



FAO/GLOBAL ENVIRONMENT FACILITY PROJECT DOCUMENT



PROJECT TITLE: STRENGTHENING THE ADAPTIVE CAPACITY TO CLIMATE CHANGE IN THE FISHERIES AND AQUACULTURE SECTOR OF CHILE	
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GEF FOCAL AREA/LDCF/SCCF: CLIMATE CHANGE	
GEF STRATEGIC OBJECTIVES/LDCF/SCCF: CCA-1; CCA-2	
ENVIRONMENTAL AND SOCIAL RISK CATEGORY: MODERATE	
FINANCING PLAN: SCCF Allocation:	USD 2,500,000
Co-financing:	
SUBPESCA	USD 14,790,011
MMA	USD 846,421
FAO	USD 101,361
Sub-total cofinancing:	USD 15,737,793
Total Budget:	USD 18,237,793

¹ Based on *Resultados y prioridades de la FAO en la región de América Latina y el Caribe y examen estratégico regional*, FAO 34th Regional Conference for Latin America and the Caribbean, Mexico City, Mexico, 2016
<http://www.fao.org/3/a-mp711s.pdf>

EXECUTIVE SUMMARY

Chile is one of the largest fish producing countries in the world and, fisheries and aquaculture are among the productive activities of a higher economic and social relevance at the national level. In 2014, total landing was 3.80 million tons, where 68% corresponds to fishing and 32% to aquaculture. The export volume was 1.34 million tons. It is estimated that the direct and indirect labor associated with fishing activities and aquaculture in Chile, would exceed the 200,000 people and in some coastal areas this is the only source of income. The participation of women in fisheries and aquaculture shows a significant impact on jobs with a 30% participation in the workforce.

Over the last decades and after a historical growth of more than 8 million tons in 1994, fishery has shown a downward trend due to overfishing of many fishery resources. Additionally, in recent decades, aquaculture has grown considerably in terms of volumes and profits, from 184,000 tons in 1994 to 1.2 million tons in 2014; However, the total volume of landings and harvest show a marked downward trend. The average volume of 3.8 million tons per year over the last five years, below the 4.7 million tons average of the last decade, reflects a deterioration of main fisheries and aquaculture harvest. This leads to negative socioeconomic impact, including reduction of income and food security in fishing and aquaculture communities.

While, in the case of fisheries, the deterioration is usually attributed to an overexploitation of the resource and, in the case of aquaculture is attributed to production, environmental, social and market problems, we cannot rule out changes in the environmental conditions which may have influence over the fishery resources' behavior, biological characteristics, availability, accessibility and vulnerability which may be affecting their current status. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change, projects a redistribution of high seas net primary production and a worldwide drop in all scenarios evaluated and ascertains, with a high level of confidence, that climate change adds to overfishing threats and other non-climatic stress factors. In Chile, the effects of climatic variability due to El Niño in the ocean, fisheries and aquaculture are well documented, and there have been several studies on forecasts and expected impacts of climate change, as well as vulnerability of fisheries and aquaculture. From the point of view of fisheries and aquaculture's vulnerability and adaptation to climate change, the artisanal fisheries sub-sector in general, is identified as one of the sectors that deserves highest attention given its direct link with the sea and the large socio-economic dependence associated with the extraction of marine resources.

Chile has implemented a series of initiatives aimed at a sustainable development of fisheries and aquaculture, including management, research, and monitoring of fishing, industrial aquaculture, artisanal fisheries and small-scale aquaculture, as well as the research and knowledge generation on climate change related to fisheries and aquaculture. However, in general, these initiatives do not give much consideration to climate change and its adverse effects and thus, are not geared to generate the necessary capabilities to have a more resilient fisheries and aquaculture sector, able to adapt to the expected effects of climate change. To address this issue, the following barriers should be overcome: 1) Weakness of the institutional framework, including the absence of inter-institutional coordination and limitations of public, private and civil society capacities to understand and cope with climate variability and climate change in the fisheries and aquaculture sector; 2) The limited experience and availability of technologies and implementation of best practices in the fisheries and aquaculture sector to adapt to climate change, increases the vulnerability of coastal communities; 3) Limitations of information and knowledge at community level for an adequate management of fisheries and aquaculture resources addressing the expected climate change impact.

The project aims to overcome these barriers by transforming the current context of the deterioration of fisheries, vulnerability to climate variability and climate change, and limited institutional capacities, as well as increasing experience and availability of technologies and application of best practices in the sector to reduce the vulnerability and adapt to climate change.

The objective of the project is to reduce vulnerability to climate change in fisheries and aquaculture in Chile and increase its capacity of adaptation to climate change. To achieve this, the project will be implemented according to the following four components:

- 1) Strengthening public and private institutional capacity for effective climate change adaptation
- 2) Improving the capacity of adaptation to climate change of local fisheries and aquaculture communities
- 3) Increasing knowledge and awareness-raising on climate change in fisheries and aquaculture communities
- 4) Project management, monitoring and evaluation

Project expected outcomes are: (1) Strengthened public and private institutional capacities to implement/improve CC adaptation actions in fisheries and aquaculture (at national and local levels); (2) Local stakeholders have

established adaptive capacity systems and invest in innovative adaptation technologies at local level.; (3) Local coastal communities are aware, knowledgeable and prepared to cope with climate change effects on fisheries and aquaculture; 4) Project implemented, lessons learned and best practices documented and disseminated

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Acronyms²

AAA	Authorized Areas for Aquaculture
ACOTRUCH	Association of <i>Coho</i> Salmon and Trout Producers
ALA	Fishing Open Access Areas
MEABR	Management and Exploitation Areas for Benthic Resources
AMICHILE	Mussel Farming Association
ASIPES	Industrial Fishing Association
CCA	Climate Change Adaptation
CCRF	Code of Conduct for Responsible Fisheries
CEAZA	Centre for Advance Studies in Arid Zones
ECLAC	Economic Commission for Latin America and the Caribbean (UN)
CIAM	Center for Marine Applied Research
PSC	Project Steering Committee
UNFCCC	United Nations Framework Convention on Climate Change
CMS	Ministers Sustainability Council
NPC	National Project Coordinator
CONAPACH	Chilean Confederation of Artisanal Fishers
CONFEPACH	Artisanal Fishing Federations
CORFO	Chilean Agency for Economic Development
SSF Guidelines	Voluntary Guidelines to Achieve Sustainable Small-Scale Fisheries (FAO)
NPD	National Project Director
EEF	Ecosystem Approach to Fisheries
FIE	Final Independent Evaluation
NSCC	National Strategy on Climate Change
PT	Project Team
FAO	Food and Agriculture Organization of the United Nations
FAP	Fisheries Management Fund
FFPA	Development Fund for Artisanal Fisheries
FIPA	Fund for Fishing and Aquaculture Research
FLO	Funding Liaison Officer
FPMIS	Field Programme Management Information System
GHG	Greenhouse Gases
GEF	Global Environment Facility
IFOP	Fisheries Development Institute
INPESCA	Fisheries Research Institute
INTESAL	Salmon Technology Institute
PPR	Project Progress Report
IPCC	Intergovernmental Panel on Climate Change
PIR	Project Implementation Review
LGPA	General Law of Fisheries and Aquaculture
M&E	Monitoring and Evaluation
MMA	Ministry of Environment of Chile
NGO	Non-Governmental Organization (NGO)
CSO	Civil Society Organization
LTO	Lead Technical Officer (FAO)
MEABR	Management and Exploitation Areas for Benthic Resources
NAP	National Adaptation Plan to Climate Change for Fisheries and Aquaculture
NAPCC	National Action Plan on Climate Change 2008-2012
NAP	National Adaptation Plan to Climate Change

² Acronyms reflect the Spanish initials, to allow better track for project stakeholders and readers.

PTF	Project Task Force
AWP/B	Annual Work Plan/Budget (AWP/B)
MTE	Mid-Term Evaluation
BH	Budget Holder
SALMONCHILE	Chilean Salmon Industry Association A. G.
SCCF	Special Climate Change Fund
SERNAPESCA	National Fisheries and Aquaculture Service
SONAPESCA	National Fisheries Society
SUBPESCA	Undersecretariat of Fisheries and Aquaculture
ToR	Terms of Reference
SST	Sea Surface Temperature
NPCU	National Project Coordination Unit
USD	United States Dollars
OMZ	Minimum Oxygen Zones

SECTION 1 –RELEVANCE

1.1 PROJECT CONTEXT

1.1.1 National context

The Chilean productive sector based on the use of marine resources is comprised of capture fisheries (artisanal³ and industrial⁴) and aquaculture. Chile is one of the main fishing producing countries in the world and, although the participation of the fisheries and aquaculture sector in Chile's gross domestic product (GDP) is small (between 3% and 3.5% by adding raw materials and processed products), is one of the productive activities of greatest economic and social relevance at the national level.

In 2014 the volume of landings was close to 3.80 million tons, with end products generation in the order of 1.6 million tons. Exports show a growing trend, with 1.34 million tons in 2014, 7.4% more than in 2013, with foreign exchange earnings of USD 6,164 million, 17.6% more than in 2013. The products were exported to over 110 countries, mainly United States, Japan, Brazil and Russia.

The sector has a high impact on coastal communities, generating direct employment for 150,000 people in 2013, of which 47.3% are artisanal capture fisheries, 26.2% processing industry, 24.2% aquaculture and 2.2% for industrial capture fisheries. By 2015, it is estimated that the direct and indirect workforce related to fishing and aquaculture activities in Chile, would exceed 200,000 people. In some coastal areas this is the only income source. The participation of women in fisheries and aquaculture workforce has a significant impact on jobs and it estimated that their participation is equivalent to 30.0%.

Fisheries

After a great historical growth of more than eight million tons in 1994, fishing has experienced a downward trend during recent decades due to overfishing. During 2014, the total landings of fishing was 2,589 million tons, representing 68.1% of the total volume of the fisheries and aquaculture sector.

A total of 141 marine species are fisheries, of which, 74 are fish, 23 crustaceans, 31 molluscs and 13 seaweeds; however, only some of them underpin the largest landings, mainly represented by fish such as anchovy (*Engraulis ringens*), sardine (*Strangomera bentincki*), jack mackerel (*Trachurus murphy*), and mote sculpin (*Normanichthys crockery*), which in 2013 accounted for 83% of fish landing. In the case of molluscs, cuttlefish or giant squid (*Dosidicus gigas*) represented 85% of landings and the Chilean kelp (*Lessonia beteroana*, *L. spiaca*) accounted for 65% of landings.

Historically, the largest supplier of fisheries raw materials in Chile was the industrial extractive fisheries, whose landings showed an annual average of 87,03% of the total landings of extractive fishing during the 90s. However, the landing structure has changed dramatically and

³Artisanal fishing is the extractive fishing activity carried out by individuals who, in a personal, direct and habitual way, work as artisanal fishers registered in the National Registry for Artisanal Fishers, with or without an artisanal fishing boat (maximum length not exceeding 18 meters and 80 cubic meters of storage capacity) (General Law on Fisheries and Aquaculture)

⁴Industrial fishing is the extractive activity on vessels longer than 18 meters, with technical fishing systems, such as trawling, longline and purse seiner, that allow the massive capture of fishery resources (General Law on Fisheries and Aquaculture)

it can be observed now (2014) a high incidence of artisanal extractive fisheries landings registering the 58.2% (1.51 million tons) of the total landings of extractive fishing, which has surpassed the records of the industrial fishing that, by 2014, only reached 41.8% (1.08 million tons).

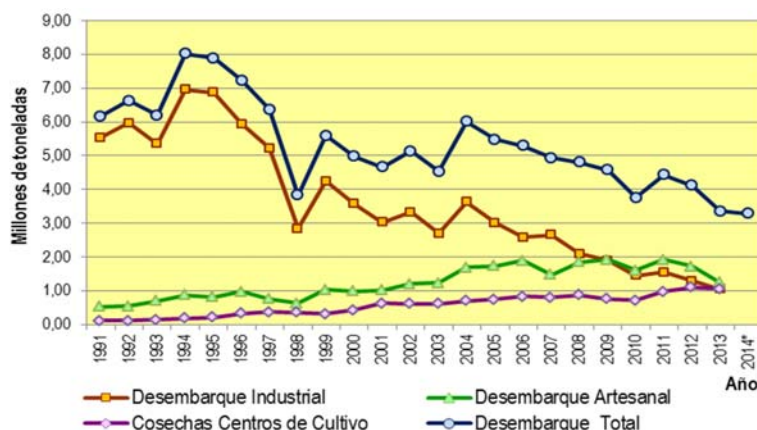


Figure 1.1 Fisheries landings and farm harvest. 1991-2014

According to the First Fisheries and Aquaculture Census conducted between 2007-2008, there were 876 artisanal fishing communities in Chile with 71.880 fishers (37% women and 63% men) who were divided between coves⁵ and artisanal settlements⁶. In 2013, the total number of registered fishers in the Artisanal Fishing Registry⁷ was 91,395, where 22% are women and 78% men. In 2013, the industrial fishing with a fleet of 161 ships, created a total of 2,139 direct jobs and through the operation of 633 processing plants, a total of 34,712 jobs.

Women have a high participation in the artisanal fisheries where, in 2013, had an incidence of 22.3% of the total registered artisanal fishers in the various categories (seashore collector, shellfish gatherers, fishers and owners of artisanal boats). The category ‘seashore collectors’ (seaweed collectors, seashore collectors and freediving) registers the highest number of women with an incidence of 79.8% (17,922 people) of the total fishers registered in the category. It is also important to note the record of 544 artisanal boats owners, which manage 4.6% of artisanal vessels registered in the country.

Aquaculture

In recent decades, aquaculture has grown considerably in Chile in terms of volumes and profits, from 184,000 tons in 1994 to 1.2 million tons in 2014. Aquaculture is developed with 20 species: seven fish, eight molluscs and five seaweeds, where the most important one is fish with 74% of total production. The main cultivated species are the Atlantic salmon (*Salmo salar*), Pacific salmon (*Oncorhynchus kisutch*), rainbow trout (*Oncorhynchus mykiss*) and mussels (*Mytilus chilensis*). Molluscs represent 25% of all harvest and seaweed only 1%.

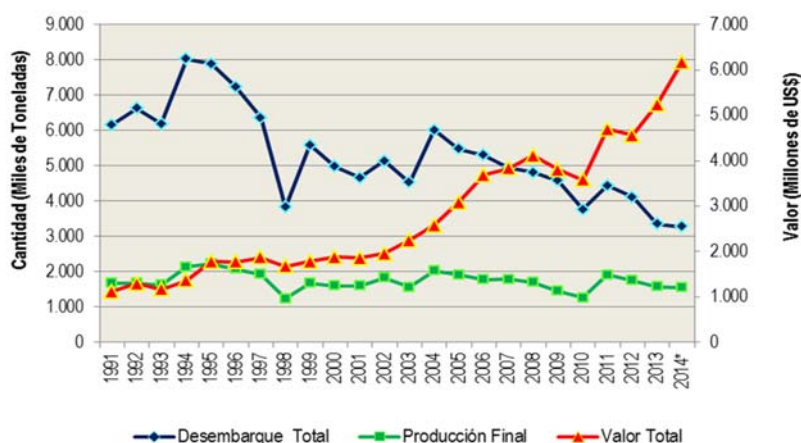
⁵*Caleta* or cove (small bay): places along the coastline where artisanal fishing activities take place and where fishers berth their boats.

⁶Artisanal settlement: Areas of productive activities and meeting points which are not legally recognized by Decree 240 of the Undersecretariat of Navy that defines the coves.

⁷The National Registry for Artisanal Fishers is the list of fishers (men and women), and vessels fitted out for artisanal fishing, which is maintained by the National Fisheries Service (Servicio Nacional de Pesca y Acuicultura) and contains information about fishers’ identification, category and type of extractive fishery activity.

During 2014, the total harvest of the aquaculture subsector reached 1.214 million tons which is slightly higher than that obtained the previous year, and represents 29.9% of the total volume produced by the fisheries and aquaculture sector. From the total harvest, 78.6% (955,000 tons) corresponds to salmon farming. This activity represents 36% of food exports and provides direct and indirect employment to over 70,000 people. In second place, the production and economic contribution, of Chilean mussel (*Mytilus chilensis*), Magellan mussel (*Aulacomya atra*), giant mussel (*Choromytilus chorus*), scallops (*Argopecten purpuratus*), oysters (*Ostrea chilensis*) and others. The Chilean mussel is the most relevant species in terms of farming and exported volumes. During 2014, 2,272 hatcheries were operating, the most important ones located in the regions of Los Lagos, Aysen, Atacama, Araucania, Coquimbo, Magallanes, Los Rios and Biobio.

Notwithstanding the foregoing, the volume of landings and harvest of the fisheries and aquaculture sector in the last five years (3.8 million tons per year on average) shows a marked downward trend, reaching in 2013 and 2014 a figure below the last decade average (4.7 million tons), a situation that reflects a deterioration of the main fisheries and a significant economic and social impact on fishing communities.



Source: Own elaboration based on information provided by SERNAPESCA

Figure 1.2. Evolution of landings, production and foreign currency generation in the fishery and aquaculture sector in Chile 1991 – 2014.

Institutional framework

The fisheries and aquaculture sector is managed by the **Ministry of Economy, Development and Tourism**, through the Undersecretariat of Fisheries and Aquaculture, the National Fisheries and Aquaculture Service under the authority of this Ministry and the Fisheries Development Institute under the authority of the Agency for Economic Development (CORFO).

The **Undersecretariat of Fisheries and Aquaculture (SUBPESCA)** is the agency responsible for regulating and managing the fisheries and aquaculture activity, through policies, regulations and management measures, under a precautionary and ecosystem approach that promotes conservation and sustainability of living aquatic resources for a productive sector development. To this end, the following strategic objectives have been established: i) Design and implement policies, regulations and management measures aimed at the conservation and sustainability of

living aquatic resources, in coordination with and participation of economic agents of the fisheries and aquaculture sector, through participatory bodies in accordance with the established law; ii) Have timely sectoral information to count on the necessary elements for taking decisions on regulatory and sectoral management, and iii) Mitigate socio-economic impact on the sector associated with the gradual and sustained recovery of the main national fisheries, through the promotion and productive diversification of the sector. SUBPESCA has eight Regional Directorates of Fisheries and Aquaculture distributed along the Chilean territory, in charge of the administrative activities of the Undersecretariat in the regions and chair the Zonal Fisheries Councils and the Regional Recreational Fishing Councils.

In order to include the climate change variable, in 2014 SUBPESCA created the Technical Advisory Group on Climate Change (GTACC), composed of specialists in the area, representatives of the Ministry of Environment, universities and the Fisheries Development Institute, in order to advise the Undersecretariat of Fisheries and Aquaculture on: i) management and research issues in terms of climate change variability, risk assessment and potential impacts; and ii) scientific and technical climate change aspects, under a multidisciplinary and socio-ecological approach. the SUBPESCA and the Ministry of Environment have developed a Climate Change Adaptation Plan for Fisheries and Aquaculture, approved by the Sustainability Ministers Council (SMC) in December 2015

The **National Fisheries and Aquaculture Service (SERNAPESCA)** has the mandate to monitor compliance with fisheries and aquaculture regulations, providing services to facilitate its proper implementation and conduct effective health management in order to contribute to the sustainability of the sector and protection of living aquatic resources and their environment. To this end, it has established the following strategic objectives: i) Supervise fishing and aquaculture activities ensuring compliance with legal and regulatory norms set for the sector; ii) Ensure the health quality of exporting fishery and aquaculture products in order to comply with the health requirements of importing countries; iii) Ensure the health and environmental status of aquaculture contributing to the competitiveness of the sector; and iv) Provide sectorial, complete, timely and reliable information. SERNAPESCA has the responsibility to manage fisheries and aquaculture registries and produce official statistics of the country which constitutes an important input for understanding and monitoring the vulnerability of communities.

On the other hand, the Fisheries Development Institute (IFOP) is a non-profit private corporation, whose public role is to support the sustainable development of the country's fisheries and aquaculture sector, through the elaboration of scientific and technical information of public value, necessary for the regulation and conservation of fisheries and aquaculture resources and ecosystems. Its strategic objectives are: i) generate and provide scientific knowledge and information of public value necessary for the definition of regulatory measures to strengthen sustainability and production of living aquatic resources for industrial and artisanal use; and ii) ensure the dissemination, updating, protection and quality of public information. In this sense, the IFOP creates, develops and transfers knowledge of public value on the aquaculture and fisheries sector, which includes environmental information, in order to conserve and/or preserve the resource base, which is key to promote the sustainable development in the country. Thus, the essential role of IFOP is to support the Authority with research, so as to ensure sustainable development of the agents involved in the sector.

In addition, several agencies whose aim is to provide financial resources to support the development of fisheries and aquaculture depend on the Ministry of Economy, Development and Tourism, namely: i) the **Fund for Fisheries and Aquaculture Research (FIPA)** administered by SUBPESCA, which finances fisheries and aquaculture research projects, necessary for the adoption of measures to manage fisheries and aquaculture activities; ii) the **Fisheries Management Fund (FAP)**, under the authority of the Ministry of Economy, Development and Tourism, closely linked to the work of SUBPESCA, which seeks to promote and develop sustainable fishing, through development tools and social intervention with a territorial perspective (monitoring and control, training and lateral entry, research and promotion of seafood consumption); and iii) the **Development Fund for Artisanal Fisheries (FFPA, acronym in Spanish)**, administered by the Artisanal Fisheries Development Council (chaired by SERNAPESCA), aims at promoting sustainable development of the artisanal fisheries sector and support the efforts of artisanal fishers' organizations legally established in Chile, with a view to improving living and working conditions of its members, respecting the resources and the environment, through co-financing of projects managed by the organizations themselves.

