts are expected on livelihoods and GDP due to the low relative contribution of fisheries and aquaculture. No significant impact is expected on government revenue because no or minimal purse-seine fishing is likely in the EEZ.



x Data source: Gillett R., Fong M. (2023) Fisheries in the economies of Pacific Island countries and territories (Benefish Study 4). Pacific Community (SPC), Noumea, New Caledonia.
 xi National GDP in 2020.
 xii Primarily in tuna-related employment, including harvest, processing, observers, government and ancillary services. Data source: FFA (2022) Tuna Fishery Report Card 2022. Pacific Islands Forum Fisheries Agency, Honiara, Solomon Islands.
 xiii Average value 2017-2021.

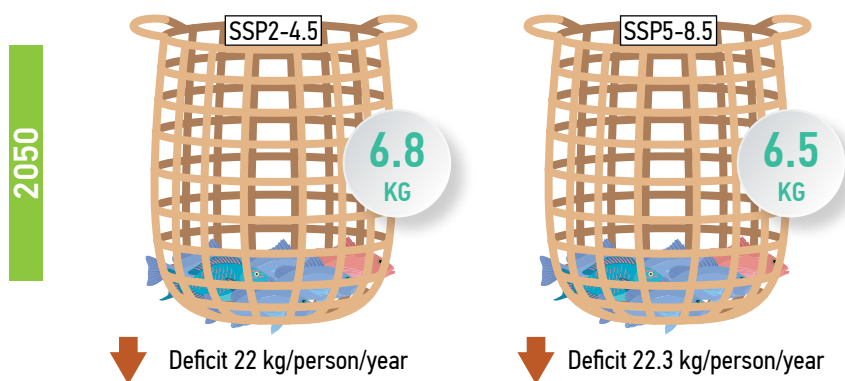
Aquatic food security

Aquatic (blue) foods provide an important source of nutrition in Vanuatu, and current consumption is 35 kg/person/year, made up of locally and imported reef and other finfish, shellfish, canned fish and pelagic fish (further details in Chapter 8)^{xiv}.

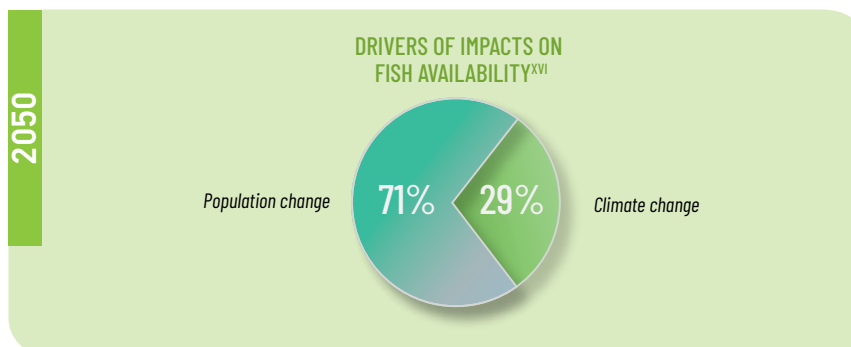


Vanuatu is projected to experience a deficit in fish supply by 2050 based on current fisheries catch rates and average consumption. This will be driven by population growth, and exacerbated by climate change impacts on coastal, estuarine and freshwater fisheries. There is expected to be a decline in available whole fish by 2050^{xv} and the possibility of insufficient access to aquatic foods, resulting in **high vulnerability**.

HOW MUCH FISH WILL BE AVAILABLE PER PERSON IN 2050?



To meet the future needs of a growing population and address declining catches for local consumption under climate change, sustainable coastal and estuarine fisheries management is essential. A greater contribution from pelagic fish, canned fish and aquaculture, and other protein sources (e.g. agriculture), will also be required to support food security and good nutrition. Any adaptations should consider environmental and social safeguards and avoid maladaptation.



^{xiv} Data estimated for whole fish from: Sharp M.K., Andrew N.L. (2024) Aquatic food consumption in the Pacific region. Food Systems Brief No. 22. Pacific Community, Noumea, New Caledonia.