In addition to the aforementioned institutions, different bodies have been created in order to foster the effective participation of fisheries and aquaculture sector's agents at the national level, on matters related to fisheries and aquaculture, contributing to a sustainable development of the sector. The **National Aquaculture Commission** is the advisory body to the President of the Republic, (through the Ministry of Economy, Development and Tourism) and made up of representatives of the productive sector, groups of small-scale aquaculture farmers, services and sectoral institutions in charge of formulating and evaluating actions, measures and programmes required to implement the National Aquaculture Policy. The **National Fisheries Council** is an organization made up of representatives of the public sector, business trade associations, trade unions, artisanal organizations and advisors appointed by the President of the Republic. It gives opinions, recommendations, proposals and duly substantiated technical reports to SUBPESCA, in all those matters stipulated in the General Law on Fisheries and Aquaculture as well as in any other law of sectorial interest.

Likewise, the **Scientific Technical Committees** are advisory bodies to SUBPESCA on scientific matters relevant for fisheries and aquaculture management. There are eight Scientific Technical Committees, as advisory/consultative bodies on relevant scientific matters for the management of fisheries with closed access, as well as environmental and conservation issues and others of interest for SUBPESCA. This includes: a) The current status of fisheries; b) Determination of biological reference points; c) Determination of the range to fix the overall fishing quota; d) Design of management and conservation measures; and e) Formulation of management plans. There are also three Scientific Technical Committees for Aquaculture (environmental, health and territorial planning) as advisory/consultative bodies on relevant scientific matters for aquaculture management. Committees are consulted and required through SUBPESCA, in areas such as: a) Methodologies to classify farming and ranching centres and concessions according to biosafety level; b) Proposals for establishing macro-zones pursuant to regulations of the General Law on Fisheries and Aquaculture (LGPA) concerns; and c) Evaluation of health programs.

The **Management Committees** are advisory/consultative bodies to the fishing authority, composed of the main stakeholders of each fishery and SUBPESCA and SERNAPESCA

analysts. The **Regional Fisheries Directorates** are the operational and functional body of SUBPESCA in eight geographical zones along the coastal regions of the country (there are 15 territorial divisions or regions, I to XV). Its role is to contribute to the decentralization of administrative measures to ensure participation of fishing industry actors from different zones in matters relating to fisheries and aquaculture. The Regional Fisheries Director chairs the Regional Fisheries Council, which is a consultative/decisive body for matters established in the law and is made up of government representatives, industrial ship owners, small vessels owners; fishery products processing plants, aquaculture farmers of the area, officers and crew, artisanal fisheries organizations and non-profit legal entities.

The **Ministry of Environment (MMA)** is the state body responsible for collaborating with the Presidency of the Republic in the design and implementation of policies, plans and programmes on the environment, as well as the protection and conservation of biological diversity and water renewable natural resources, promoting sustainable development, the integrity of the environmental policy and regulations. In the same vein, it has the mission to lead the sustainable development through the generation of efficient public policies and regulations, promoting best practices and improving public environmental education. The responsibilities of the MMA is to propose policies and formulate plans, programmes and action plans on climate change, working with the different organs of the State administration at the national, regional and local levels in order to determine its effects and implement, through Office of Climate Change (OCC), the necessary measures of adaptation and mitigation. In this context, the MMA has led the development of several strategic instruments such as the National Strategy on Climate Change, the National Action Plan on Climate Change, the National Adaptation Plan to Climate Change, and the aforementioned Plan for Adaptation to Climate Change for Fisheries and Aquaculture (see subsection of legal and policy framework for a description of these instruments).

The **Chilean Navy Hydrography and Oceanographic Service (SHOA, acronym in Spanish)** is the institution responsible for maintaining the network of sea level measurement stations, in charge of installing, receiving and maintaining the equipment, quality control, update and management of database produced. Its National Tide Gauge Network is a system which consists of 42 permanent stations located along the coast, to observe oceanographic parameters and obtain scientific and operational information to study processes at regional and global scale such as El Niño, the overall sea level rise, monitor tsunami waves, bathymetric data reduction sheet in navigation charts, among others. Since 2000, it has been measuring directional waves in Valparaíso bay, which has been used to populate a database with environmental information. During the unusual high seas that hit the central coast of the country, between 6 and 8 August 2015, the buoy recorded waves that reached a maximum height of 10.23 m.

The **Chilean National Office for Emergency of the Ministry of Interior and Public Security (ONEMI, acronym in Spanish)** is the technical agency of the State of Chile responsible for coordinating the National Civil Protection System. Its mission is to reinforce the Emergency and

Early Warning System and strengthen the Civil Protection System, provide care and support in emergency situations in line with the risk variables throughout the country such as frontal systems, snowstorms in the south, post-frontal instability, evacuation of the coastline after tsunami alerts, etc. It has a National Early Warning Centre responsible for real time monitoring of the national territory. It is responsible for permanently and systematically monitor the evolution of threats, vulnerability and destructive events, to collect, evaluate and quickly disseminate, validated available information on risks or emergency situations. It also coordinates control operations of such events and other mitigation measures of duly assessed damage.

The private fisheries and aquaculture sector has several trade associations that bring together stakeholders involved in primary production and processing of fisheries and aquaculture, covering both, industrial and artisanal fisheries. In the area of artisanal fisheries the **Chilean Confederation of Artisanal Fishers (CONAPACH)** is composed of unions, cooperatives and trade associations of artisanal fishers, with the mission of representing artisanal fishers in Chile, protect their rights and help them improve their living conditions, and the **Chilean Confederation of Artisanal Fishing Federations (CONFEPACH)** which brings together 14 organizations of artisanal fishers in the country and aims at improving working conditions and quality of life at sea.

The industrial fisheries sector is formed by: the **Fisheries Society of Chile (SONAPESCA)** composed of various associations dedicated to primary production, processing and marketing of fishery products; the **Industrial Fishing Association (ASIPES)** represents its associates by promoting fisheries development and watch over the preservation of resources; the **National Institute of Fisheries Research (INPESCA)** which is a private institute of management and scientific-technical applied research focused on the evaluation, diagnosis, forecast and analysis of major fisheries located in the south-central region of Chile, as well as the environmental impact assessment of the production process; and the **Center for Marine Applied Research (CIAM)**, a scientific institution devoted to study the marine environment and conditions, and all the variables which, in this scenario, may impact or affect the nature of the fishing industry. This is done through gathering information to estimate the condition of the fishery resource and help to increase the efficiency of the industrial capture. In the area of aquaculture: the **Chilean Salmon Industry Association A. G. (SALMONCHILE)** brings together the leading producers of Atlantic salmon, Pacific salmon and trout and their suppliers, working in the health, environmental, regulatory, and socio-economic areas of salmon farming; the **Salmon Technology Institute (INTESAL)** that belongs to SALMONCHILE provides scientific and technical support to associates to contribute to taking decisions related to sustainable development of the activity; the **Association of Coho Salmon and Trout Producers (ACOTRUCH)** represents small and medium enterprises, to present the reality of this productive sector to the authorities and industry and defend the rights of the associated producers; and the **Chilean Mussel Farmers Association A.G. (AMICHILE)** brings together leading Chilean mussel producers and processors, more than 50 companies and producers, aiming at a sustainable development of mussel farming. The **Chilean Association of Professional Fishermen (APROPECH)** is a trade association established in 1972, composed of 374 members, with a wide distribution across the national fisheries and aquaculture sector, and has the mission to seek development and protection of the activities inherent in the

professions of its members, for a competent performance, and promoting the sustainability of living aquatic resources and their environment

The academic sector plays an important role in the sustainable development of fisheries and aquaculture through research and development activities including, among others, topics related to products development and control, genetics, health, population studies, and impact of climate change on fisheries and aquaculture, including the **University of Concepcion**, the **Pontificia Catholic University of Valparaíso**, the **University of La Serena**, the **University Austral de Chile**, the **University Arturo Prat**, and the **Catholic Northern University**, among others.

Among the NGOs that implement initiatives in the sector: **The Nature Conservancy (TNC)** works closely with fishers of MEABRs who occupy 40 kilometres of the Valdivia Coastal Reserve; **World Wildlife Fund (WWF)** promotes sustainable fishing; and **Oceana** and **The Pew** fosters the creation of marine protected areas and, in general, the protection of the oceans.

Legal and policy framework

The prevailing fisheries law in Chile is the **General Law on Fisheries and Aquaculture N° 20657 (LPGA)** that sets forth the consolidated text of Law 18892, dated 1989 and its amendments. The LPGA introduces, among its objectives, the conservation and sustainable use of aquatic resources through a precautionary and ecosystem approach of fisheries regulations, safeguarding the marine ecosystems to preserve the aquatic resources.

The concept of sustainable use in the LPGA refers to “the responsible use of aquatic resources in accordance with the rules and local, national and international regulations, as appropriate, so that social and economic benefits derived from such use can be maintained over time without jeopardising the opportunities for growth and development of future generations”. The precautionary approach refers to be more cautious in terms of resources management and conservation when scientific information is uncertain, unreliable or incomplete, and not to argue the lack of scientific information or unreliable or incomplete scientific information, as a reason for postponing or failing to take conservation and management measures. The ecosystem approach is understood as an approach that “considers the interrelationship of the predominant species in a given area”. The LPGA also introduces new regulations regarding access to the industrial and artisanal fisheries activities and regulations for investigation and control. At the request of the government of Chile, the LPGA is being discussed by a team of FAO specialists in fisheries from legal and economics disciplines, in line with the instruments, agreements and international best practices for the sustainability and good governance of the fisheries sector.

The **General Framework Law on the Environment (Law 19300)**, dated 1994) establishes the environmental institution with the creation of the Ministry of Environment as the governing body of the country in environmental matters, along with other services and agencies with responsibilities in environmental matters. One significant change in this law stems from Law N° 20417, dated 2010, which, in Article 70, stipulates some provisions especially important for taking actions in the field of climate change, including: 1) propose environmental policies and report regularly on their progress and compliance; 2) ensure compliance with international conventions; 3) propose policies and formulate plans, programmes and action plans on climate change, and work with the different organs of the State Administration at the national, regional and local levels in order to determine its effects as well as the implementation of the necessary measures for adaptation and mitigation; 4) perform the necessary studies and collect all

available information to determine the environmental baseline of the country; and 5) collaborate with sectoral ministries and agencies at the national, regional and local level, in the formulation of environmental policies for the management, use and sustainable use of renewable natural and water resources in the development of environmental criteria for sectoral policies and plans, and the development of educational and dissemination programmes to promote citizen concern for care of the environment.

The Law N° **20249 / 2008** that establishes **the Marine Coastal Area for Indigenous Peoples** aims to protect the customary use of these spaces, in order to maintain the traditions and the use of natural resources by the communities living by the coastline. Likewise, it establishes that the marine coastal area for indigenous peoples will be delivered, by the Ministry of National Defense, Undersecretariat of the Armed Forces, to the SUBPESCA, which will sign the relevant right of use agreement with the association of communities or their assignee. Moreover, the law also stipulates that the management of the marine coastal area for indigenous peoples should ensure the conservation of natural resources within it and care for the welfare of the communities, according to a management plan prepared in observance of the current legislation, applicable to various uses and approved by an intersectoral commission stating that indigenous communities associations will have access to the management of the marine coastal areas for indigenous peoples.

The objective of the **National Aquaculture Policy** is to promote the highest achievable level of economic growth of Chilean aquaculture, within a framework of environmental sustainability and equitable access to the activity. For this, the policy sets out a strategy for the sustainable development of aquaculture, taking into account: i) economic growth; ii) environmental sustainability; iii) protection of the health heritage; iv) equity; v) public institutions and legal framework; and vi) research and training.

The **National Strategy on Climate Change (NSCC)** was developed and approved in 1998 and contains national guidelines on climate change in Chile, grouped around three main lines of action: 1) Adaptation to Climate Change Impacts; 2) Mitigation of Greenhouse Gases Emissions; and 3) Development and Capacity Building on Climate Change. The **National Action Plan on Climate Change 2008-2012 (NAPCC)**, was developed as of the NSCC which is in being updated and revalidated for the period 2016-2021. It is a tool for decision makers to deal with adaptation, mitigation of greenhouse gases (GHGs) and capacity building on climate change. The overall objective of the NAPCC is to minimize the adverse effects from climate change, through comprehensive actions to determine the country's vulnerability and adaptation measures to face them adequately, while contributing to the mitigation of greenhouse gases, including the Fisheries and Aquaculture sector.

The **National Adaptation Plan to Climate Change (NAP)**, approved in 2014, provides a conceptual framework and guidelines for adaptation in Chile, and articulates sectoral adaptation plans that were committed in the NAPCC, for sectors defined as critical: forestry, farming and cattle, biodiversity, fisheries and aquaculture, health, infrastructure, water resources, energy industry, cities and tourism. It is expected that the national plan will provide the institutional structure through which actions of different sectors, localities and regions are coordinated and coherent, considering that the adaptation can be carried out at a specific sector level, at multisectoral, regional or national level.

Given that the fisheries and aquaculture sector is one of the priority sectors of the NAP, a **Plan for Climate Change Adaptation in Fisheries and Aquaculture (PACCPA**, for its acronym in Spanish), was developed and approved in December 2015. The main objective of this Plan is to strengthen the capacity of adaptation of fisheries and aquaculture to the challenges and opportunities of climate change, considering a precautionary and ecosystem approach. Its specific objectives are: 1) Implement a precautionary and ecosystem approach to fisheries and aquaculture as a way to improve resilience of marine ecosystems and coastal communities, which make use of aquatic resources and the sector in general; 2) Conduct the necessary research to expand the knowledge about the climate change impact and scenarios on the ecosystem conditions and services on which the fishing and aquaculture activity is based; 3) Disseminate and report on climate change impacts in order to educate and train users and stakeholders of the fisheries and aquaculture sector in these matters; 4) Improve the regulatory, political and administrative framework to effectively and efficiently address the challenges and opportunities posed by climate change; and 5) Develop direct adaptation measures aimed at reducing vulnerability and the impact of climate change on fisheries and aquaculture activities.

1.1.2 Areas of intervention

The project will develop pilot experiences in four coves located in different regions of Chile from North to South, which represent key cases to replicate and upscale learning in technical, environmental, socio-economic and institutional aspects, to implement a fisheries and aquaculture management system with capacities of adaptation to climate change.

Various technical and practical criteria were taken into consideration to select the pilot coves; first selecting the Regions where to intervene and then, at the more local level, the selection of the coves.

Regions Selection

In the first place, a preliminary and rapid vulnerability assessment of fisheries in Chile and an estimate of vulnerability to climate change by region was performed, dividing the country into macro zones. The vulnerability assessment of the sector in the different regions of the country, was conducted according to the classical approach that combines elements such as exposure, sensitivity and adaptive capacity⁸. Then, the regional share in the national landings was included in the analysis, together with a geographical and fishing representation to have a regional sectoral exposure. The sectoral sensitivity was subsequently assessed based on three parameters: i) the regional level of poverty, ii) the degree of feminization of the fishery and iii) the number of fishermen. Finally, to calculate vulnerability the resilience of the sector was

⁸ <http://www.fao.org/3/a-i5109e.pdf>

subtracted. Resiliency was established according to two criteria: i) diversity of fish species (types of fisheries) by region, and ii) the proportion of MEABR⁹ in each Region¹⁰.

Thus, an approximation of the most vulnerable regions in four macro-zones was obtained, and the following regions were selected: **Tarapaca** (North macro zone), **Coquimbo** (Central-Northern macro zone), **Bio-Bio** (Central-Southern macro zone) and **Los Lagos** (Southern macro zone).

Communities/coves selection

In this stage, experts and representatives of local stakeholders were consulted in meetings with Zonal Directors of Fisheries and Aquaculture and professionals of the fisheries and aquaculture sector of SUBPESCA. In particular, they were consulted on the selection criteria and their perception of the capacity of communities in their regions, the level of viability of the project in their regions and sites, as well as their willingness to cooperate. Finally, logistical or practical criteria that would facilitate project implementation were included namely: i) ease of access, ii) local diversity of fisheries and aquaculture, iii) current initiatives in sustainability and initiatives of marine space planning (micro and macro zoning); and iv) representativeness level of selected sites, to facilitate the scale-up of project lessons learned. Thus this process resulted in the preselection of 10 coastal areas with potential for intervention.

For the final selection of the pilot coves, data on fisheries and aquaculture activities were collected in each area from the official georeferenced database of SUBPESCA¹¹. Fishery indicators were quantified in each area such as: i) the nearby coves, ii) local associations, iii) the number of fishers, MEABR, boats and others. In addition, the aquaculture activity was also quantified in terms of Authorized Areas for Aquaculture (AAA)¹², concessions and species, in addition to existing marine conservation areas (marine protected areas). Additionally, viable logistical and practical criteria were established for each of the ten pre-selected areas, including: i) rate of poverty in the community, ii) micro and macro zoning, iii) access to the site, iv) current aquaculture projects and, v) local capacities (universities, research centres).

Hence the selected coves were: **Caleta Riquelme** in the Tarapaca Region, **Caleta Tongoy** in the Coquimbo Region, **Caleta Coliumo** in the Bio Region, and **Caleta El Manzano-**

⁹ Species diversity allows to observe the fishing options in a region and in the event of a species decrease or extinction, that region has more options of adjusting their fisheries. At the same time, a more diversified region has a fisheries community who manage different fishing techniques and gears, having thus a higher adaptation capacity for fisheries and aquaculture production. On the other hand, the General Law on Fisheries and Aquaculture defines the 'Management and Exploitation Areas for Benthic Resources (MEABRs)' as geographical zone allocated by SERNAPESCA to one or more artisanal fisheries associations for the execution of a Management and Exploitation Project for Benthic Resources. Part of this area could be devoted to aquaculture activities, prior authorization of the Undersecretariat of Fisheries. The presence of MEABRs in a region indicates the degree of fishermen organization and the use of ecosystem sustainability criteria in the management of resources, which represents a greater capacity for adaptation comparing to regions that have not advanced on this

¹⁰ These two criteria used to talk about adaptation of the sector, are the result of better management of natural resources by the organizations of fishermen and coastal community in general, which have been implemented with technical support from the SUBPESCA and external consultants for more than a decade (examples are areas of management and most recently, management plans for free areas).

¹¹ <http://200.54.73.148:8080/>

¹² The Authorized Areas for Aquaculture are those geographical areas where the State has the authority to receive and process applications for aquaculture concessions (General Law on Fisheries and Aquaculture).

Hualaihue in Los Lagos Region (see the map with the location of selected coves in Appendix 7. Table 1.1 below is a summary of the main characteristics of the pilot coves.

Table 1.1.: Characterization of Pilot Coves

	Caleta Riquelme	Caleta Tongoy	Caleta Coliumo	Caleta El Manzano
Location (City/Region)	Iquique / Tarapaca	Coquimbo / Coquimbo	Tome /Bio Bio	Hualaihue / Los Lagos
Regional geographical representation	Northern Macro zone	Centre North Macro zone	Centre South Macro zone	Southern Macro zone
Vulnerability of the Region to Climate Change	High	Medium	Medium-high	Medium
General characterization of the cove	Urban cove. Large number of fishers depend on few pelagic resources that are highly vulnerable.	Urban cove. Large number of organized fishers who depend on many pelagic, benthic, demersal resources and aquaculture	Rural cove. A large number of organized fishers who depend on many pelagic, benthic, demersal resources and an incipient aquaculture activity. High female participation in the fisheries and aquaculture sector.	Rural cove. Located in the southern highway with restricted access by ferryboats. Includes four fishers organizations working on pelagic fishing and benthic resources as well as mussel farming.
Poverty level	9,3% (medium high)	12,2% (high)	25,8% (very high)	11,9% (high)
Fishing activity - Type of fishery - Main resources	Yes Artisanal Swordfish (<i>Xiphias gladius</i>), silver fish (<i>Seriotelella spp</i>), mako shark (<i>Isurus oxyrinchus</i>), mahi (<i>Paroma signata</i>), shellfish and brown seaweed	Yes Artisanal Benthic resources, demersal and pelagic fish. At present, cuttlefish (<i>Dosidicus gigas</i>) is the main resource	Yes Artisanal Chilean hake (<i>Merluccius gayi gayi</i>), conger eel (<i>Genypterus sp</i>), Pacific pomfret (<i>Brama australis</i>), sardine (<i>Strangomera bentincki</i>), crab (<i>Cancer edwardsi</i>). Seashore collectors and seaweed farming (chicoria) mainly women.	Yes Artisanal Southern hake (<i>Merluccius australis</i>), golden kingklip (<i>Genypterus blacodes</i>), ray (<i>Raja spp</i>). Women work as seashore collectors of seaweed, Chilean mussel (<i>Mytilus chilensis</i>), clams (<i>Venus antiqua</i>) and razor clams (<i>Tagelus dombeii</i>)
- Number of fishers	1002 (10 % women)	866 (15% women)	456 (25% women)	362 (25% women)
Aquiculture activity - Main / Potential resources	No (but there is AAA) Potential: northern scallop (<i>Argopecten purpuratus</i>), Pacific oyster (<i>Crassostrea gigas</i>), Chilean oyster (<i>Ostrea chilensis</i>), red abalon (<i>Haliotis rufescens</i>), loco (<i>Concholepas concholepas</i>), octopus <i>mimus</i>), acha, dolphinfish (<i>Coryphaena hippurus</i>), sea cucumber	Yes Northern scallop (<i>Argopecten purpuratus</i>), abalon (<i>Haliotis rufescens</i>), oyster (<i>Ostrea chilensis</i>), red sea squirt (<i>Pyura chilensis</i>) seaweed (Chilean kelp, gracilaria),	Yes Miticulture Seaweed: Luga luga (<i>Mazzaella membranacea</i>); Gigartina radula type pig skin (<i>Gigartina skottsbergii</i>).	Yes Chilean mussel seeds collection. Industrial aquaculture in the zone (salmon) Algae: Luga luga (<i>Mazzaella membranacea</i>); Gigartina radula type pig skin (<i>Gigartina skottsbergii</i>); Gracilaria seaweed (<i>Gracilaria spp</i>).

	Caleta Riquelme	Caleta Tongoy	Caleta Coliumo	Caleta El Manzano
- Number of aquaculture farmers	(<i>Athyonidium chilensis</i>), chascon (<i>Lessonia nigrescens</i>), gracilaria seaweed (<i>Gracilaria chilensis</i>) --	At least 50% of fishers (430 fishers) work on the north scallop farming.	Incipient experience of some fishers on seaweed farming.	Aquaculture farmers are the same fishers of the organization who collect Chilean mussel seeds.
Organizations	3 artisanal fishers' unions ('Guardiamarina Riquelme', 'Albatros' and 'Bahía'), grouped under the Caleta Riquelme Corporation (454 fishers) 4% women	2 organizations: Trade Association of Independent Fishers of Tongoy (253 members) and Trade Association of Shellfish Divers, Artisanal Fishers of Tongoy (92 members) 2% women	5 organizations: (Fishers Union N°1 of Caleta Coliumo, Las Vegas Union of Coliumo, Algueras N°1 Union and Algueras N°2 Union, Trade Association of Boat Owners), gathered under the Trade Association Caleta Coliumo. 80 members (19 % women).	4 unions: El Manzano Union, Punta Quillon Union, San Pedro El Manzano Union and San Juan El Manzano Union; with 203 members (40% women)
Level of perception of climate change per actor	They perceive changes in water temperature, presence of tuna, migration of crabs to deep sea waters, mortality of clams due to anoxia, but they are unable to determine if this is due to climate change.	They perceive new fishery products (cuttlefish or giant squid), increase in the anoxic conditions and change in months of maximum scallop seed catching. They report a lower number of seeds caught.	They observe a lower number of species, extinction of some species formerly extracted and relate this to contamination, overexploitation and, to a lesser extent, to the tsunami.	They observe changes not only in the availability of resources and seasonality of fishing, mainly pelagic and demersal, but also high fluctuations in the Chilean mussel seeds catching.
Adaptation capacity¹³	Medium	Medium	Medium	Medium
Strengths	Trained leaders. Presence of University Arturo Prat. Recognized as an organized and pro-active community. Good relationship with authorities, companies and research centres	Broad experience in cultivation of shellfish, especially scallops and oysters, which gives them the ability to diversify with other species. Leaders with experience and trained in management. Good relationship with neighbouring industries. Willingness of leaders to collaborate. Traceability certification available.	Leaders with experience and trained in management. They have diversified activities with seaweed farming and tourism. They process products. Presence of University de Concepcion	Some diversification capacity (tourism). Open leaders. They receive technical support. Capacity to get public funds.

¹³ During full project preparation, visits to allowed to identify the elements of social, economic, human, environmental and financial capital of the fishing and aquaculture communities, which determine, to a greater or lesser extent, their capacity for adaptation to climate change. Using expert criteria a level of adaptability (high, medium, low) was assigned, considering the communities organization degree in the pilot coves, their degree of influence on decisions in the sector, their perception of environmental issues and their knowledge of climate change that determine its ability to innovate.

	Caleta Riquelme	Caleta Tongoy	Caleta Coliumo	Caleta El Manzano
Exposure to extreme events	Affected by a tsunami in 2014. Floods are increasingly frequent.	Several extreme event in 2015: heavy swells, earthquake and tsunami.	Changes in the features of the coast due to the earthquake and tsunami in 2010. Floods in nearby areas in 2015.	Since it is located close to volcanoes, it has been affected by recent volcano eruptions in the region. Massive losses in 2007 and damage due to heavy rain 2015. In addition, the El Niño phenomena hit heavily this zone in 2015.

1.2 CURRENT STATUS

1.2.1 Climate Change vulnerability and problems

Status of fisheries and aquaculture resources in Chile

The aforementioned statistics (see subsection 1.1.1 National context), certainly prove the importance of fisheries and aquaculture in Chile. However, it should be considered that the operational and economic outcomes of the sector are directly related to the availability of aquatic resources and these, in turn, to the biophysical variability and the effects of fishing. In this sense, the current status of the main national fisheries shows a marked deterioration of the resource populations, as shown in Table 1.2 below. Of the 38 major fisheries under exploitation, 8 are classified as depleted or collapsed (21%), 8 overexploited (21%), 12 in full exploitation (32%) and 10 (26%) treated as in full exploitation (benthic resources).

Table 1.2. Summary of the status of main national fisheries. Year 2014

RESOURCES AND FISHERY UNIT OR AREA	STATUS YEAR 2014
Anchovy (XV-II Regions)	Overexploitation
Anchovy (III and IV Regions)	Overexploitation
Anchovy (V-X Regions)	Collapsed or Depleted
Chilean nylon shrimp (II-VIII Regions)	In full exploitation
Northern golden kingclip (41°28,6' S.L. 47°00' L.S.)	Collapsed or depleted
Southern golden kingclip (47°00' S. L. - XII)	Collapsed or depleted
Jack mackerel (XV - X Regions)	Overexploitation
Yellow squat lobster (III-IV Regions)	In full exploitation
Red squat lobster (XV -IV Regions)	In full exploitation
Chilean hake (IV - 41°28,6' S. L.)	Collapsed or depleted
Hoki (V - XII Regions)	Overexploitation
Southern hake (41°28,6' S. L. - XII Region)	Overexploitation
Merluza tres aletas (41°28,6' S. L. -XII Region)	Overexploitation
Sardine (V - X Regions)	In full exploitation
Spanish sardine or Pilchard (XV to II Regions)	Collapsed or depleted
Spanish sardine or Pilchard (III to IV Regions)	Collapsed or depleted
Alfonsino (XV - XII Regions)	Collapsed or depleted
Cardinal fish (III - X Regions)	Collapsed or depleted
Ray (VIII Regional- 41°28,6' L.S.)	Overexploitation
Chilean seabass (47° to 57° S. L.)	Overexploitation
Yellow squat lobster (V-VIII Regions)	In full exploitation
Red squat lobster (V - VIII Regions)	In full exploitation

RESOURCES AND FISHERY UNIT OR AREA	STATUS YEAR 2014
Brown seaweed (XV-XI Regions)	Treated as in Full Exploitation
Chilean seabass (XV Region al 47° S. L.)	Treated as in Full Exploitation
King Crab (XIV-XII Regions)	Treated as in Full Exploitation
Red sea urchin (X-XI Regions)	Treated as in Full Exploitation
Sea asparagus (VIII-XIV-X-XII Regions)	Treated as in Full Exploitation
Cuttlefish or giant squid (XV-XII Regions)	Treated as in Full Exploitation
Juliana (X Region)	Treated as in Full Exploitation
Juan Fernandez rock lobster (V Region and Oceanic islands)	Treated as in Full Exploitation
Limpets (XV-XII Regional)	Treated as in Full Exploitation
Loco (XV-XII Regional)	Treated as in Full Exploitation
Razor clam (XV-XII Regional)	Treated as in Full Exploitation
Swordfish (XV-XII Regional)	In Full Exploitation
Northern octopus (XV-IV Regional)	Treated as in Full Exploitation
Pacific pomfret (XV-XII Regional)	Treated as in Full Exploitation
Southern sardine (X Region)	In Full Exploitation
Southern sardine (XI Region)	Treated as in Full Exploitation

Source: SUBPESCA, 2015

This classification includes the main resources for the artisanal fisheries subsector which is pelagic fisheries of anchovy and jack mackerel (overexploited) and sardine (in full exploitation), demersal fisheries of southern hake, ray and Chilean seabass (*Dissostichus eleginoides*) (overexploited), Chilean hake and golden kingclip (collapsed or depleted). Regarding benthic resources, excluding seaweed, there is a significant reduction of those located in the Fishing Access Areas (ALA, acronym in Spanish)¹⁴, which has resulted in lower landings; while, the opposite is observed in the MEABRs where resources have been recovered and hence, the landings have increased.

The aquaculture, despite its significant growth, has faced a series of challenges and productive, environmental, social and market problems and conflicts with other sectors. Salmon farming has faced problems such as production instability, variations in international prices, transformations and social conflicts, accusation of *dumping*, questioning to its sustainability and health management, massive outbreaks of diseases and others. There is also concern about the environmental impact of salmon farming on the marine ecosystem, including the organic load of waste, disposal of chemicals and drugs into the marine environment, copper precipitation on sediments, the indiscriminate use of antibiotics and anti-parasitic drugs, disruption of marine food chains, and salmon escapement, among others. However, this sector has significantly contributed to the economic growth and development of the populations of the

¹⁴Correspond to those sectors of the coastline, which are not declared under any type of maritime concession or other special use permit of the marine space. The concept was coined mainly for artisanal benthic fisheries outside the MEABRs in freedom of fishing regime. Since 2012, fisheries of invertebrates benthic resources and seaweed provide for the implementation of management plans.

South of Chile to stop the emigration of young people and providing a source of relevant work especially for women in processing plants. But these statements have also been questioned today, since outsourcing of personnel, their schedules and salaries have been compared to be far below of what operators receive in the same posts in countries such as Norway (FAO, 2014). In Chile, legislation has gradually been moving forward to regulate both these labor shortcomings and gender equality.

We must bear in mind that the first efforts in commercial aquaculture in Chile were carried out between 1921-1973, through plans and initiatives, mainly from the government, on the basis of extensive and semi-intensive cultivation. Farms for molluscs cultivation were created to develop mussel farming and the oyster culture, as well as farms for salmon cultivation for the creation and development of commercial fisheries of “ranching” type.

However, commercial aquaculture began in Chile in the early 80's consistently with the national economic policy that encouraged the private sector initiative and opening to the international trade, also as a response to the increase of overexploitation of native species local stocks intended for the international market. This is how aquaculture aimed at foreign trade and, based on the cultivation of introduced species of high commercial value, was quickly developed.

The greatest technological development has taken place in salmon farming, followed by the cultivation of scallops and oysters. In general, the mussels and algae harvest and farming are of medium and small scale, with lower investment and technology.

Chilean mussel farming consists of collecting seeds from the natural environment during summer months for 20-25 days (depending on temperature), from areas of natural seed production. While it is technically feasible to produce mussel seeds *hatcheries*, the collection of wild larvae is now the largest source of seeds for mussels farming. However, seeds' gathering is variable and environmentally conditioned by year, month, water salinity and temperature and this variability of seeds is the biggest problem for this aquaculture sub-sector.

The experience of the aquaculture industry for several decades now projects it as an important part of the national economy, more sustainable not only with respect to its natural environment, but also with regard to social and labor relations with its employees and surrounding communities. This reality is on one hand demanded by markets where Chile presents aquaculture products, and on the other, by the population that uses natural products.

The current status of fisheries and aquaculture in Chile (deterioration of fisheries and high environmental and health vulnerability) shows some negative effects on socioeconomic aspects, such as lowering income of fishing communities and food security. Regarding the first, in recent years, the fall of artisanal fisheries landings has had an impact on fishers' income. For example, an exercise about the valuation of the main species landed by this sector (based on 2014 values), shows that the value of artisanal production in the years 2012 and 2013, reached USD 580.4 million and USD 501.7 million, respectively, which means an annual decrease of 13.6% in the potential revenues of artisanal fishers. In such a decrease, the greatest effects are noted in the ‘fish’ group, where landings in 2012 and 2013, show a decrease of 35% compared to 2014. With regards to food security, lower landings of fresh product for direct human consumption, have influenced the availability and price of everyday consumer goods for the Chilean population. An example of the above is the Chilean hake, the most traditional fish in the Chilean market, which shows a steady decline in landings, representing an average annual of 15.6% in

the offer of this product for the period 2012 – 2014. Hence, the local consumer has turned to other fish products to offset the limited availability and high prices of Chilean hake; however, alternative species like Pacific pomfret, also show a decline in landings in the period 2012-2013 of 44.8%. It is clear, that the limited availability and high prices of fishery products are affecting national food security (including fish intake) and livelihoods of coastal communities.

Climate variability and climate change projections

Climate variability and climate change are affecting fishing and aquaculture due to sea water acidification, changes in sea temperature, water current patterns, frequency and severity of extreme events, sea level rising and ecological changes. The direct and indirect impacts include variations on populations' distribution, habitats, food chains, impacts on costs and productivity, livelihoods and security of fishing communities. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) projects a redistribution of the high seas net primary production and, in 2100, a worldwide drop in all scenarios evaluated. With a high confidence level, climate change adds to the threats of overfishing and other non-climatic stress factors, making marine management regimes more difficult.¹⁵

In the Chilean case the deterioration of the fisheries is usually attributed to overexploitation; however, we should also consider changes in the environmental conditions that may have influence on resources' behavior (e.g., migration, distribution and others), biological characteristics (e.g., growth, reproduction, population structures and others) and the availability, accessibility and vulnerability of fisheries resources, aspects which added to the overexploitation, may have an impact on the current status of fisheries. Unfortunately, the lack of information about environmental changes as a result of the climate change, among others, (except for those caused by El Niño phenomenon that are very well known indeed), is an obstacle to really know the impact that those issues may have on the fisheries status.

The effects of climate variability due to El Niño phenomenon in the ocean and fisheries are well documented. The rise in sea temperatures off Peru and northern Chile usually causes migrations, changes in species abundance and composition, among others. Several studies¹⁶ emphasize that the El Niño in 1997/98 caused the mass mortality of razor clams (*Mesodesma donacium*) in the north, changes in the space structure of the jack mackerel added to the overexploitation of the resource, and reduction and depletion of the red squat lobster (*Pleuroncodes monodon*); and also suggest that the Pacific Interdecadal Oscillation together with El Niño, define the space distribution of small pelagic fish, especially anchovy (*Engraulis ringens*). The current El Niño (2015-2016) has had dramatic negative impacts on salmon farming and on mussel harvest and farming in southern fjords due to red tides which have caused large losses for the industry and have affected employment and livelihoods.

The aforementioned examples account for the ecological effects of climate variability, although it is difficult to isolate natural phenomena from fishing pressure on marine resources. As

¹⁵ IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectorial Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova B., Girma E.S., Kissel A.N., Levy S., MacCracken P.R., Mastrandrea & L.L. White (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

¹⁶Quoted by: Alarcón C., L. Cubillos., R. Norambuena, A. Montecino, S. Neira, R. Quiñones y E. Gonzalez. (2013). Portfolio of proposals for the adaptation plan to climate change for the fisheries and aquaculture sector. Undersecretariat of the Environment, Ministry of Environment of Chile, 225 p. Project Document.

previously mentioned, many of the fisheries resources of Chile are under exploitation levels that exceeds the biological capacity of ecosystems to recover what defines a high degree of vulnerability to environmental changes.

Studies from University of Chile¹⁷ indicate that while the average temperature on the planet has increased steadily since the mid-twentieth century due to higher concentration of Greenhouse Gases (GHG), the observations in Chile show greater variability. Since late 1970s, ocean temperatures off the coast of Chile and the air temperature on continental Chile have followed a dissimilar trend. The ocean surface and the air in contact with it have cooled at a rate of 0.3°C per decade, while the air over the Andes has been heated in a similar magnitude. Both trends are explained, in part, by global climate change. Fluctuations in rainfall in the Central-North macro zone due to variability between events of El Niño and La Niña; while in the South, the decrease in rainfall over the past six decades, would be linked to anthropic factors of GHG increase.

As for forecasts, the same studies estimate an increase of Sea Surface Temperature (SST) off the coast of Chile in the order of 1-2°C, by the end of the century due to the greater thermal inertia of the ocean. Climate change will produce a southward shift of high pressure, increasing the wind blowing along the Chilean coast. This will cause a greater upwelling of cold waters, offsetting the surface warming, which will have a significant impact on biological productivity of the ocean.

In addition, the lower amount of rain forecasted in the country will reduce the yearly flowrate of the rivers, intensified by a higher evaporation in a warmer environment and lower snow accumulation. This will result in a lower water flow in the channels, which could cause changes in the flow of freshwater and sediments to the sea, affecting the living aquatic conditions and thus, fishing in estuary areas. A decrease in rainfall could lead to increased salinity in coastal areas and southern fjords, with impact on aquaculture related to the incidence of parasites and some other diseases.

Studies performed by the Economic Commission for Latin America and the Caribbean (ECLAC)¹⁸ on coastal dynamics and climate trends and coastal impact of climate change by the middle of the century (2040) in Latin America and the Caribbean, indicate that a higher increase in sea temperature is expected in the north of Chile, while in the south and southern zone, winds and waves will intensify with changes in the train of waves. The trend is an increase in the mean sea level, with the following impacts on the coast: i) coastal flooding due to mean sea level rise and extreme events, and ii) beach erosion in the north due to changes in the equilibrium plan form, and in the south, due to sea level rise. The prospective analysis of trends in sea level in the Chilean coast leads to ambiguous outcomes, with decrease in the sea level in the north and rise in the south, which can be explained, in part, by the coastal raising due to the tectonic activity in the country. The sea level rise and coastal erosion may damage the fisheries and aquaculture infrastructure and lead to the relocation of settlements with a subsequent impact on fishers' livelihoods.

¹⁷University of Chile. 2008. Climate variability in Chile: evaluation, interpretation and projections. Project statement ACT-19.

¹⁸ECLAC. 2012. The economy of climate change in Chile. UN ©. Santiago, Chile.

Table 1.3 below shows a summary of the main trends observed and projected change for forcing in Chile, based on available information. Data on species or sensitive fisheries and exposed zones are included, when appropriate.

Table 1.3. Trends and change projections for main physical forcing in the ocean.

Forcing/Effect	Observed Trend	Projected Trend	Sensitive species or fisheries	Zone highly exposed
Sea surface temperature	↓ 0,1-0,3°C per decade since 1970	Contradictory studies	- temperate fish (anchovy) - brown seaweed	Higher increase in the north.
Wind (upwelling)	6,5 m/s ↑ upwelling in the last decade	↑ 7,5 m/s by 2070 ↑ upwelling	small pelagic fish Central Chile	Higher increase in the southern regions
Mean sea level	north ↓ 55-82 cm centre ↑ 6 mm South ↑ 162 mm	↑5-10cm by 2050, ↑ 18-28 by 2100	Estuary system	- Easter Island – Southern regions
O ₂ dissolved	↓ O ₂ global	↓ decrease	pelagic fishing	Open ocean s/i
Acidification	s/i	↑ global acidification with more intensity in high latitudes	Chilean mussel and loco; probably other calcifying species	Southern from Temuco (

Note: ↓ decrease; ↑ increase; n/i no country information; °C degree Celsius. Source: Prepared with different information sources.

Moreover, the number of extreme weather events projected in the country will also increase risks in the sector, including the rise in the wave height, the intensity of the waves and changes in the intensity and direction of winds, affecting both coastal infrastructure and natural systems. The physical impact on the coast include: i) coastal flooding and increase in flood-plains; ii) loss of deltaic zones; iii) disappearance of wetlands; iv) coastal erosion on beaches and cliffs, v) effects on flood levels on beaches; vi) effects on the dynamics of the dunes; vii) effects on estuary hydrodynamics and morphodynamics; viii) effects on operational and structural behaviour of maritime works; ix) increased damage during floods and storms; saline intrusion into aquifers; level rise of the water table. These impacts have not been assessed in detail in the country and are part of the studies for infrastructure adaptation.¹⁹²⁰

The heavy seas phenomenon in the Chilean coast is often associated with storms in the Pacific Ocean, which can be aggravated with El Niño events. The winter frontal systems with concentrated and heavy rains have also produced floods, landslides and heavy seas along the coast.²¹ The physical effects of extreme events caused by climate change will affect the operation of ports and fishing coves, disrupting the activities during the events.²² In fact, the recent storms have caused negative impacts on fisheries and aquaculture, proving the lack of preparedness and response mechanisms in the affected productive sectors.

¹⁹ECLAC. 2012. The economy of climate change in Chile. UN ©. Santiago, Chile.

²⁰MMA, 2014. National Adaptation Plan to Climate Change. Ministry of Environment, Government of Chile.

²¹DIPECHO. 2012. Risk Analysis of Disasters in Chile.

²²MMA, 2014. National Adaptation Plan to Climate Change. Ministry of Environment, Government of Chile.

Vulnerability of the fisheries and aquaculture sector and unexpected impact of climate change

The vulnerability of fisheries and aquaculture in Chile was analysed by Cubillos et al (2012) with expert judgment to project the effect of climate change on fisheries analysed. This analysis was updated during the design phase of the project in terms of the conservation status of fisheries (see Table 1.2 above), and to incorporate other species not previously analysed and add new analysis criteria which is summarized in the following table.