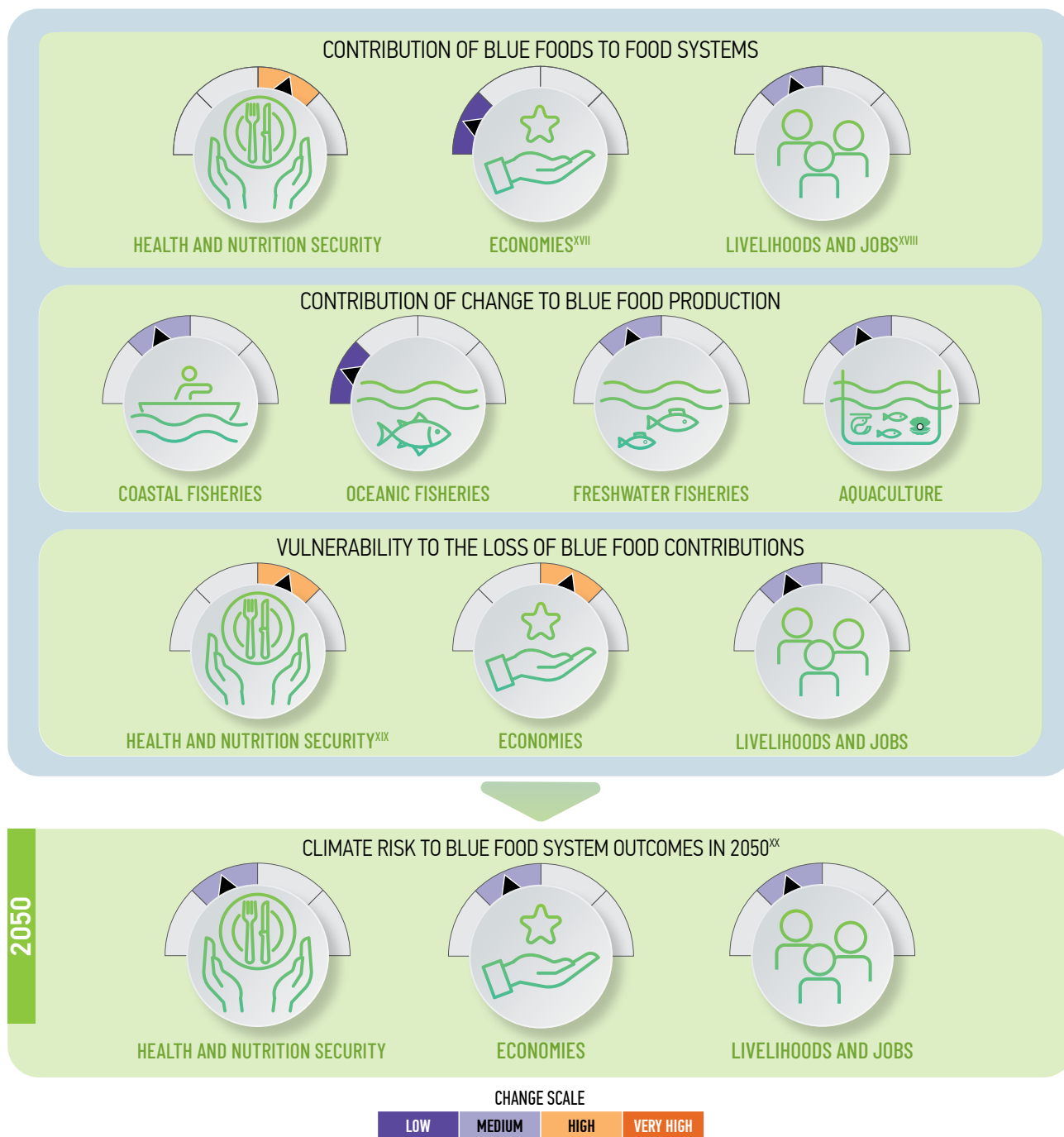
^{xv} Based on projected coastal, estuarine and freshwater fisheries catches by 2050 from Chapters 3 and 5.

^{xvi} Based on current aquatic food consumption levels. Note that agriculture can also provide additional protein sources to supplement a decline in aquatic foods, however any adaptations should consider environmental and social safeguards and avoid maladaptation.

Blue food production systems

In the Pacific Islands region, blue foods contribute significantly to nutrition security and health, economies, livelihoods and jobs. By comparing contributions, climate impacts, and vulnerabilities across these outcomes, priority climate actions can be identified for sustaining their role in sustainable development under climate change (further details in Chapter 9).

In Vanuatu, blue foods are very important for nutrition security and health. Compared to other Pacific islands, projected climate impacts to blue food production by 2050 are medium to high. Socioeconomic conditions make Vanuatu's sustainable development more vulnerable to climate-induced losses.



Altogether, the contributions of blue foods to sustainable development in Vanuatu face medium levels of climate risk, due to lower levels of impacts and dependence. Vanuatu is expected to be more adaptive to climate change, and priority climate actions can focus on adapting blue food production systems, for instance through improved fisheries and catchment management.

^{xvii} Including variables such as total fisheries production value and foreign access fees.

^{xviii} Including variables such as total number of jobs across supply chains, share of households for which fishing is the main source of income and gender equity considerations.

^{xix} Including nutrition-related health outcomes such as nutrient deficiencies and noncommunicable diseases.

^{xx} Risk is shown for a high-emissions scenario (SSP5-8.5). Rapid emissions reduction would reduce climate risk.