Table 1.4. Ecologic vulnerability to climate change of Chilean fisheries and aquaculture species/resources

	Category	Species	distribution	abundance	growth, reproduction	calcification
Fisheries	Fish	Anchovy	3	3	3	
		Sardine	3	3	3	
		Jack mackerel	2	3	3	
		Chilean hake	2	3	2	
		Other hake	2	2	2	
		Conger eel	2	3	2	
	Crustaceans	Lobster	3	2	3	3
		Crabs	1	2	3	3
		Shrimps	1	2	2	
	Molluscs and invertebrates	Cuttlefish	1	1	1	
		Loco	2	2	3	3
		Sea urchin	1	2	3	3
	Phaeophyte	Brown seaweed	3	3	3	
Aquaculture	Fishes	Salmonids	2	1	3	
	Molluscs	Mytilidae	2	2	3	2
		Pectinidae	3	2	3	2

3=high, 2=moderate and 1= low. Source: Elaboration from Cubillos et al, 2012.

Chile has some assessments of the impact of climate change on some fishery²³ resources; however, there is no comprehensive approach that takes into account the potential impact on the sector or the assessments are contradictory. Allison et al (2009)²⁴ analyzed the vulnerability of national economies to impacts of climate change on fisheries, and they concluded that the vulnerability in Chile is low. Although the sensitivity of the Chilean fishery is considered high,

²³ Quiñones, R, Salgado, H., Montecinos A., Dresner, J & Venegas M. 2013. Evaluation of fisheries impact to climate change potential and vulnerability reduction: case study main fisheries in the central and South zone of Chile, in: D. Soto y R. Quiñones, eds. Climate change, fishing and aquaculture in Latin America: potential impacts and adaptation challenges. Workshop FAO/Centro de Investigación Oceanográfica en el Pacífico Sur Oriental (COPAS) University de Concepción 5–7 de Octubre de 2011 Concepción, Chile. FAO Actas de Pesca y Acuicultura No 29. Roma, FAO. pp. 183–273.

²⁴ Allison, E.H., Perry, A.L., Badjeck, M.C., Neil Adger, W., Brown, K., Conway, D., Halls, A.S., Pilling, G.M., Reynolds, J.D., Andrew, N.L. and Dulvy, N.K., 2009. Vulnerability of national economies to the impacts of climate change on fisheries. Fish and fisheries, 10(2), pp.173-196.

the authors assume that the country is less exposed to thermal changes and that the national economy has the capacity to face the phenomenon.

ECLAC and Cantabria University (2011)²⁵ points out that a potential impact of climate change would be a modification of the frequency of occurrence and intensity of El Niño and La Niña phenomenon and its impact on the Humboldt current. In Chile, these changes could negatively affect the high primary productivity that characterizes the Humboldt system and, together with this, increase the number of events of minimum oxygen concentration. In addition, changes in temperature or salinity of marine farming waters, as in open sea of Chiloe, could cause the spread of disease. The upwelling system of the Humboldt Current holds important part of world fisheries. Blanchard et al (2012)²⁶ studied the impact of climate change on biomass and fish production, and compared a biogeophysical and chemical model with a food chain dynamics model. The authors projected a sharp decline in phytoplankton and zooplankton in the northern area of the Humboldt Current, with similar consequences in global fish biomass (30-40%).

The current is characterized by the presence of oxygen minimum zones (OMZ) which, due to climate change, could be expanded and affect fisheries resources. The results of Brochier et al (2013)²⁷ show that in the future, climate change could significantly reduce the capacity of small pelagic fish (anchovy, sardine and jack mackerel) in the Humboldt Current, with huge ecological, economic and social consequences. The authors suggest that climate change would reduce the area of larvae growth in these species as a result of thermal stratification and increase of OMZ. While the upwelling projected for the central and southern part of the country could increase the production of plankton and thereby increase the area of larvae growth for small pelagic fish, that could create an expansion of OMZ towards the surface reducing the vertical range of the anchovy habitat.

Studies conducted by Yanez, Barbieri and Silva (2014)²⁸ use temperature as proxy to assess the potential effects of climate change on anchovy fishing in northern Chile, in four climate change scenarios by 2100. Silva et al (2015)²⁹ estimate a slight decline in the space distribution of relative abundance of swordfish and sardine in a pessimistic scenario. Both studies conclude minor changes in landings of pelagic resources as a consequence of climate change. However, they recommend further research considering the different stages of the species and the inter-specific relationships that would eventually change.

²⁵ CEPAL-University de Cantabria. 2011. Efectos del cambio climático en la costa de América Latina y el Caribe. Dinámicas, Tendencias y Variabilidad Climática. UN ©. Santiago, Chile.

²⁶ Blanchard J., Jennings S., Holmes R., Harle J., Merino G., Allen J.I., Holt J., Dulvy N. and Barange N. (2012). Potential consequences of climate change for primary production and fish production in large marine ecosystems. *Philosophical Transactions of the Royal Society B* (2012) 367, 2979–2989 doi:10.1098/rstb.2012.0231

²⁷ Brochier T., Echevin V., Tam J., Chaigneau A., Goubanova K., Bertrand A. 2013. Climate change scenarios experiments predict a future reduction in small pelagic fish recruitment in the Humboldt Current system. *Global Change Biology*. doi:10.1111/gcb.12184

²⁸ Yáñez E., Barbieri M.A., Plaza F. & C. Silva. 2014. Climate Change and Fisheries in Chile. In: Mohamed Behnassi, Margaret Syomiti Muteng'e, Gopichandran Ramachandran & Kirit N. Shelat (Editors). *Vulnerability of Agriculture, Water and Fisheries to Climate Change: Toward Sustainable Adaptation Strategies*, Springer, Chapter 16, 259-270.

²⁹ Silva C., Yanez E., Barbieri M.A., Bernal C., Aranis A. 2015. Forecasts of swordfish (*Xiphias gladius*) and common sardine (*Strangomera bentincki*) off Chile under the A2 IPCC climate change scenario. *Progress in Oceanography*. Doi: 10.1016/j.pocean.

In the period 2003-2014, Lara et al (2015)³⁰ observed an abnormal cold temperature on the sea surface, which was related to the drop of Chilean mussel larvae availability in open sea of Chiloe. The space extension and temporary persistence suggest the alteration of other ecological processes and a link with large-scale climate forcing, suggesting an impact of climate change on mussels' production.

González et al (2013)³¹ following the methodology of Allison et al 2009, assessed the vulnerability of salmon, Chilean mussels, northern oysters and seaweed farms. Without being conclusive, due to the lack of associated information, the authors argue that in socio-economic terms, the Northern scallop would be most vulnerable aquaculture species, followed by salmon, Chilean mussels and finally, the seaweed gracilaria .

From the point of view of vulnerability and resilience to climate change, the artisanal fisheries sub-sector, in general, is identified as one of the sectors that requires greater attention because of their direct link with the sea and the high socioeconomic dependence on the extraction of marine resources. But there are also indirect impacts on local communities through employment. Industrial salmon farming has recently shown to be very vulnerable and is experiencing very large farmed salmon mortalities caused by algal blooms connected to the current el Nino. This is generating numerous environmental and social impacts including through employment in the sector.³²

1.2.2 Baseline initiatives

A series of initiatives have been implemented in Chile aimed at the sustainable development of fisheries and aquaculture sector, including management, research, monitoring of industrial fisheries and aquaculture as well as artisanal fisheries and small-scale aquaculture and research and knowledge generation on climate change linked to fisheries and aquaculture. While such initiatives are implemented by different government agencies (national, regional and local), private sector, NGOs, communities or other institutions, the most important financial support comes from sectoral Funds.

Hence, the **Fisheries and Aquaculture Research Fund (FIPA, acronym in Spanish)** is funding research projects to contribute knowledge to the sector and provide the best available information for decisions to be made by the fishery Authority on sustainable management of fisheries and aquaculture, coastal planning, environmental studies, studies associated with climate change and health aspects of aquaculture. The **Fisheries Management Fund (FAP, acronym in Spanish)** seeks to promote and develop a sustainable fishery activity, by means of development and social intervention instruments with a territorial approach, for which purpose it finances the implementation of regional programmes to support the productive diversification, strengthen artisanal fishers' organizations, and seafood processing and marketing. It should be noted that strategic alliances between the FAP and Regional

³⁰Lara C., Saldias G., Tapia F., Iriarte L., and Broitmana B. 2015. Interannual variability in temporal patterns of Chlorophylla and their potential influence on the supply of mussel larvae to inner waters in northern Patagonia. Preprint submitted to Journal of Marine Systems.

³¹González, E., Norambuena, R., Molina, R., Thomas, F. 2013. Evaluation of potential impacts and reduction of aquaculture vulnerability to climate change in Chile-Case study aquaculture in Chile. En. Soto, D., Quiñones, R. (ed.) Climate change, fishery and aquaculture in Latin America: potential impacts and challenges for adaptation. Workshop FAO/Centro de Investigación Oceanográfica en el Pacífico Sur Oriental (COPAS), University de Concepción, Concepción, Chile. FAO Minutes of Fisheries and Aquaculture. No. 29. Rome, FAO. 335 pp.

³² <http://www.reuters.com/article/us-chile-salmon-idUSKCN0WC0A2>

Governments have been established to complement the relevant budgets for the implementation of initiatives. The **Development Fund for Artisanal Fisheries (FFPA, acronym in Spanish)** finances initiatives stemming from artisanal fishers' organizations, such as implementation of new technologies, innovation, business management, activity diversification, training and technology transfer. In the year 2014, about USD 6.8 million were allocated to fund different projects and, for the period 2015/16 the budget allocation is USD 24.6 million. Likewise, institutions like SUBPESCA and the MMA, have own or sectoral funds to finance research and consultancies to support living aquatic resources management and the environmental management as a whole.

Various initiatives implemented by SUBPESCA and the MMA, some of which have been funded with the aforementioned funds, are related to the project and will provide co-financing (see details in Section 3.3 below). These initiatives are described and classified according to thematic areas, relevant for the adaptation of the fisheries and aquaculture sector to climate change, as follows:

1. Baseline initiatives regarding capacity building for the adaptation to climate change

Through the basic research program for the management and administration of fisheries and aquaculture of the **SUBPESCA**, a set of initiatives is being developed, one of them being related to the thematic area of adaptation to climate change. This area aims at providing support to public and private stakeholders of the fisheries and aquaculture sector, promoting the development of a better adapted and resilient fishery and aquaculture sector to climate change, by generating alternatives and production strategies, implementation of new production models and the incorporation of best practices. It implements diversification projects; strategic strengthening of aquaculture diversification; economic valuation of ecosystem services related to water resources; design and assessment of farming models for small-scale aquaculture; capture and selectivity analysis of trawl nets; socioeconomic evaluation of the aquaculture sector; monitoring and/or information systems of prices at the beach, red tide, satellite imaging and evaluation and analysis of aquaculture practices. The final or partial outcomes achieved with these actions are experiences that can be included in the project to maximize the effectiveness of measures to be applied. Likewise, the experiences and lessons learned from the SCCF project will enable the government and the productive sectors, supplement this programme with guidelines, to replicate the measures implemented at local level, throughout the country.

The programme also seeks to generate, interpret and disseminate knowledge and information for the public and private sector, and civil society to identify and understand the impacts of climate change and the vulnerability of habitat associated with living aquatic resources. In this regard, an important activity is the identification, characterization and vulnerability to climate change of essential habitats associated with aquatic resources. These actions will constitute an important input to raise awareness and knowledge as part of the SCCF project. Similarly, the SCCF project will provide background information to contribute to the overall objective of this governmental action.

The **MMA** implements the NAP at a national level. The main lines of action of the NAP are: 1) Establish the conceptual framework for adaptation in Chile; 2) Establish the institutional framework under which the National Adaptation Plan and sectoral plans will operate; 3) Establish and update sectors that require adaptation plans and establish criteria and guidelines

for their development and implementation; and 4) Define the necessary cross sectoral actions for adaptation to climate change. The NAP provides the basis for programmes of adaptation to climate change and, therefore, facilitates the institutional coordination at the proposed project level. The SCCF project will help to leverage various lines of action included in the NAP.

FAO is currently implementing the project Assistance to Review the General Law on Fisheries and Aquaculture in the context of instruments, agreements and best international practices for sustainability and good governance of the fisheries sector, whose objective is to strengthen fisheries governance and management in Chile, so that it is aligned to the international instruments and agreements that allow for better sustainable management of fisheries and aquaculture resources. On the other hand, FAO has worked with the Undersecretariat of Fisheries in the design and implementation of a capacity building programme for the members of the fisheries committees, to face conflicts and reach agreements. The objectives of the programme are: (i) improve the training of professionals in public institutions responsible for the implementation of programmes and policies on fisheries and aquaculture, so they can contribute to strengthening the institutions and facilitate the governance of the sector, (ii) allow for consultation of the participants in order to generate a critical mass of public actors committed to the good performance of sectoral institutions and adequate conflict management and solutions, and (iii) develop skills to effectively and efficiently apply the tools and methodologies for proper design and management of public policies, committed to the sustainable development of the fisheries and aquaculture sector.

2. Baseline initiatives on research, information and monitoring for planning and decision-making

SERNAPESCA is responsible for fisheries and aquaculture statistics, and collect, process and disseminate such official information about the country, that includes industrial landings, artisanal landings, farming harvest, exploitation in MEABRs, production of the processing industry, industrial vessels, artisanal vessels, farms operation, and price at the beach. This information constitutes an important input to identify, monitor and analyse the vulnerability of coastal localities. The SCCF project may contribute to this governmental action, providing detailed information about productive activities carried out in pilot areas.

IFOP, through its *Comprehensive Assistance Programme for Fisheries and Aquaculture* (ASIPA, acronym in Spanish), seeks to support decisions about policies for the national fisheries institution, through the development of scientific and technical information of public value, necessary for the regulation and conservation of fishery and aquaculture resources and relevant ecosystems. To this end, IFOP monitors the main national fisheries, the bio-oceanographic conditions and the economic conditions of the fisheries and aquaculture industry. This information is used to develop indicators to identify, monitor and analyse the environmental conditions and sustainability of national fisheries and aquaculture, as well as the socio-economic situation of the sector. The SCCF project can contribute to these monitoring activities with detailed information about production activities (status of resources and socioeconomic condition) carried out in localities where pilot activities will be developed.

3. Baseline initiatives on conservation and sustainable use of fisheries and aquaculture resources

The Basic Research Program for the Management and Administration of the Fisheries and Aquaculture (SUBPESCA) has implemented various initiatives of permanent application, related to five thematic areas: i) sustainable management of main national fisheries; ii) coastline use and management; iii) marine biodiversity conservation; iv) environmental and health monitoring; and v) adaptation to climate change (see Sub-section 1.2.2, point 1).

The thematic area # i) *Sustainable management of main national fisheries*, is intended to generate knowledge and information for decision-making based on precautionary and ecosystem approaches, applying sustainability criteria, through the evaluation of fishes, crustaceans, molluscs, invertebrates and seaweed, estimate biological parameters, growth and population dynamics, the biological-fishery monitoring, and natural banks exploration and evaluation. The activities carried out by this sub-programme provide the basis of knowledge and information for sectoral management, applying precautionary and ecosystem approaches and genus. The SCCF project will establish the basis for incorporating climate change indicators in this and other programmes for taking decisions and contribute to the identification of vulnerabilities.

The thematic area # ii) *Coastline use and management* is focused on the productive sector and local coastal communities. Its aim is to collect information that support territorial planning, by considering environmental and bathymetric conditions and coastal communities context. This thematic area determines the location of small-scale aquaculture areas, cartographic regulation with that of the MEABRs, and the survey and determination of the lowest tide lines in both cases. This sub-programme will contribute to the territorial planning of the areas where the SCCF project will implement adaptation measures. In turn, the SCCF project will generate information that contributes to the process of territorial planning.

The thematic area # iii) *Marine biodiversity conservation* compiles information regarding knowledge and protection of living aquatic species and marine areas, in compliance with international agreements, focused on marine protected species, marine protected areas, sampling of flora and fauna in inland waters ecosystems and analysis of marine and continental biodiversity. These lines of work can serve to provide the SCCF project with information on marine protected areas, which can be useful for implementing adaptation measures in the MEABRs of pilot coves. The SCCF project will also generate local information that may serve to this programme to complement the ongoing research.

The thematic area # iv) *Environmental and health monitoring* follows high-risk diseases, environmental-health studies in the area of aquaculture, oceanographic and physical parameters studies, baseline and environmental monitoring studies, activities directed towards public sector institutions and coastal communities. This sub-programme relies on important information to understand the behaviour of environmental conditions and, indirectly, the effects of climate change, which is relevant for the analysis of the evolution of the national and local vulnerability states. In this context, the information provided by this programme will be a contribution to the analysis of the vulnerability of coastal communities and support to the adoption of climate change adaptation measures.

4. Baseline initiatives on communication and information-sharing on sustainable use of fisheries and aquaculture resources and climate change

There are several tools widely used to disseminate information and knowledge to the actors of the fisheries and aquaculture sector. The radio is a widely used means of communication which allows to deliver information quickly and efficiently. In Chile it is a credible means and reaches areas where other means have no coverage. Many local radio stations, especially in the fishing areas have special radio programmes to send messages to fishers at sea.

News websites of fisheries and aquaculture with daily updates and newsletters that reach smartphones and emails are another common tool, as the portal www.aqua.cl that delivers information via email from Monday to Friday to the fisheries and aquaculture sector, with a newsletter and contingency updates in the news portal, and also produces a printed magazine. The *Mundo Acuicola Review* has a printed format, an online platform and a digital newsletter (www.mundoacuicola.cl), that covers fisheries and aquaculture.

In the regions of project intervention there are several means to deliver information about fisheries and aquaculture. In the Region of Tarapaca, La Estrella de Iquique newspaper and Radio Riquelme have the largest number of readers and listeners and CIAM has a channel of information through social media. In the Region of Coquimbo, the weekly newspaper *Tiempo* includes news on fisheries and aquaculture and has a news portal. The Centre for Advanced Studies in Arid Zones (CEAZA, acronym in Spanish) publishes special supplements in local newspapers, writes children's stories about the sea and broadcasts radio ecocapsules. In the Region of Valparaíso, *El Mercurio de Valparaíso* newspaper issues a monthly magazine called *Revista Nuestro Mar* and has a news portal about fisheries, aquaculture, coastline and port. In the Region of Bio-Bio local newspapers have extensive coverage of fisheries issues, specially, El Sur and El Diario newspapers in Concepción. Radio Bio-Bio has nationwide coverage of conflicts in the fisheries activity through its network of stations in the north and south of the country. In the Region of Los Lagos, the Llanquihue and La Estrella de Chiloé newspapers have a section called *Vision Acuicola*, issue a monthly magazine and have news portal for the sector. The Biobío and Reloncaví radios have extensive coverage, and Chiloé Radio and the community radio *Estrella del Mar* in Chiloé have coverage in remote areas.

Broadcast channels air special programmes on aspects of climate change, such as *Cambio Global* in TVN and *Tecnociencia* in Channel 13. The NGO Fundación Terram has a weekly electronic newsletter on climate change, free issue for subscribers, and a website and social media like Facebook and Twitter to disseminate information.

The SCCF project may arrange strategic alliances with the media through the existing communication channels, to disseminate information and raise awareness on climate change and its effects on fisheries and aquaculture, report on project progress and positive results of the adaptation measures that could be replicated in other zones of the country.

1.2.3 Remaining barriers to address CC vulnerabilities

Despite the efforts of the Government and stakeholders of the Chilean fisheries and aquaculture sector, there are still some barriers to have a more resilient fisheries and aquaculture sector, capable to adapt to the expected impacts of climate change.

Barrier 1: Weaknesses of the institutional framework, including lack of interagency coordination and limited public, private and civil society capacities to understand and cope with climate variability and climate change on the fisheries and aquaculture sector.

The institutional sector is lacking in coordination capabilities, knowledge and information management and the ability to understand and cope with the effects of climate change. Public institutions and stakeholders of the sector have limited ability to understand all the effects of climate change on natural resources that sustain the economic activities. This leads to insufficient understanding of the links between the management of fisheries and aquaculture resources and the impacts of climate change, something that has an impact on decision-making, especially in the medium and long term to facilitate and encourage the adaptation of the fisheries and aquaculture to climate change. Since some resources have management problems, this limitation may increase exposure to the effects of climate change. While the Plan for Climate Change Adaptation in Fisheries and Aquaculture was approved, it still lacks the institutional arrangements for its management and implementation in the sector.

Research and monitoring programmes do not consider the impact of climate change, including variability and vulnerability. This means a lack of knowledge regarding the environmental, social and economic effects of climate change, which hinders the implementation of management measures under an ecosystem approach for a sustainable development of the activity. This has effects that result in: i) insufficient diligence and speed in implementing adaptive regulations, designed to respond to sudden changes in environmental conditions and operational scenarios in a timely manner; ii) deficiency or slowness in the process of regularization and/or authorization of related activities in the artisanal coves, which are primarily considered landing sites; making it difficult to incorporate technologies that would add value to the capture landed, such as: storage systems of fishery resources, ice production chambers and processing plants, among others.

The IFOP maintains a system of biological, oceanographic, fisheries and economic monitoring of the sector, which provide comprehensive information to take decision based on sustainability and ecosystem criteria yet this is done at broad scale. Although the data and information provided by IFOP includes environmental variables, they do not consider specific aspects aimed at understanding the behavior and evolution of variables associated with climate change, which is an obstacle to perform comprehensive analysis of the main Chilean fisheries and aquaculture under different climate change scenarios. Likewise, various research centres and institutions collect information about environmental variables; however, this information does not consider specific climate change variables, is local and focused on the analysis of specific fisheries, is not available for the scientific community and decision makers and is scattered in different institutions. While data is collected, it is not translated into information for end users and for the local decision making; hence, the knowledge, scope and magnitude of climate change impact is limited and leads to take biased decisions and makes difficult to adequately support interventions related to climate change in the sector.

There is a deficit in the coordination of regional strategies for fisheries and aquaculture to facilitate joint action by local public bodies (Regional³³ Fisheries and Aquaculture Directorates, Regional Ministerial Secretaries, Research Centres, Development Corporations, Fisheries Communities and others). This results in a lack of common vision to address the sustainable development of fisheries and aquaculture sector and therefore a high dispersion of powers and initiatives, which concludes with excessive fragmentation in decision-making and a low effective participation local actors in matters related to climate change. Insufficient

³³ “Regional” refers to the management divisions/territories along the country

coordination is also evident in the area of research and technological innovation, with little interaction between research teams, duplication of studies and gaps in specific areas.

It has been observed that public and private institutions and the civil society have difficulties in understanding the problem and have no sufficient information about it; this makes difficult to obtain financial resources to support the process of adaptation to climate change and monitor its implementation, hence, the lack of resources and technical capacities is one of the major obstacles to move forward.

These limitations lead to negative impacts in terms of making regulations which do not include the effects of climate change which, together with other undesirable practices and the absence of an ecosystem approach, may affect the availability of resources and hence, the sustainable development of the activity. Likewise, negative impact on employment, income and quality of life, among others, of a large number of stakeholders (artisanal fishers and small-scale aquaculture farmers, industrial fishing fleets, aquaculture industry (for example salmon); processing plants, distribution chains, and marketing activities) whose livelihoods depend on these activities and represent the main economic engine in coastal areas; and finally major socio-economic effects on the national economy (regional GDP, food security and others).

Barrier 2: Limited experience and availability of technologies and application of best practices in the fisheries and aquaculture sector for climate change adaptation, increases vulnerability of coastal communities

Chile has a good level of development of the fisheries and aquaculture sector, but to date, the effects of climate change have not been duly considered, so it is observed a low level of experience, availability of technology, best practices and poor management, what hinders the incorporation of measures for climate change adaptation. There is uncertainty about the impacts of climate change on fisheries and aquaculture, livelihoods, and there is no assessments of local vulnerabilities to adaptation focused on artisanal fisheries and small-scale aquaculture.

The limited local information on climate change is a weakness that hinders the possibility to raise awareness and understand the real impacts of climate change and therefore, limits the prioritization of initiatives undertaken by the affected actors for the adoption of adaptation measures. Thus, the fisheries communities (mainly artisanal fisheries and small-scale aquaculture farmers) do not have appropriate support programmes to build resilience through training, transfer of knowledge and information, technological innovation, monitoring systems, improvement of management systems and training of instructors who can help them to build local adaptation measures that are sustainable over time.

The lack of information and knowledge also reduces the availability of more financial resources at the regional level to support new investments, technologies and innovations aimed at the adoption of adaptation measures, such as: aquaculture of native species, implementation of *hatcheries*, availability of new capture methods for new species that may appear due to environmental changes, implementation of production traceability systems, wash of equipment and nets and others. Likewise, diversification processes of local fishing and aquaculture oriented towards a better use of available resources and the improvement of productive activities along with complementary activities, have not been properly internalized by artisanal fisheries and small-scale aquaculture.

Moreover, the long geographical area of Chile; its great diversity of climate, environment and ecosystems; the high diversification of productive activities (exploitation, processing, distribution and trade); and the great diversity and/or inclusion of new stakeholder (sustained increase in women participation, integration of people from other productive activities such as mining, agriculture), are factors that limit the adequate and rapid incorporation of experiences. Also, the prioritization of the urgent needs of the communities due to their poverty level, contribute to the delay in the adoption of medium and long term measures (including adaptation to climate change).

These aspects impact on fisheries communities, lessen their quality of life, increase their vulnerability, and produce negative effects on the performance and efficiency of the production activities of artisanal fishers and small-scale aquaculture farmers. The reduction in income affects new generations of fishers interested in pursuing the artisanal fisheries trade, due to fewer available resources, leading young people to look for better opportunities through higher education or working on other productive activities that offer higher salaries (e.g., mining).

Barrier 3: Limited information and knowledge at the community level to address the expected impacts of climate change and manage fisheries and aquaculture resources in an efficient manner

While communities perceive changes (e.g. water temperature, local extinction of species, new species, increased anoxic conditions), in general, fishers and aquaculture farmers do not have the ability to discern whether they are due to climate change or not, and sometimes are attributed to local factors or events (e.g., pollution, extreme events such as heavy seas). Also, while aware of the events that affect their coves, there are also new events (in terms of intensity) for which there is no previous experience and therefore, cannot be predicted, forcing them to learn as the event occurs. Communities do not have prevention mechanisms to face extreme climate events and monitor climate variability and effects of climate change.

There is little awareness in the coastal communities of the importance of threats posed by climate change, except for the events that have immediate negative effects such as El Niño phenomenon in the northern part of the country, which is mentioned as a constant cause in that zone.

The information on meteorological and environmental variables that is useful for the sector is scattered in different institutions and, in some cases, is the same information but with different objectives (transport and navigation, basic research, among others). Although there is abundant information about the environment, the communities do not have the capacities to use it for planning activities aimed at addressing the impact of climate change. In general, there is little information tools designed for these communities that include topics about climate change so, the information used by fishers and aquaculture farmers is limited and not used efficiently.

The transfer of information, knowledge and lessons learned in the field of fisheries and aquaculture resources management, is still insufficient and makes it difficult to replicate successful experiences to encourage, strengthen and take actions including climate change adaptation. Thus, due to the lack of information, the local communities have not integrated the climate change as a relevant topic and/or of immediate concern in their towns, a fact that affects the non-prioritization of measures related to climate change and hence, the local decisions that do not consider the climate change variable.

Moreover, it is important to note that, at the community level, there is local wisdom related to climate change, which has not been systematized, integrated and disseminated within the community or at regional and national level, an aspect that contributes to the ‘misinformation and ignorance’ about climate change impacts.

All these factors reduce the possibility that the communities may adopt and implement adaptation measures that contribute to a more sustainable and efficient use of fisheries and aquaculture resources in the long term, reverting the deterioration of the quality of life of the same.

1.3. THE CCA ALTERNATIVE (SCCF)

1.3.1 Project strategy

The strategy of the project is to promote the transformation of the current context of deterioration of fisheries; vulnerability to climate variability and climate change; and limited institutional capacities, as well as the lack of experience and availability on technologies and application of best practices to reduce the vulnerability and adapt to the effects of climate change.

The project will facilitate the implementation of the National Adaptation Plan to Climate Change for Fisheries and Aquaculture helping to remove the barriers identified to create an enabling environment to strengthen the resilience of Chile to the effects of climate change on fisheries and aquaculture, through two main lines of action that are not currently being covered by the baseline activities and represent major obstacles for adaptation: i) development of public and private capacities for adaptation to climate change at national, regional and local levels, as well as inter-agency coordination, and ii) build the capacities to adapt to the effects of climate change at the local level through technical assistance and implementation of demonstration pilot projects and innovative technologies and systems for adaptation to climate change.

The project is aligned with the Code of Conduct for Responsible Fisheries (CCRF) and its principles, which includes the entire value chain of fisheries, aquaculture and related activities. The implementation of the project activities will be guided by the Ecosystem Approach to Fisheries (EAF) and aligned with the Voluntary Guidelines to achieve Sustainable Small-Scale Fisheries (SSF Guidelines) and the Ecosystem Approach to Aquaculture (EAA)³⁴.

Text box 1: Code of Conduct for Responsible Fisheries

More than 170 Member States of FAO endorsed the Code of Conduct for Responsible Fisheries (CCRF) in 1995. The Code is voluntary and provides principles and standards applicable to the conservation, management and development of all fisheries. It also covers the capture, processing and marketing of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries management of coastal areas. Following the CCRF numerous international action plans have been developed to address the Illegal, Unreported and Unregulated (IUU) Fishing, shark management, fleet capacity and seabirds, as well as international guidelines for deep sea fishing and bycatch management. Guidelines have also been developed to support the implementation of the CCRF, such as the Guide for Fishery Purposes. Article 9 of CCRF addresses the responsible development of aquaculture and to support this, various specific guidelines have been developed including the ecosystem approach to aquaculture (EAA).

Source: <http://www.fao.org/docrep/013/i1900s/i1900s.pdf>

³⁴ <http://www.fao.org/docrep/014/i1750s/i1750s.pdf>

The Chilean legislation considers the ecosystem and precautionary approaches as the basis for sustainable fisheries and aquaculture. In keeping with the same, the project will be implemented according to the EAF. The EAF focuses on fisheries management and development with a view to balance different societal objectives, by incorporating knowledge and uncertainties in relation to biotic, abiotic, and human components of the ecosystems and their interactions, under a comprehensive approach within reasonable ecological limits. By definition, the EAF promotes comprehensive conservation and restoration practices and sustainable use of the marine sector; it also promotes the inclusion of all stakeholders in the decision-making process to the lowest possible level. Thus, by implementing the project within a framework of recognised policies and practices, the continuity of efforts and sustainability will be ensured.

Text box 2: Ecosystem Approach to Fisheries (EAF)

The objective of the EAF is to balance different societal objectives, by incorporating knowledge and uncertainties in relation to biotic, abiotic, and human components of the ecosystems and their interactions, under a comprehensive approach within reasonable and coherent ecological limits. The purpose of the EAF is to plan, develop and manage fisheries, taking into account the multiple needs and desires of the society, without affecting the different options, so future generations may benefit from all goods and services from marine ecosystems. Some key elements of the EAF are:

- Decentralize decisions and actions to the lowest pertinent level, while recognizing the need of mechanisms to ensure that decisions and management actions are consistent and coordinated at the highest levels, as required by the EAF.
- Identify the fisheries to be included in each case and the geographical area to be covered (complement fisheries management system boundaries with ecosystems boundaries).
- Establish appropriate, explicit and applicable rights to ecosystem resources. Under the EAF it is necessary to recognize that the access rights systems should also include other uses besides the harvesting of the resources it refers to.
- Establish and apply effective conflict resolution mechanisms.
- Recognize and identify direct and indirect uses and users of the ecosystem and involve all stakeholders in knowledge sharing, decision making and management.
- Translate EAF high-level policy goals into transparent and comprehensive operational objectives.
- Establish short and long term management objectives as well as indicators and benchmarks for operational objectives agreed upon, to provide a framework for monitoring management performance.
- Consider transboundary impacts of fisheries on adjacent ecosystems or other ecosystems.
- Governance for EAF should ensure human welfare and ecosystem and equitable sharing of benefits.
- Understand and manage ecosystems in an economic context, including management of market factors which promotes overexploitation and incentives for sustainable resource management.
- Conserve biodiversity, structure and functioning of the ecosystem, avoid irreversible impacts on fisheries ecosystem and reduce undesirable reversible impacts (e.g., bycatch and feeder fish).
- Decisions about conservation and fisheries management should be based on the best scientific information available, and also take into account traditional wisdom on resources.
- Improve knowledge of the structure, components and functioning of the marine ecosystem under consideration, the role of habitat and biological, physical and oceanographic factors affecting ecosystem stability and resilience; improve monitoring of bycatch and feeder fish in all fisheries to have knowledge of the amount of fish actually capture.

Text box 2: Ecosystem Approach to Fisheries (EAF)

- Support research and technological development of fishing gear and practices to improve the selectivity of the equipment.

Source: FAO. 2003. Fisheries management. 2. The ecosystem approach to fisheries. 2.2. The human dimensions of the ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 2, Add. 2. Rome, FAO. 88 pp.

The project will promote sustainable management actions, livelihoods, addition of value, gender equality, climate change, policies, information and communication, and capacity building in the context of the SSF Guidelines.

Text box 3: Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the context of Food Security and Poverty Eradication

The Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the context of Food Security and Poverty Eradication (SSF Guidelines) are the first internationally agreed instrument specific for the small-scale fisheries sector. The SSF Guidelines developed as a complement to the 1995 CCRF of FAO, was adopted by the Committee on Fisheries (COFI) in 2014. Fishers organizations and NGOs played a key role during the development stage and it is expected that this continues during the implementation stage.

Source: <http://www.fao.org/3/a-i4356s.pdf>

The project will also adopt the Ecosystem Approach to Aquaculture (EAA).

Text box 4: Ecosystem approach to aquaculture (EAA)

The EAA is a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity, and resilience of interlinked social-ecological systems. Being a strategy, the EAA is not *what* is done but rather *how* it is done. The participation of stakeholders is at the base of the strategy. The EAA also echoes the development principles provided for in the EAF.

Principle 1: Aquaculture development and planning must take into account the full range of ecosystem functions and services, and must not jeopardize the sustained delivery of these to society.

Principle 2: Aquaculture should improve human wellbeing and equity for all stakeholders.

Principle 3: Aquaculture must be developed appropriately within the context of other sectors policies and objectives.

Source: www.fao.org/docrep/014/i1750s/i1750s.pdf

The project's strategy will also adopt an inclusive and participatory approach, with broad participation of men, women and young people, incorporating local wisdom, public-private partnerships and flexibility in line with the adaptation. The project will promote the participation of stakeholders through tools such as: a) contacts with leaders or authorities of the towns and pilot coves, b) dissemination of the information about the project (objectives, planned activities), c) community meetings, d) participatory diagnostics, e) consultation and validation workshops, f) training, and g) participatory evaluation. The objective is to involve artisanal fishers and small-scale aquaculture farmers in activities such as: a) participation in

inter-institutional working groups on climate change in fisheries and aquaculture; b) design of best fishing and aquaculture practices with a resilience approach; c) local monitoring of climate variability and climate change; d) incorporation of local wisdom; e) implementation of best practices for adaptation; and f) exchange of experiences and learning with fishers and aquaculture farmers of pilot coves located close to the pilot coves. The project will put an emphasis on the participation of women empowering them to increase their participation in planning and decision making processes and to leverage their productivity, income and livelihoods. The participation of women and young people will be promoted through workshops, and consultation and validation processes. Training activities at the coves will be carried out at times and also taking into account the fishing seasons, so men, women and young people can participate without disturbing their daily activities.

1.3.2 Project objectives, outcomes and outputs

The objective of the project is to reduce the vulnerability of the fisheries and aquaculture sector to climate change and increase their capacity of adaptation to the same. In keeping with this purpose, the project has been structured according to four components, which are described below.

Component 1: Strengthening public and private institutional capacities for effective climate change adaptation

In order to remove Barrier 1, the project has to increase the existing knowledge about risks associated with climate change and the capacity of public and private institutions to understand and consider the adaptation measures that should be applied at the national and local level, and provide greater technical, operational and regulatory support for artisanal fishers and small-scale aquaculture farmers to implement climate change adaptation measures and reduce vulnerability.

The process of strengthening institutions, specifically, at the decision makers level will be carried out considering the ecosystem and precautionary approaches, through comprehensive and holistic visions, enabling to make decisions conducive to strengthening the principles of sustainable development. This will contribute to the adoption of policies and actions related to climate change, on the basis of a comprehensive perspective of ecosystems, adding information associated with climate change indicators, to research and environmental and sectoral monitoring programmes and to the decision making process.

To this end, the additional SCCF funding of USD 481,329 will be devoted to technical assistance to: i) strengthen the processes of inter-institutional coordination, forming working groups with the participation of key stakeholders to promote coordination on climate change; ii) develop an information system to improve availability and access to climate change information, to generate indicators of climate change for the sector and improve monitoring of climate change effects; iii) train public officials and national experts to improve their skills and raise awareness among regional authorities and decision makers about the effects of climate change on the sector.

Co-financing of Component 1 will be provided by SUBPESCA (USD 9,620,682: USD 71,023 cash and USD 9,549,659 in-kind); the MMA (USD 132,310: USD 29,876 in cash and USD 102,434 in-kind); and FAO will contribute USD 101,361 (cash). Co-financing will support capacity development for ecosystem-based fisheries and aquaculture management; studies on climate change scenarios, including current vulnerability and adaptation projections; technical staff related to climate change issues; and support to field activities to strengthening fisheries governance and management.

Outcome 1.1: Strengthened public and private institutional capacities to implement/improve CC adaptation actions in fisheries and aquaculture (at national and local levels)

Indicator 9 (CCA-2): Number of people trained to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures.

Baseline: 0

Target: 100 government officials, 60 national experts, and 240 decision-makers from national, regional and municipal level

Indicator 10 (CCA-2): Capacities of regional, national and sub-national institutions to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures

Baseline: 1 Institution (SUBPESCA). Capacity score:2 (as per SCCF Tracking tool)

Target:1 Institution (SUBPESCA). Capacity score:6 (as per SCCF Tracking tool)

Outcome 1.1 will be achieved through 3 outputs as follows:

Output 1.1.1: Coordinating/advisory bodies on climate change, fisheries and aquaculture working at national, regional and local level.

As part of the organizational structure proposed by the National Adaptation Plan to Climate Change, this output will design and implement an institutional structure that provides management and implementation arrangement for the Plan for Adaptation to Climate Change for Fisheries and Aquaculture. In Project Year (PY) 1, Public and Private Inter-institutional Working Groups for Fisheries, Aquaculture and Climate Change (IWG) will be established, one at the national level, four in the regions of project intervention (Tarapaca, Coquimbo, Bio-Bio and Los Lagos) and two at town level (in Tome and Hualaihue). In the case of the Iquique and Coquimbo cities, there are offices to deal with fisheries and aquaculture issues formed by local actors, therefore the same offices will act as Working Group in these cities.

The main objective of these working groups will be to provide advice and improve coordination between the vertical (national-regional-local) and horizontal (regions and towns/cities) levels, in terms of climate change, fisheries and aquaculture, for which purpose they will meet every two or three months. The design of the IWG includes a Technical Secretariat, that will meet frequently and its main function will be to implement agreements and resolutions. The organizational structure of the IWG, secretariats and detailed functions will be completed in year 1, together with a financial stability strategy of the same. Each IWG will prepare and implement annual operational plans.

The IWG will contribute to expand the coverage and diversity of stakeholders, incorporating regional and local actors and bringing together all institutions with competency in fisheries and aquaculture. The following table summarizes the composition of each working group, with the institutions identified during the design phase of the project. During the implementation of the project other institutions relevant to the objectives of the IWG may be invited to participate

Table 1.5. Potential members of the national, regional and towns/cities IWG

National IWG	Regional IWG	Town/cities IWG
SUBPESCA SERNAPESCA	SUBPESCA SERNAPESCA	Municipal governments Regional Fisheries Directorates

National IWG	Regional IWG	Town/cities IWG
IFOP MMA National Directorate Maritime Territory and Merchant Marine (DIRECTEMAR) Navy Hydrographic and Oceanographic Service (SHOA) GATCC- SUBPESCA Directorate of Port Operations (DOP) Universities <ul style="list-style-type: none"> - Pontifical University Catholic of Valparaíso - University of Concepción - University Austral of Chile - University Catholic of Norte - University de La Serena - University Arturo Prat National organizations of artisanal fishers and small-scale aquaculture farmers <ul style="list-style-type: none"> - CONAPACH - CONFEPACH National organizations of large-scale fisheries and aquaculture <ul style="list-style-type: none"> - SONAPESCA - ASIPEs - SALMONCHILE - ACOTRUCH - AMICHILE 	IFOP MMA DIRECTEMAR DOP Regional Governments (GORE) Universities <ul style="list-style-type: none"> - Pontificia University Católica de Valparaíso - University de Concepción - University Austral de Chile - University Catholic of Norte - University of La Serena - University Arturo Prat Research Centres <ul style="list-style-type: none"> - CIAM in Tarapaca - CEAZA in Coquimbo - INPESCA in Bío Bío - INTESAL in Los Lagos National organizations of artisanal fishers and small-scale aquaculture farmers <ul style="list-style-type: none"> - CONAPACH - CONFEPACH 	National organizations of artisanal fishers and small-scale aquaculture farmers <ul style="list-style-type: none"> - CONAPACH - CONFEPACH Beneficiary organizations in pilot coves: <ul style="list-style-type: none"> - Corporación Caleta Riquelme - Trade Association of Independent Fishers of Tongoy and Trade Association of Shellfish Divers, Artisanal Fishers of Tongoy - Trade Association Caleta Coliumo - Unions: El Manzano, Punta Quillón, San Pedro El Manzano and San Juan El Manzano in Huailahue

Output 1.1.2: Interoperable information base system that integrates fisheries, aquaculture and climate change data, to generate information for end-users and decision-makers.

The project will start a process to develop an information base system from a database model interconnected and integrated among institutions that produce and manage data associated with climate change from the fisheries and aquaculture sector at government level. According to the information gathered during full project preparation, it has been estimated that the time to implement and operate an information system will be greater than the duration of the project. Therefore, the SCCF support will be provided for the initial design processes, being the completion and implementation of the system managed by an official government institution, such as the IFOP³⁵, according to sectoral public policies on climate change.

The SCCF support will cover the design of the content of the information system; while the design of the system, the IT platform and its implementation will be managed by the relevant institution. Throughout the process, it will coordinate with the MMA that is designing a biodiversity monitoring network (terrestrial, marine and inland) in the context of climate

³⁵ The IFOP currently has the largest base of fishery and aquaculture country data, and its mandate is the fisheries and aquaculture research therefore is considered feasible that processes built on this baseline (systematization, indicators, protocols) are incorporated into institutional and continuous processes to system implementation definitive information

change, to ensure synergies with this initiative, build on the progress already made and generate benefits to the institutions involved.

The development of the system will include the following key activities: 1) systematization of information; 2) development of indicators of climate change; and 3) design and implementation of the information system.

The systematization of information will be done by IFOP, SUBPESCA, SERNAPESCA, MMA, SHOA-CONA, the Meteorological Service of Chile and the Meteorological Service of the Navy. On an experimental basis, the information gathered from local monitoring carried out in the four pilot coves (through Output 2.1.2) will be integrated, to meet the needs of information and early warning of fishers and aquaculture farmers in these locations.

National indicators (quantitative and qualitative) will be defined during PY1. They will be used to backup policies and strategies of mitigation and adaptation to climate change and assess success in terms of reducing vulnerabilities in the sector as well as key indicators to measure variables of climate change within the area of operation of fishers and aquaculture farmers in the four pilot coves, in order to inform, support and alert fishers and small-scale aquaculture farmers about possible effects of climate change. The definition of local indicators will take into account the information needs of fishers and fish farmers and their capacity to generate and feed simple information into the system.

A group of experts will be formed to define indicators (e.g., coastline demographics, sea surface temperature, sea level, air temperature, rainfall, state of seagrass beds, distribution, exotic marine species, abundance and composition of phytoplankton and zooplankton). The long-term objectives, the information collection method and the frequency of measurement and reporting will be determined. Key indicators to measure variables of climate change within the area of operation of fishers and aquaculture farmers of the four pilot caches (which will be monitored under Output 2.1.2) will be determined, in order to inform, support and alert local fishers and small aquaculture farmers, regarding possible effects of climate change. The local monitoring will allow to test the connection between the end-users/information providers and the main monitoring and feedback system.

With regard to data availability and data source, a working group will be formed in the PY1, that will be responsible for identifying the information available, upload it to the system, define the amount of data, metadata and computer data platforms related to climate change indicators, and develop a register of the information available in each participating institution. The registry elaboration will continue during PY2, in addition to the development of information exchange protocols and the upgrade of the current computing systems to upload and save the information. A metadata to access the system will be developed during PY2 and 3.

The project will support the design of the contents of the information system in PY2. Groups of experts and end users will work together to define the information uploaded and downloaded to the system, institutional processes and interactions; people responsible for the processes and specific objectives. The proposed design of the content of the information system will be developed as of the PY3 and an international experts workshop on climate change and information systems will be held to validate the design of the content with emphasis on the usefulness for national, local decision making and end users.

From PY4 (post-project), it is expected that IFOP will continue with the system design, required computing platform, implementation and commissioning of the information system. The information system will lay down the foundations for a future climate change monitoring and evaluation system in the sector.

Output 1.1.3: Capacity development programme for public officials, national experts, and regional and local decision-makers.

In PY1 the project will design and implement a training programme to upgrade and build expert capacities on climate change in fisheries and aquaculture for public officials and national experts, and to raise awareness among decision-makers on the projections and expected impacts of climate change in the sector and the need to approach this subject at central, regional and local levels. The objective is to develop capabilities to identify, prioritize, implement, monitor and evaluate strategies and measures to adaptation at the institutional level.

By a Letter of Agreement (LOA) with a national research institution and/or consultants for fisheries, aquaculture and climate change, a course will be designed and implemented for 100 civil servants, consisting of online classes (e-learning) and classroom teaching (b-learning) and a final exam to be awarded a certificate as an incentive to participate.

Also, six training sessions for 60 national experts (three training sessions between PY1 and PY2, and three remedial and upgrade training sessions in PY3) will be held in order to update and increase knowledge about the effects of CC in the coastal area of Chile, its ecosystems, water resources and related economic activities, among others.

To raise awareness about the effects of climate change, the project will carry out workshops for regional authorities, executive and legislative power authorities and municipal authorities. Three workshops for 100 regional authorities will be carried out; including a workshop in the Central Zone in year 1, a workshop in the North Zone in PY2, and a workshop in the South Zone in PY3. A workshop for executive and legislative power authorities responsible for budget allocations will be held in PY2. At the regional level, four workshops will be carried out in PY2 and PY3 (one per region) for 80 regional and municipal authorities.

The institutions participating in the programme are: the Ministry of Economy, Development and Tourism (SUBPESCA, SERNAPESCA, IFOP, Undersecretary of Economy); MMA; regional governments of Tarapaca, Bio-Bio, Coquimbo and Los Lagos, Regional Fisheries Directorates; Regional Ministerial Secretariats of Economy and Environment; Regional Councils; municipal governments of Iquique, Coquimbo, Tome, Hualaihue; research centres (CIAM, CEAZA, INPESCA, INTESAL) and universities (Catholic of Valparaiso, Arturo Prat, La Serena, Concepcion, Austral, Catholic of Norte).

Component 2: Improving the capacity of adaptation to climate change in local fisheries and aquaculture communities

In order to remove the Barrier 2, the project will promote the implementation of adaptation actions in coastal communities with artisanal fishers and small-scale aquaculture farmers. The actions will be implemented on a pilot basis in four coves that match the conditions of vulnerability and that, at the same time, are representative of the sectoral and environmental diversity of the coastal zone of the country. The measures to be implemented will be aimed at

the incorporation of technology and innovation, operational processes, management and training/education, which shall be based on the EAF, as well as an integrated sectoral and environmental vision in order to make adaptation measures compatible with principles of sustainability at the local level. The interactions of the fisheries communities of the pilot sites with local and regional economic activities will also be considered.

Component 2 will aim at three objectives: i) to increase adaptive capacities of local communities (see Output 2.1.1 below); ii) to monitor these pro-adaptation field interventions with a participatory approach (see Output 2.1.2); and iii) to generate alternative livelihoods for vulnerable communities, diversifying fisheries and aquaculture production (see Output 2.1.3).

The additional SCCF funding of USD 1,525,659 will fund technical assistance for: i) design and implementation of productive diversification activities with a resilience approach, ii) training of fishers and aquaculture farmers in ecosystem approach, risk mapping, productive diversification with a resilience approach; iii) training of local monitors; iv) investment in best practices and technologies for adaptation to climate change.

Co-financing of Component 2 will be provided by SUBPESCA (USD 4,825,459: USD 155,570 in cash and USD 4,669,888 in-kind) through territorial planning programmes, support to Management and Exploitation Areas for Benthic Resources (MEABRs), vulnerability analysis of coastal communities, and support to productive diversification of the artisanal fisheries and small-scale aquaculture sub-sector.

Outcome 2.1: Local stakeholders have established adaptive systems and invest in innovative adaptation technologies at local level.

Indicator 2 (CCA-1): Type and extent of assets strengthened and/or better managed to withstand the effects of climate change

Baseline: 0 linear kilometers of coastline managed to address the effects of climate change

Target: 709,3 linear kilometers of coastline better managed to address the effects of climate change

Indicator 3 (CCA-1): Population benefiting from the adoption of diversified, climate-resilient livelihood options.

Baseline: 0 people

Target: 4,550 people (25% women)

Outcome 2.1 will be achieved through 3 outputs as follows:

Output 2.1.1: Pilot programme to strengthen and develop adaptive capacities of fisheries and aquaculture communities and organizations in four coves (Riquelme, Tongoy, Coliumo and El Manzano-Hualaihue).

The pilot programme aims to develop the capacities of fisheries and aquaculture communities and organizations to identify, prioritize, implement, monitor and evaluate strategies for adaptation to climate change at the community level.

For the design and implementation of the pilot programme in PY1, academic and/or research centres in the regions of intervention will be identified and letters of agreement will be signed to this effect. A workshop with experts and stakeholders will be carried out to define the terms

of reference of the programme as well as the relevant content of the same. The contents will be basic and introductory and developed in a participatory manner. The materials will be prepared in a plain language to facilitate understanding, and include, among others, educational posters on climate change and adds posted on fishers' organizations to foster their participation. Training workshops will be carried at times when beneficiaries (women and men) can participate without disturbing their daily activities. The development of this programme will take into account the coordination with the Division of Environmental Education and the Regional Commissions for Environmental Education of the MMA, in order to strengthen these organizations in the area of fisheries and aquaculture.

Between years 1 and 3 the programme will train 20 local extension monitors (five by cove) whose mission will be to spread the project and the climate change theme in their respective coves, leverage the exchange of experiences and local wisdom, and help disseminate best practices for adaptation to climate change. The monitors will be fishers and aquaculture farmers' leaders of the pilot coves who will be trained in modules under a blend learning modality (classroom workshops and e-learning), and at the end of the training they will receive a certification. 16 workshops will be carried out in different topics such as: i) general contents of climate change, ii) risk management, iii) environmental information systems, and iii) management and repopulation of MEABRs.

Likewise, 80 fishers and aquaculture farmers will be trained in: i) ecosystem approach, ii) risk maps, and iii) management of environmental and climate information. 8 participatory workshops will be held in the pilot coves where participants will be taught in theoretical and practical concepts. Risk maps and management plans with an ecosystem approach for fisheries and aquaculture for each pilot cove will be developed in a participatory work. Then, the risk maps will be monitored annually by cove, against new climate and natural disasters scenarios.

Output 2.1.2: Pilot programme to monitor climate change adaptation in 4 coves

Output 2.1.2 is directly linked to the information system developed under Output 1.1.2.

The pilot programme for local environmental monitoring will be implemented, with the aim of developing a prevention mechanism to cope with climate variability and climate change at the local level, and support the implementation of adaptation measures in the pilot coves.

For the design and implementation of the pilot programme, during year 1 academic institutions and/or research centres in the regions of intervention will be identified, and letters of agreement will be signed.

During PY1, key indicators will be defined for measuring variables (or proxies) of climate change within the area of operation of fishers and aquaculture farmers of the four pilot coves. Local knowledge of fishers and aquaculture farmers will be included into the set of indicators. Local instructors trained under Output 2.1.1 shall be responsible for implementing the monitoring activities in their respective coves throughout the entire project. They will work together with fishers and aquaculture farmers and gather information from their comments.

An environmental monitoring protocol will be designed and implemented based on the sampling of oceanographic and biological variables, easy to implement and monitor by fishers and aquaculture farmers, such as salinity, temperature and Secchi disk, in addition to visual observations of the sea and weather conditions in general. Samples of the surface plankton will be added to these records, which will then be observed under magnifying glasses arranged in

rooms of work in dry conditions, located at each of the organizations involved. This practice, whose frequency will be determined in a participatory manner and together with local technicians, will provide the fishers and aquaculture farmers the possibility to participate, in a pilot manner, in a protocol of environmental records that will allow them to make better decisions in the future. The protocol will be supported by equipment that will be distributed to participating coves and managed by previously trained monitors together with the local technical team.

As part of the monitoring programme, rapid assessments of vulnerability will be carried out in each pilot cove. The first one in PY1 in order to establish the baseline, and the during the last year with the objective of determining the situation as outcome of the actions undertaken during the project. The evaluations will be conducted by regional technicians who will be trained in academic institutions and/or research centres, with the support of local monitors.

The information obtained from local monitoring activities will be uploaded to the information system being developed under Output 1.1.2 in a pilot/testing mode , to eventually issue reports that help meeting the needs of information and early warning given to fishers and aquaculture farmers at the pilot coves. Likewise, this information will be of use for the IWG, SUBPESCA Management Committees and other relevant bodies to: 1) review the knowledge generated in the environmental and biological monitoring; 2) agree upon and propose a shared agenda of topics and content for training; 3) propose management measures at the central level, and 4) implement and coordinate response actions to environmental changes including at the lowest local level possible.

Output 2.1.3: Strengthened programmes for development and productive diversification with a climate change adaptation approach (in 4 coves)

This output will strengthen development programmes that are being implemented in pilot coves with the incorporation of best fishing and aquaculture practices with a climate change adaptation approach. The objective is to build adaptation capacities and incorporate local wisdom and lessons learned from artisanal and small-scale fisheries, to improve current methodologies and procedures, adopt alternative technologies, diversify productive activities and improve production management models with EAF, EAA and sustainable development interventions.

The project will invest in best practices and technologies for adaptation to climate change and to enhance resilience of fisheries and aquaculture communities in pilot coves. During the design phase of the project a list of best fishing and aquaculture practices has been identified, focused on resilience and other livelihoods, which is summarized below and that will be implemented during the project.

The pilot coves are mainly fishing, but in some of them, like Tongoy Cove, there is a wide experience in farming of scallops, and incipient to medium experience in the farming of seaweed and mussels, in Coliumo and El Manzano coves, respectively (see section 1.1.2, table 1.1), thus aquaculture is proposed as an alternative or adaptation to climate change. During the last decade, aquaculture activities in coastal communities were incorporated as a complement to extractive activities, promoting a change in the behavior of fishermen from extractors to marine farmers, which in turns expands their experience in practices related not only to this new technology, but also to activities related to it (for example, the use of nets, etc). This new

condition, along with the tangential experience of the participation of the fishermen – divers and women in the salmon industry, enables them to become more resilient to the effects of the CC and the overexploitation of natural resources. Diversification towards aquaculture will also ensure that the farming systems are climate change resilient

Table 1.6 below, summarizes best practices and proposed technologies. Appendix 8 contains more detailed information on best practices identified at each cove level, along with an explanation on how each practice contributes to generating adaptation to the effects of climate change

Table 1.6: Best practices and technologies to be implemented in pilot coves (Caletas) to enhance resilience

Best practices and technologies		Caleta Riquelme	Caleta Tongoy	Caleta Coliumo	Caleta El Manzano
Fisheries	Identification, adaptive and sustainable exploitation and alternative processing of bycatch that appears due to climate change	X		X	X
Aquaculture	Repopulation of benthic resources in MEABRs (a kind of mollusc that is part of the MEABRs)			X	X
	Technology improvements to produce scallop seeds in <i>hatchery</i> , even in environmentally unfavorable conditions (oceanographic conditions) and to address losses during extreme weather events/catastrophes		X		
	Construction of thematic-dynamic maps (based on FAO's recommendations, http://www.fao.org/3/a-i5004s.pdf) that include CC effects and support decisions taken in the productive process (with operational, risk and environmental indicators such as: oxygen, currents, t°, S°/oo and others).	X	X	X	X
	Seaweed farming in management areas (experimental aquaculture)	X	X	X	X
	Technical support programme for mussel seeds collection in the cove to face unfavorable environmental changes (seeds collection technologies, collectors transfer, etc.)				X
	Analyse and propose (to SERNAPESCA) a bivalve molluscs health management programme (BMHP) in the areas dedicated to aquaculture, which supports decision making affected by severe changes in the general conditions, based on FAO's recommendations (FAO Fisheries and Aquaculture Technical Paper 511, 2010)		X		X
Other livelihoods	Add value to fishery and aquaculture products, based on: better maintenance and/or semi-process of fishery products; intermediate products and improved presentation of marketed products, among others. Incorporate the use of collective marks to distinguish the origin of the product.	X	X	X	X

Best practices and technologies		Caleta Riquelme	Caleta Tongoy	Caleta Coliumo	Caleta El Manzano
	Develop a seal that endorses best local fisheries and aquaculture practices in terms of climate change adaptation and more sustainable practices	X	X	X	X
	Identification and design of a tourism initiatives package including: seafood stalls, gastronomy, recreational fishing, and others.	X	X	X	X
	Assessment, design and identification of legal administrative and sustainability requirements for the installation of reefs in management areas.	X	X		

Other good practices related to livelihoods have been included, since coastal communities today are facing important changes in its environment, not only by the effects of climate change but also due to the intensive use of its coastline by multiple actors. Because of this, it is necessary to make them an active part of the decision making, which should be planned, informed and highly participatory. In light of these new scenarios, innovative approaches are needed not only for the local governance, but also to add value to fisheries and aquaculture products post capture.

Fishers and aquaculture farmers will be trained with the learning by doing methodology, through playful and practical activities which, by experience, will be incorporated to fishers' daily activities. Thus, fishers and aquaculture farmers will learn something new and incorporate this to their daily activities. Local wisdom will be included to the training as well.

Thus, productive diversification with a resilient approach will benefit 910 producers who are members of the following organizations: Caleta Riquelme Corporation (Caleta Riquelme); Trade Association of Independent Fishers of Tongoy and Trade Association of Shellfish Divers, Artisanal Fishers of Tongoy (Caleta Tongoy); Trade Association of Caleta Coliumo (Caleta Coliumo); El Manzano Union, Punta Quillon Union, San Pedro El Manzano Union and San Juan El Manzano Union (Caleta El Manzano), as well as members of their families.

Component 3: Strengthening knowledge and awareness-raising on climate change in fisheries and aquaculture communities

In order to remove Barrier 3, the project will promote awareness among local coastal communities associated with the four pilot communities and with other communities in the intervention regions, to disseminate and scale-up learning on best fishing and aquaculture practices with a focus on adaptation to climate change adverse effects. Hence, the objective is to raise awareness, understanding and knowledge about climate change, its sources and adverse effects on fisheries and aquaculture at local level and the importance of increasing the capacity to adapt to such effects, thereby positioning the climate change issue in key stakeholders.

The additional SCCF funding of USD 218,514 will be used to finance: i) national, regional and local workshops, so stakeholders may become aware of the adverse effects of climate change on fisheries and aquaculture locally; and ii) visits to exchange experiences and learning among fishers and aquaculture farmers of the pilot coves, and visits of fishers of other communities to the pilot coves as a way to disseminate the adaptation mechanisms already implemented.

Co-financing for Component 3 will be provided by SUBPESCA (USD 69,659 in cash) and the MMA (USD 494,746: USD 419,536 in cash and USD 75,210 in-kind) through knowledge-sharing public programmes for the fisheries and aquaculture sectors, information materials design and development (e.g. newsletters, radio capsules), and technical staff time to be dedicated to climate change topics. .

Outcome 3.1: Local coastal communities are aware, knowledgeable and prepared to cope with climate change effects on fisheries and aquaculture.

Indicator 5 (CCA-1): Public awareness activities carried out and population reached

Baseline: no awareness-raising activity has been carried out for CCA in fisheries and aquaculture in the project areas.

Target: 22,594 people benefited from communication and awareness-raising activities (5% of the population lives in the pilot sites area. Total population of the 4 areas: 451,878 inhabitants. 50% women)

Outcome 3.1 will be achieved through 2 outputs as follows:

Output 3.1.1: Project communication strategy, designed and implemented.

A communication strategy will be devised in PY1, which will be implemented throughout the entire project. The main objective of the strategy is to give a simple message to coastal fisheries and aquaculture communities that will be affected by climate change events and require information to be prepared. The communication strategy will include a media management to support project activities, identify key messages, tools to disseminate information about climate change, and workshops to increase awareness of stakeholders.

The media management includes: i) preparation of press releases; ii) interviews with relevant actors who share concerns about climate change issues with a view from the academia, NGOs, fisheries and aquaculture organizations and institutions participating in the project; iii) compilation of studies and materials on climate change; iv) support the project spokespersons in the preparation of interviews with relevant information of the sector; v) writing opinion columns about key messages of the project; vi) specialized media as 'Revista Aqua', 'Mundo Acuicola', 'Vision Acuicola', 'Industrias Pesqueras', 'Revista Nuestro Mar' and regional newspapers to address the theme of the project; vii) dissemination of statements to the press database, in coordination with FAO, SUBPESCA and MMA Press teams; viii) coordination for the publication of official communications on FAO, SUBPESCA and MMA websites.

Dissemination tools include: i) monthly newsletter, ii) radio campaigns with themes of adaptation to climate change, iii) an application of information for smartphones, iv) an information campaign with news and articles on traditional media and those specialized in fisheries, aquaculture and climate change; v) poster with information on climate change, vi) a basic guide on climate change, and vii) a children's story book on adaptation to climate change for fisheries and aquaculture. These products will be available on the web platforms of project organizations. Also, there will be a Twitter account and a Facebook Fan Page to disseminate the progress of the project and related issues.

12 workshops to raise awareness among authorities and stakeholders will be held in each of the regions of intervention, four workshops at the beginning of the project, four workshops at the middle of the project and four workshops at the end of the project and also a closing workshop

at national level. Through these workshops it is expected to increase sensitivity in least 450 key players from the fisheries and aquaculture sector (at least 25% women). 24 workshops will be held in schools in the towns/cities where the pilot coves are located (two workshops per town/city a year), to present the children's book about climate change and increase sensitivity about the topic among the school population. Events with the press will also be held in each capital of the four regions to present the basic guide on climate change to the public.

Output 3.1.2: Mechanism to disseminate field adaptation measures, implemented

In PY3 there will be visits among fishers and aquaculture farmers of the pilot coves, and visits of fishers of other communities to the pilot coves as a way to promote the exchange of experiences and lessons learned about the adaptation measures and strategies already implemented, promote the exchange of local wisdom and contribute to replicate and scaling up project outcomes. Eight visits will be scheduled for 36 fishers and aquaculture farmers (at least 20% women) of the pilot coves and 160 fishers and aquaculture farmers from surrounding communities (at least 15% women).

Component 4: Project Management, Monitoring and Evaluation (M&E)

The objective of Component 4 is to perform monitoring and evaluation of the project progress, compliance with indicators, monitor risk mitigation measures and identify new measures to deal with unforeseen risks, and draw lessons learned (including successes and failures) resulting from the implementation of the project, which will be disseminated at the regional level and the rest of the world, and will serve for projects to be implemented in similar regions.

The additional SCCF funding of USD 155,450 will be allocated to M&E activities, including project progress monitoring, compliance with indicators, midterm and final external evaluations, project systematization and preparation of dissemination tools.

Co-financing for Component 4 will be provided by SUBPESCA (USD 34,830 in cash) and the MMA (USD 138,709: USD 43,042 in cash and USD 95,667 in kind), by supporting the dissemination of project information and achievements at national level, building national capacities and promoting the replication of successful adaptation measures. This will include technical staff time dedicated to the climate change topics.

Outcome 4.1: Project implemented, lessons learned and best practices documented and disseminated

Output 4.1.1: Project management, monitoring and evaluation system operating and providing systematic information on progress in reaching expected outcomes and targets

From PY1 until the end of the project, the Project Coordinator will prepare biannual Project Progress Reports (PPR). The PPRs will include the project results framework with relevant outcomes and output indicators, baseline and targets, risk matrix, monitoring of potential new risks and mitigation measures to reduce unforeseen risks. Once a year, the Project Coordinator will provide inputs to the Lead Technical Officer (LTO) and with this, the LTO-FAO will prepare the Annual Project Implementation Review (PIR). The PIR includes the project results framework with relevant outcomes and output indicators, baseline and targets, the risk matrix and will identify potential risks and mitigation measures to reduce unforeseen risks.

Output 4.1.2: Mid-term Evaluation and final evaluations, implementation and sustainability strategies adjusted to the recommendations.

After 21 months of the implementation of the project, a Mid-term Evaluation will be performed will be conducted by independent consultants (national and international) under the supervision of the Independent Evaluation Office (OED) of FAO, in consultation with the project team, including the FAO-GEF Coordination Unit, the LTO and other partners.

Three months before the end of the project implementation (month 39), a Final Independent Evaluation will be conducted by independent consultants (national and international) under the supervision of the Independent Evaluation Office (OED) of FAO, in consultation with the project team, including the FAO-GEF Coordination Unit, the LTO and other partners.

Output 4.1.3: Publication of best practices and lessons learned

Newsletters will be periodically prepared and disseminated to report project progress, outcomes and achievements, which will be socialized with institutional and community stakeholders (including decision-makers).

From PY2, annual workshops of best practices will be held in each pilot cove with the participation of representatives of the coves, the scientific and academic world and public services, FAO and other relevant stakeholders, to discuss lessons learned (12 in total). In addition, technical reports will be published annually containing best practices and lessons learned (3 in total) including successful cases and failures. The specific topics to be addressed in these publications will be defined during project implementation. All publications will be uploaded to the Websites of the project and the institutions that are executing partners, and printed copies (in a limited number) will be distributed to government representatives and local partners.

1.3.3 Stakeholder engagement

Table 1.6 below identifies the stakeholders and their roles in the implementation of the project. Table 1.7 identifies partner institutions that will participate in the implementation.

Table 1.6. Stakeholders and their role in the implementation of the project

Stakeholder	Role in the implementation of the project
Undersecretariat of Fisheries and Aquaculture (SUBPESCA)	Project Executing partner. Co-financer. Member of the Project Steering Committee. Responsible for the execution of baseline initiatives and guide the activities of the project, according to public and sectoral policies. Within this context, it will be the link between public organizations involved in the project for the realization of actions aimed at institutional strengthening. Member of the National Working Group (NWG). (Component 1). It will also coordinate the implementation of government initiatives promoting (directly or indirectly) adaptation to climate change (Component 2); and will be the main sponsor of dissemination and raising awareness programmes (Component 3), considered in the project.
Ministry of Environment (MMA) –	Co-executing partner of the project. Co-financer. Member of the Project Steering Committee. Co-responsible for the implementation of baseline initiatives and guide the activities of the project according to public

Stakeholder	Role in the implementation of the project
Undersecretariat of Environment	policies. Together with SUBPESCA will support the coordination process among public organizations involved in the project for the realization of actions aimed at institutional strengthening. Member of the National Working Group (Component 1). It will be the co-sponsor of dissemination and raising awareness programmes (Component 3), which will be developed under the National Adaptation Plan to Climate Change.
Fisheries Development Institute (IFOP)	Participation in the design of technical requirements of the information system (data and necessary information, climate change indicators and information system output) to respond to decision makers' needs (Component 1). In the long term, potential administrator of the information system and its relevant software platform.
Regional Directorates of Fisheries and Aquaculture	Member of the Regional Working Groups (RWG) and Local Working Groups (LWG), to coordinate and advise on climate change. Responsible for coordinating and supporting the implementation of project activities at regional / local level. It will be the link between regional / local public agencies involved in the project for the realization of actions aimed at strengthening local institutions (Component 1). It will coordinate and support field activities of the project (Component 2), particularly the design and implementation of proposed measures. It will also be the main coordinator of dissemination and raising awareness programmes carried out at regional / local level (Component 3).
Beneficiaries/ members of local artisanal fishers and small-scale aquaculture farmers' organizations in pilot coves: <ul style="list-style-type: none"> - Caleta Riquelme Corporation (Region of Tarapacá) - Trade Association of Tongoy (Region of Coquimbo) - Trade Association of Coliumo (Region of Bío Bío) - El Manzano Union – Hualaihue (Region of Los Lagos) 	Members of Local Working Groups (Community) to coordinate and advise on climate change to local authorities. They will be the main beneficiaries of capacity building actions for adaptation to climate change (Component 2), and in that context, they will: <ul style="list-style-type: none"> - Participate in workshops to improve the capacity of adaptation to the effects of climate change (fishing techniques, farming techniques, raw material processing, complementary activities, strengthening management capabilities, and others) - Form part of a participatory team responsible for designing local interventions in fisheries, aquaculture, addition of value and alternative/complementary activities - Participate in the implementation of local interventions, best practices and technologies, focusing on resilience for climate change adaptation - Implement a local monitoring system of the effects of climate variability and climate change - Participate in the exchange of experiences with organizations from neighboring fishers' organizations and the other pilot locations. - Develop and implement procedures for the dissemination of information about CC in fisheries and aquaculture among associates
Indigenous Peoples members of fisherfolk organizations and living outside direct project intervention areas	They are project direct and indirect beneficiaries. According to FAO Policy on Indigenous and Tribal Peoples ³⁶ and the Environmental and Social Management Guidelines ³⁷ , a Free, Prior and Informed Consent (FPIC) process should be conducted, and a Grievance Mechanism will be made available. The FPIC will be duly conducted in PY1 before starting operations in El-Manzano- Hualaihue site and nearby areas, where indigenous people will be indirect beneficiaries.

³⁶ <http://www.fao.org/docrep/013/i1857e/i1857e00.htm>

³⁷ <http://www.fao.org/3/a-i4413e.pdf>

Table 1.7. Project implementation partners

Stakeholders	Role in the project
Government organizations	Government organizations
National Fisheries and Aquaculture Service (SERNAPESCA)	Provide information for monitoring the exposure of the fisheries and aquaculture sector and know the vulnerability of local fishing communities. Member of the National Working Group (Component 1)
Dirección General del Territorio Marítimo y Marina Mercante (DIRECTEMAR) (potential)	Member of the Working Groups (WG) to coordinate and advise on CC in fisheries and aquaculture (to national, regional and local authorities), both at the National Working Group (NWG) level, DIRECTEMAR; and at the Regional Working Group (RWG) level, Harbour Master. Its role to facilitate the implementation and execution of adaptation measures in the pilot areas (Component 2), in particular, with regard to territorial planning, safety at sea and maritime operations.
Chilean Navy Hydrography and Oceanographic Service (SHOA)	Member of the National Working Group (NWG) to coordinate and advise on CC in fisheries and aquaculture. It will provide information on oceanographic indicators to support the monitoring of climate change effects and weather forecast, which should contribute to the development and application of models and taking decisions (Component 1)
Regional Governments/ Regional Councils (Tarapaca, Coquimbo, Bio Bio, Los Lagos) (potential)	Members of the Regional Working Group (RWG) to coordinate and advise on climate change. Their participation in the project is aimed at: <ul style="list-style-type: none"> - Ensure that project interventions are in line with regional development plans (Component 1) - Coordinate the relationship and exchange between project and other initiatives of the regional development plans (Component 2) - Support the dissemination and socialization process of climate change at regional level (Component 3)
Municipal Governments (Iquique, Coquimbo, Tome, Hualaihue)	Member of the Local Working Group (LWG), to coordinate and advise on climate change. Their participation in the project is aimed at: <ul style="list-style-type: none"> - Ensure that project interventions are in line with community development plans (Component 1) - Coordinate the relationship and exchange between the project and other initiatives of the municipal development plans (Component 2) - Support the process of dissemination and socialization of climate change at the local level (Component 3)
Academia	
Universities: <ul style="list-style-type: none"> - Pontificia University Catolica de Valparaiso - University de Concepcion - University Austral de Chile (potential) - University Catolica del Norte (potential) 	Members of the National Working Group (NWG) and Regional Working Group (GTR) to coordinate and advise on climate change. Depending on the subject, they may be involved in: <ul style="list-style-type: none"> - Design and/or development of training programs (Components 1 and 2) - Perform vulnerability assessments in the coves (Component 1) - Participate in the design and/or implementation of adaptation measures in pilot coves (Component 2) - Design and /or execute innovation initiatives and technological development (Component 2)

Stakeholders	Role in the project
<ul style="list-style-type: none"> - University de La Serena (potential) - University Arturo Prat (potential) 	
Research Centres	
<ul style="list-style-type: none"> - CIAM. Region of Tarapaca - Centre for Advanced Studies in Arid Zones (CEAZA). Region of Coquimbo (potential) - INPESCA. Region of Bio Bio - Salmon Technology Institute (INTESAL). Region of Los Lagos - INCAR, Concepcion (Interdisciplinary Centre for aquaculture research) (potential) 	<p>Members of Regional Working Groups (RWG) to coordinate and advise on climate change. It is expected an important participation as:</p> <ul style="list-style-type: none"> - Beneficiaries of awareness campaigns and training on climate change - Sharing of knowledge and experience in the behavior of environmental variables and the effects of CC, such as: <ul style="list-style-type: none"> ✓ Biological monitoring ✓ Oceanographic monitoring ✓ Environmental and health monitoring ✓ Information systems and indicators ✓ Integrated Forecast systems (atmospheric and oceanographic monitoring and modelling)
Private Sector	
<p>National organizations of artisanal fishers and small-scale aquiculture farmers</p> <ul style="list-style-type: none"> - Chilean Confederation of Artisanal Fishers (CONAPACH) - Chilean Confederation of Artisanal Fishing Federations (CONFEPACH) (potential) 	<p>Members of the National Working Group (NWG) and Regional Working Group (RWG) to coordinate and advise on climate change. Their participation is related to:</p> <ul style="list-style-type: none"> - Beneficiaries of awareness campaigns and training on climate change (Component 3) - Dissemination of information about CC in fisheries and aquaculture among associates (Component 3) - Participation in the design of adaptation measures (Component 2) - Participation in exchange visits to pilot coves to be trained in adaptation measures (Component 2) - Support to local organizations in the implementation of adaptation measures (Component 2)
<p>National organizations of industrial fisheries and aquaculture</p> <ul style="list-style-type: none"> - Fisheries Society of Chile (SONAPESCA) - Industrial Fishing Association (ASIPES), VIII Region (potential) - Salmon Industry Association A.G. (SALMONCHILE) 	<p>Members of the National Working Group (NWG) and Regional Working Group (RWG) to coordinate and advise on climate change.</p> <ul style="list-style-type: none"> - Beneficiaries of awareness campaigns and training on climate change (Component 1) - Supply information available in the organization related to variables indicating CC (Component 1) - Participation in the design of adaptation measures (Components 1 y 2) - Support the implementation of adaptation measures (Component 2) - Dissemination of information about the effects of CC in fisheries and aquaculture among associates (Component 3)

Stakeholders	Role in the project
<ul style="list-style-type: none"> - Union of manufacturers of Coho Salmon and trout Association (ACOTRUCH) (potential) - Asociación Gremial de Mitilicultores de Chile A.G. (AMICHILE) 	

1.3.4 Adaptation benefits

The direct beneficiaries of the project are artisanal fishers and small-scale aquaculture farmers of the 4 coves (including at least 20% of women) and members of their families, including indigenous peoples, who through adaptation to climate change will improve their livelihoods, their resilience to the adverse effects of climate change, food security, and through increased fishery production and/or greater value of fishery products, their family income. The project will provide these beneficiaries with technical assistance and training to improve their knowledge of the impacts of climate change and the vulnerability of the fisheries and aquaculture sector and hence, be encouraged to develop their adaptation capacities, incorporate local wisdom observed in artisanal fisheries and small-scale aquaculture, improve current methodologies and procedures, adopt alternative technologies, diversify productive activities and improve production management models, under ecosystem, resilience and sustainable development approaches.

The project will also benefit over 100 government officials, 60 national experts, and 240 decision-makers from national, regional and municipal level, who will increase their knowledge about the scope and effects of climate change on fisheries and aquaculture, to develop skills to identify, prioritize, implement, monitor and evaluate strategies and adaptation measures at the institutional level.

The indirect beneficiaries of the project will be the inhabitants of the towns/cities where the pilot coves are located and the citizens of the four regions intervened will benefited from information on vulnerability to climate change and adaptation efforts in the fisheries and aquaculture sector. The project will prepare and socialize informative and training material aimed at different audiences through printed media, radio and online media, which will reach men, women, youth and children.

The expected adaptation benefits at the local level include:

In the short and mid-term: i) Reduced vulnerability of fisherfolks' livelihoods as a result of capacity development and strengthening (e.g. production diversification and risk management training, best practices and management areas); ii) Increased sustainability of fisheries and stability of income of small-scale fisherfolks and aquaculturists as a result of new resources and/or technologies for fishing and aquaculture activities, complementary activities and value added, and improved management and administration operations under an ecosystem-based approach; iii) Increased sustainability of aquaculture and its options as a production system

more resilient to climate change; iv) Improved production conditions for small-scale fisherfolks and aquaculturists through information and local monitoring; v) Increased availability of information on the adverse effects of climate change on fisheries and aquaculture for decision-making and adoption of a climate change adaptation approach in the sector; vi) More effective coordination between public and private institutions, and small-scale fisherfolks and aquaculturists and stakeholder participation in climate change adaptation activities; vii) Increased number of people trained to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures (100 government officials, 60 national experts, and 240 decision-makers from national, regional and municipal level); viii) Increased capacities of regional, national and sub-national institutions to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures (i.e. SUBPESCA reaches a score equivalent to 6, as per the SCCF tracking tools); ix) 709,3 linear kilometres of coastline better managed to address the effects of climate change; x) 4.550 people (25% women) benefiting from the adoption of diversified, climate-resilient livelihood options; xi) 22,594 people benefited from communication and awareness-raising activities for CCA in fisheries and aquaculture in the project areas (5% of the population lives in the pilot sites area. Total population of the 4 areas: 451,878 inhabitants. 50% women).

In the long term: i) Increase resilience to climate change impacts, to maintain or improve livelihoods, productive means and other income sources; ii) Better use of the information for climate change adaptation and disaster risk management; iii) Increase knowledge and understand the type of exposure, sensitivity and adaptive capacity of fishing and aquaculture communities and investments to address climate change; iv) Reduce the exposure to natural disasters and associated losses; v) Sustainability of livelihoods and socioeconomic benefits of fishers and aquaculture farmers, ensured by investments in climate change adaptation through innovations of fishing methods, fishing gear, aquaculture designs, product diversification and alternative livelihoods; vi) Appropriate integration of climate change in the institutional frameworks and sectoral and cross-sectoral policies for fisheries and aquaculture at the national and regional levels through capacity building and institutional strengthening of fisheries administrations, associations of fishers and aquaculture farmers associations and knowledge networking; vii) Strengthen national and regional institutions through capacity building in risk management, adaptation measures, practice and technologies in the aquaculture and fisheries sector.

1.4 LESSONS LEARNED

Several lessons will be taken into account, especially within the framework of the project components, and particularly Component 2 for the design and implementation of interventions (see details in Section 1.3).

While preparing the National Adaptation Plan to Climate Change and the Plan for Adaptation to Climate Change for Fisheries and Aquaculture, it was possible to identify that climate change has a low priority among the stakeholders which results in a low participation in dialogue forums. This reassures the need to raise awareness on the subject. Sharing experiences from a regional perspective is the key to greater involvement and therefore training on the subject.

There are several initiatives, projects and programmes dealing with sustainable management of fisheries and aquaculture; investment, innovation and training; environmental behaviour and variability, supported by different public funds, that provide some lessons learned that should be addressed, namely:

- 1) Consider early warning systems and appropriate technology to be used in response to catastrophic events, primarily natural disasters and climate change events (earthquakes, tsunamis, tidal waves) that are increasingly frequent, and affect significantly the port infrastructure, fishing and aquaculture materials and structures (e.g., culture lines) and equipment in general (boats and motors).
- 2) Establish regional applied research alliances to use the existing scientific and technological capacities in each region and at a national and international level, among public and private institutions, universities, technical institutions and NGOs.
- 3) There is practical experience of artisanal fishers and small-scale aquaculture farmers in creating and strengthening first and second level organizations (unions and federations, trade associations) as well as their participation in organizations at the national level (e.g., CONAPACH, CONFEPACH, AMICHILE) that should be used. This situation puts communities in a good position to incorporate climate change training and adaptation activities to their short and mid-term planning
- 4) There is practical experience of artisanal fisheries and small-scale aquaculture farmers' organizations, in planning and diversification (e.g., coastline micro-zoning, MEABRs, repopulation, farming) that should be used to develop programmes for technological upgrade, operational efficiency and productive scaling up.
- 5) There is a great opportunity to transfer experience in fisheries and aquaculture management between selected regions, not only about pelagic species, but also molluscs and seaweed of national and international economic significance that should be considered in the identification and design of productive diversification strategies.

1.5 STRATEGIC ALIGNMENT

1.5.1 Coherence with national development policies and objectives

The project is consistent with the current policy framework of the Republic of Chile and policies in development regarding sustainable development of the fisheries and aquaculture sector and adaptation to climate change (see section 1.1.1 legal framework and policies).

The project is in line with the provisions of the General Law on Fisheries and Aquaculture and will contribute to its implementation by adopting the ecosystem approach to fisheries and aquaculture, as established by law, as part of its intervention strategy to increase the resilience of aquatic resources ecosystems, fisheries and aquaculture production systems and the communities that depend on aquatic resources.

The project is aligned with the principles of the National Adaptation Plan to Climate Change, in particular: 1) Prioritization of adaptation measures that consider most vulnerable people, places and infrastructure; 2) Use of available scientific knowledge and increase knowledge of climate change effects; 3) Create alliances among all sectors and territorial administrative

levels; 4) Promote citizen's participation in climate change adaptation and dissemination of information to the society; and 5) Simplicity and cost effectiveness in the design and implementation of adaptation measures.

The project is also aligned with the Plan for Adaptation to Climate Change for Fisheries and Aquaculture, and in particular with its specific objectives: i) Implement the precautionary and ecosystem approach to fisheries and aquaculture as a way to improve the resilience of marine ecosystems and coastal communities, which make use of living aquatic resources and the sector in general; ii) Do research to improve knowledge of climate change impact on the conditions and ecosystem services that support fishing and aquaculture activities; iii) Disseminate and provide information about the impacts of climate change in order to educate and train users and stakeholders of the fisheries and aquaculture sector; iv) Improve the regulatory, political and administrative framework to effectively and efficiently address the challenges and opportunities of climate change; and v) Develop direct adaptation measures aimed at reducing vulnerability and the impact of climate change on fisheries and aquaculture activities.

The project is in line with several of the basic principles of the National Aquaculture Policy: 1) Public-private participation, partnership and co-responsibility in the strategic planning of the sector; 2) Improving access to the activity under conditions that favour equal opportunities for all stakeholders, including those related to gender equality; 3) Strengthening and/or creation of formal instances of participation; 4) Cooperation in scientific research and technological innovation among public institutions, private sector and research and teaching institutions.

1.5.2 Coherence with national communications to the United Nations Framework Convention on Climate Change (UNFCCC)

Chile is a party to the UNFCCC, and is a country vulnerable to climate change and this project is consistent with the Second National Communication submitted to UNFCCC in 2011. The Third National Communication is being drafted. Currently, there is sufficient information to consider fisheries and aquaculture as vulnerable to the adverse effects of climate change, especially considering that these activities are important as livelihoods and sources of protein. Also, the processes of design and implementation of strategies, plans, programmes and measures to adapt the sector to the adverse effects of climate change are a challenge that can only be achieved in the medium and long term, considering the distribution and characteristics of these activities along the Chilean coast.

The project is also aligned with the objective of the National Action Plan on Climate Change 2008-2012, updated and revalidated for the period 2016-2021, which is to minimize the adverse impacts of climate change, through integrated actions to determine the vulnerability of the country and adaptation measures to adequately address them, while contributing to the mitigation of greenhouse gases, including the Fisheries and Aquaculture sector and the categories of actions included in the plan: i) adaptation to the impacts of climate change ; and ii) capacity building and extension.

1.5.3 Alignment with SCCF strategy

The objective of the project is to strengthen the capacity of the fisheries and aquaculture sector of Chile to adapt to the adverse effects of climate change through two main lines of action. On the one hand, to strengthen public and private capacities for adaptation to climate change at national, regional and local levels, and on the other hand, strengthen the capacity of adaptation

of artisanal fisheries and small-scale aquaculture farmers at the local level through pilot projects of adaptation to climate change and innovative technologies and systems, and productive and livelihoods diversification. Therefore, it is consistent with the criteria of the SCCF.

The project is aligned with the following objectives of the SCCF Adaptation programme:

- CCA-1: *Reduce the vulnerability of people, livelihoods, physical assets and natural systems to adverse effects of climate change;*
- CCA-2: *Strengthen institutional and technical capacities for effective climate change adaptation.*

Component 1 is aligned with the CCA-2 Objective, particularly with Outcome 2.3 (*Institutional and technical capacities and human skills strengthened to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures*). Component 1 will address indicators # 9 and # 10 of the SCCF Tracking Tool (see Appendix 1 of this Project Document).

Component 2 is aligned with the CCA-1 Objective, Outcome 1.1 (*Vulnerability of physical assets and natural systems reduced*), Outcome 1.2 (*Livelihoods and sources of income of vulnerable populations diversified and strengthened*), and Outcome 1.3 (*Climate-resilient technologies and practices adopted and scaled up*). Component 2 will address indicators #2 and #3 of the SCCF Tracking Tool (see Appendix 1 of this Project Document).

Component 3 is aligned with CCA-2, Outcome 2.1 (*Increased awareness of climate change impacts, vulnerability and adaptation*). Component 3 will address indicator #5 of the SCCF Tracking Tool (see Appendix 1).

1.5.4 Consistency with FAO's Strategic Framework and Objectives

This project is aligned with the FAO's Strategic Outcomes Framework (2014-2019), particularly with Strategic Objective 2 (SO2): *Increase sustainable supply of goods and services of agriculture, livestock, forestry and fishing*, Outcome 1 (OO1): Producers and natural resources managers adopt practices that increase and improve the supply of goods and services from the agricultural sector, forestry and fisheries activities in a sustainable manner; and Strategic Objective 5 (SO5): *Increase the resilience of livelihoods to threats and crises*, Outcome 3 (OO3): Countries implement impact prevention and mitigation measures that reduce risks for agriculture, food and nutrition .

Similarly, the project is consistent with FAO's Regional Priorities for Latin America and the Caribbean³⁸, aligning itself with the priority area *Climate change and environmental sustainability*: [assist governments to] *strengthen national programs for sustainable management of natural resources, reducing agro-climatic risks, mitigation of emissions and adaptation of the agricultural sector to climate change, in the new context of low carbon development*.

³⁸ See *Areas of Priority Actions for Latin America and the Caribbean for the Following Biennium (2014–2015)*, taking into account the summary of recommendations of regional technical commissions, 32nd FAO Regional Conference for Latin America and the Caribbean. Buenos Aires, Argentina, 2012.
Source: <http://www.fao.org/docrep/meeting/024/md240e.pdf>

Finally, the project is aligned with the National Priority Framework for FAO's Technical Assistance in Chile 2015-2018 and, in particular, the working area *Governance of Natural Resources and Forestry, farming and cattle and fisheries Systems under Climate Change Scenarios*, and its themes: i) promote participatory and inclusive territorial strategies, for the development of family farming and artisanal fisheries; and ii) institutional strengthening for sustainable management of natural resources in climate change scenarios.

SECTION 2 – FEASIBILITY

2.1 ENVIRONMENTAL AND SOCIAL STANDARDS

Following *FAO's Environmental and Social Management Guidelines*³⁹, the proposed project is classified within the Category Moderate. The Environmental and Social Screening Checklist⁴⁰ is attached as Appendix 9.

2.2 RISK MANAGEMENT

Project risks were identified and analysed during the preparation of the same and mitigation measures have been incorporated into the design of the project (see Risk Matrix in Appendix 4). With the support and supervision of FAO, the Project Steering Committee (PSC) will be responsible for managing these risks as well as the effective implementation of mitigation measures. The Monitoring and Evaluation system (M&E) will be used to monitor indicators of outcomes and outputs, project risks and mitigation measures. The PSC shall also be responsible for monitoring the effectiveness of mitigation measures and adjust mitigation strategies as needed, and to identify and manage any new risk that was not been identified during the preparation of the Project, in collaboration with the project partners.

The six-monthly Project Progress Report (PPR) (see subsection 3.5.3) is the main monitoring and risk management instrument. The PPR includes a section of systematic risk monitoring and mitigation actions that were identified in the previous PPR. The PPR also includes a section to identify any new risks or risks that have not been addressed yet, rating and mitigation actions, as well as the staff responsible for monitoring such actions and estimated duration of the same. FAO will monitor the project risk management and the follow up as needed, providing support for adjusting and implementing mitigation strategies. The preparation of reports on risks monitoring and rating will also be part of the Annual Project Implementation Review (PIR) prepared by FAO and submitted to the GEF Secretariat (see Section 3.5.3)

2.2.1 Risks and mitigation measures

Table of Appendix 4 summarizes the risks identified and analysed during the project preparation, likelihood and mitigation measures.

2.2.2 Fiduciary risks and mitigation measures (only for OPIM projects)

As per request of the Government⁴¹, the SCCF resources will be executed by FAO pursuant to its systems, standards, rules and regulations.

³⁹ <http://www.fao.org/environmental-social-standards/es/>

⁴⁰ Classification under Category LOW is certified by the LTO who completed the Environmental and Social Screening Checklist included in Appendix 9.

⁴¹ Official note No 160681 from February 26th, 2016, Appendix 11.

SECTION 3 – IMPLEMENTATION AND MANAGEMENT ARRANGEMENTS

3.1 INSTITUTIONAL ARRANGEMENTS

In addition to FAO as GEF agency, the project will be executed under the responsibility of Fisheries and Agriculture Undersecretary (SUBESCA), the Ministry of Environment of Chile (MMA), National Fisheries and Aquaculture Service (SERNAPESCA) and the Fisheries Development Institute (IFOP). The SUBPESCA and the MMA are the projects executing partners and will be responsible for ensuring coordination of the three components of the project, and coordination and collaboration with other partners, local communities and other entities.

FAO and the executing partners will work with executing agencies of other programmes and projects in order to identify opportunities and mechanisms to facilitate synergies with other relevant projects supported by the GEF, as well as projects supported by other donors. This collaboration will be made through: (i) informal communications between GEF agencies and executing partners of other programmes and projects; (ii) exchange of information and materials of other projects.

The project will develop collaboration mechanisms with the following GEF initiatives:

The project will develop collaboration mechanisms with the following GEF initiatives:

1. Project GEF/PNUD #2772: “Creation of an integrated national system of Protected Areas for Chile: financial and operational structure”, which aims to create a single comprehensive model of governance and financing for terrestrial Protected Areas, public and private. It was meant to develop actions in three areas: i) legal, to create a legal framework and institutions responsible for the system; ii) economic and financial services, which ensure the sustainability of the system, institutions and private protected areas; y iii) capacity building in existing institutions (public and private) for planning and management of protected areas. Although this project does not address specifically climate change, the collected experiences, particularly in the area of institutional strengthening and upscaling, may constitute important inputs for the adaptation project. Considering that it is already finished and on its final evaluation stage, this project will coordinate with the Department of Protected Areas of the Natural Resources Division in the Ministry of the Environment to promote that fisheries and aquaculture good practices for CC adaptations can be replicated in the buffer zones of marine protected areas. This replication will be in line with the sustainability of protected areas action strategy (one of the main outputs of project 2772), which promotes protected areas management to contribute to adaptation to climate change within and around the protected areas.
2. Project GEF/PNUD #3749: “Towards Ecosystem Management of the Humboldt Current Large Marine Ecosystem (GEMCH)” a bi-national project whose goal was to implement an ecosystem approach to manage the GEMCH, through a coordinated framework that strengthens governance and the sustainable use of living marine resources and ecosystem services. To this end, it develops actions to i) obtain instruments for planning and policy for ecosystem-based management; (ii) strengthen institutional capacities to implement a strategic plan and upscale the results of pilot interventions; (iii) create conditions to upscale

pilot projects and national priority interventions for the management of the GEMCH; and (iv) implement pilot management for conservation and ecosystem elasticity. The binational Project is in its final evaluation stage. During its execution, the institutions that were technical focal points were IMARPE in Peru and IFOP in Chile, one of the main partners of the this project. The results obtained during the execution of the Humboldt project, regarding pelagic fisheries (anchovy and Spanish sardine), will be used by the Adaptation to Climate Change Fisheries Project, in order to analyse behaviour of this resource, for activities that can be implemented in Riquelme cove. The adaptation project will exchange experiences and lessons with this project to boost capacity-building in the field of ecosystem approach, as well as in relation to the upscaling of measures implemented under the criteria of ecosystem and sustainable development and resilience approach.

3.2 IMPLEMENTATIONS ARRANGEMENTS

As indicated, the UN Food and Agriculture Organization (FAO) is the GEF agency responsible for monitoring and providing technical backstopping during project implementation. Also, at the request of the MMA (see section 2.2.2), FAO will be responsible for the financial and operational implementation of the project, besides its role as Implementing Agency. This implies that FAO will provide procurement and contract services following FAO rules and procedures, while providing financial services to manage SCCF resources.

For strategic decisions a **Project Steering Committee (PSC)** will be established, which will consist of representatives of SUBPESCA, MMA and the Representation of FAO in Chile. Its main function is to guide the implementation of the project, check and approve the annual work plans, approve the financial and technical reports, and provide strategic guidance to the driving general project (section 3.2.3 describes features of the PSC).

SUBPESCA, in coordination with the MMA, will designate a **National Project Director (NPD)**, who will be responsible for supervising and providing orientation regarding the policy and priorities the project supports. The NPD will also be responsible of coordinating activities with all the stakeholders in the project components. S/He will be responsible of timely requesting disbursement of SCCF funds for project execution, strictly based on the approved project's Annual Work Plan and Budget AWP/B.

Daily project management and relations with stakeholders as well as administrative, monitoring and accounting tasks are carried out by the **National Project Coordination Unit (NPCU)**, where the **Project Team (PT)** funded by SCCF funds will be located. The PT main tasks, following the guidelines of the Steering Committee (see 3.2.3 below) are to ensure the project's coordination and execution, through the effective implementation of the annual work plans. The PT will include the National Project Coordinator, four Zonal Technicians (one per pilot cove) and an Administrative Assistant (full time), and a Communications Expert and M&E Expert (part time).

The **National Project Coordinator (NPC)** will be in charge of daily management of the project and technical supervision, including: (i) coordinate and closely monitor the implementation of the project activities, (ii) day to day management, (iii) coordination with other related initiatives, (iv) ensuring high level of collaboration among institutions and participating organizations at national and local levels, (v) project progress supervision and ensuring timely delivery of inputs and deliverables; (vi) implementation of the project's monitoring and communications plan, (vii) organization of annual meetings and project workshops to monitor

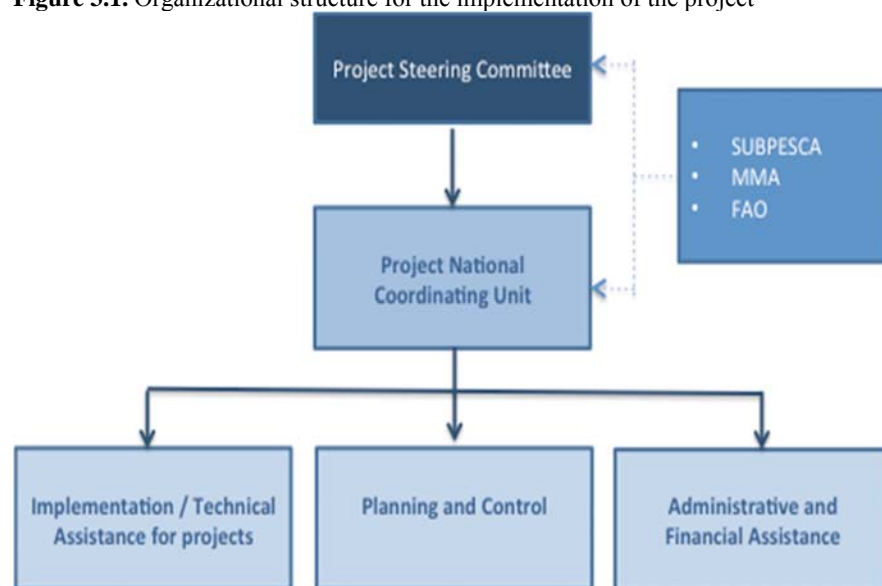
the project's progress and prepare budgets and annual work plans (AWP/B), vii) presentations of Project Progress Reports along with the AWPB to the Steering Committee (PSC) and FAO; (viii) will act as the PSC secretariat; ix) prepare the annual Project Implementation Review, and x) support the Organization of the mid-term review and final evaluation.

Also, under FAO rules and procedures and in accordance with the present project document t and the project's AWP/B, the NPC will identify costs and disbursements that should be requested to FAO for the timely implementation of the project. The NPC will supervise, provide technical support and evaluate the reports and deliverables of all project's national consultants (financed by SCCF).

The **National Operations Officer** will be responsible for the day-to-day financial and operation management of the project, including contracts and procurement according to the approved budget and annual work plans. S/He will work in close consultation with the NPD, NPC, the Budget Holder (BH see below), the Lead Technical Officer (LTO, see below) and the projects executing partners, particularly with the representation of FAO in Chile and will be operationally responsible for timely delivery of inputs required to produce results.

Draft terms of reference (TOR) of the project Coordinator and project team are found in Appendix 6. Figure 3.1 presents the organizational structure for the implementation of the project.

Figure 3.1. Organizational structure for the implementation of the project



3.2.2 FAO's Functions and responsibilities

Role of FAO in the governance structure of the Project

FAO will be the Implementing as well as financing and operating Agency for the project. As GEF implementing agency, FAO will provide supervision and technical guidance during the project execution. Administration of the GEF grant will be in compliance with the rules and procedures of FAO, and in accordance with the agreement between FAO and the GEF Trustee.

As the GEF agency for the project, FAO will:

- Manage GEF funds in accordance with rules and procedures of FAO;
- Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financers and the rules and procedures of FAO;
- Provide technical guidance to ensure that appropriate technical quality is applied to project activities, accordingly;
- Perform at least one annual supervision mission;
- Report to the GEF Secretariat and Evaluation Office, through the Implementation Report, on project progress and provide financial reports to the GEF Trustee.

As per request of the Chilean government (see section 2.2.2), FAO shall be the financial and operational executing agency of SCCF resources, including financial management, goods procurement and hiring of services following FAO rules and procedures. As financial executing institution, FAO shall submit a biannual report to the Steering Committee (SC), including a project expenditures statement.

In accordance with this project document and the AWP/B approved by the Steering Committee, FAO shall make budget revisions to keep the budget up to date in FAO financial system and shall provide this information to the Steering Committee to ease planning and implementation of project activities. In collaboration with the NPCU and the Steering Committee, FAO will participate and participate in planning, procurement and hiring processes. It will also process payments for goods, services and products requested by the PC on the basis of the AWP/B and procurement plans approved annually by the Steering Committee.

Roles of FAO in the internal organization

Roles and responsibilities of FAO staff are regulated by FAO Guide to the Project Cycle⁴², and its updates.

The FAO Representative in Chile will be Budget Holder (BH) and responsible for the management of SCCF resources. As a first step at the project inception, the FAO Representation in Chile will establish an interdisciplinary Project Task Force (PTF) within FAO to guide the implementation of the project.

The PTF is a consultative and management body that integrates the necessary technical qualifications of relevant FAO units to support the project. The PTF is composed of a Budget Holder, a Lead Technical Officer (LTO), the Funding Liaison Officer (FLO) and one or more Technical Officers based at FAO Headquarters (HQ Officer⁴³).

In coordination with the Lead Technical Officer, the FAO Representative in Chile will be responsible for timely operational, administrative and financial management of the SCCF resources, including: (1) procurement of goods and hiring services for project activities, in accordance with the rules and procedures of FAO, in accordance with the approved AWP/B; (2) process payments for goods, services and products in consultation with the Project Steering Committee; (3) submit biannual financial reports to the Steering Committee on project expenditures status; (4) at least once a year, or more often if required, prepare budget revisions put to the consideration of the FAO-GEF Coordination Unit, through the Field Programme Management Information System (FPMIS).

⁴² FAO Guide to the Project Cycle, Quality for Results, 2015, Appendix 4: Roles and Responsibilities of the Project Task Force Members

⁴³ HQ Officer in FAO Guide to the Project Cycle, Quality for Results, 2015.

The FAO Representative in Chile, in agreement with the PTF, shall give its no-objection to the AWP/B submitted by the NPCU and the Project Progress Reports (PPR). The PPR may receive comments from the PTF and shall be approved by the LTO before the BH uploads them into the FPMIS.

The GEF Project Task Manager (PTM), will work under direct supervision of the FAO Representative in Chile and will support the supervision of project management and progress, FAO's participation in procurement and hiring processes and providing technical advice to the project, in close consultation with the Project Task Force. The PTM will be paid with GEF fee resources and will be in charge of the following:

- Review and make comments to the Project Progress Report prepared by the NPCU and submit it to the BH and the LTO for approval and then to the FAO-GEF Coordination Unit in the Investment Centre Division (TCI) for clearance and uploading to the FPMIS.
- Participate in annual project progress review and planning workshops, provide comments, and advise the FAO Representative on the AWP/B approval, in consultation with the LTO and the FAO-GEF Coordination Unit.
- Review contracts and procurement documentation for those contracts and procurement to be financed by GEF resources, and advise the FAO Representative on approval, in consultation with the LTO and FAO-GEF Coordination Unit.
- Review co-financing reports submitted annually (June) by the NPCU.
- Review biannual financial reports prepared by the FAO Office in Chile, prior sending them to the NPCU to prepare the PPR.
- Conduct periodic supervision missions and support the provision of FAO technical and outcome-based management input to the project.
- Support the LTO in preparing the annual Project Implementation Review (PIR).
- Participate in the project Directors Meeting upon request of the FAO Representative.
- Participate in staff interview and selection panels for key positions, to be financed by SCCF resources. The panels will be composed of the project Steering Committee.
- Prepare draft TOR for mid-term and final evaluations in consultation with the FAO Evaluation Office, the LTO, the FAO-GEF Coordination Unit, the project executing partners, support the organization of the evaluations, contribute to the development of an eventual agreed adjustment plan in project execution approach and supervise its implementation.

The Lead Technical Officer (LTO) for the project will be the Fisheries Officer of the FAO Regional Office for Latin America and the Caribbean (RLC FAO). The role of the LTO is essential to ensure the comparative advantage of FAO in terms of projects implementation. The LTO shall oversee and provide technical support during project implementation. The LTO shall support the BH in the implementation and monitoring of the AWP/B, including work plan and budget revisions. The LTO is responsible for providing or obtaining technical approval of inputs and technical services hired by the Organization

In addition, the Lead Technical Officer (LTO) will provide technical backstopping to the project team to ensure the delivery of quality technical outcomes. The LTO will coordinate the provision of appropriate technical support from FAO units that make up the Project Task Force, to respond to requests from the Project Steering Committee. The LTO shall be responsible for:

- Review and giving no-objections to the terms of reference of consultancies and contracts as well as the *curriculum vitae* and technical proposals preselected by the NPCU for key positions, minor works and services financed by SCCF resources.
- Supported by the FAO Representative in Chile, review and ensure clearance of final technical outputs delivered by consultants and other contract holders financed by SCCF resources, before proceeding with the final payment.
- At the request of the Technical Committee, collaborate with the revision and technical observations of project's output and draft reports.
- Review and approve project progress reports submitted by the NPC in coordination with the BH.
- Support the FAO Representative in reviewing and authorizing the AWP/B submitted by the NPC for approval by the Steering Committee.
- Oversee the technical quality of the Project Progress Reports (PPR). The PPR will be prepared by the NPC with inputs from the project team. The BH will submit the PPR to the FAO-GEF Coordination Unit for comments and to the LTO for technical approval. The PPR will be submitted to the PSC for clearance twice a year. The BH will upload cleared PPR to the FPMIS.
- Supervise the technical quality of the PIR annually. The PIR will be drawn up by the CNP with inputs from the EP. The PIR will be submitted to the BH and to the FAO-GEF Coordination Unit for clearance and finalization. The FAO-GEF Coordination Unit will submit the PIR to the GEF Secretariat and the GEF Evaluation Office as part of the annual follow-up report of the FAO-GEF portfolio evaluation. The LTO shall ensure that the PC and PT have provided information on co-financing received throughout the year to be included in the PIR.
- Carry out annual project supervision missions (or as needed).
- Review TOR for the mid-term evaluation; participate in the evaluation mission, including the mid-term workshop with all key project stakeholders; develop an eventual agreed adjustment plan in project execution approach and supervise its implementation.
- Review TOR for the final evaluation; participate in the evaluation mission including the final workshop with all key stakeholders; development and follow-up on recommendations on how to ensure sustainability of project outputs and outcomes after the end of the project..

The HQ Technical Officer is a member of the PTF, as a mandatory requirement of the FAO Guide to the Project Cycle. The HQ Technical Officer has relevant technical knowledge – within FAO technical departments – in line with project thematic. The HQ Technical Officer will advise the LTO to ensure compliance with FAO corporate technical standards during project execution, namely:

- Supports the LTO in monitoring and reporting on the implementation of socio-environmental plans into moderate-risk projects. In this project, the HQ Officer will support the LTO in monitoring and reporting on the risks identified and mitigation measures (Appendix 4), in close coordination with the project partners.
- Provides technical support to project work plan.
- Approves technical reports and supervise the quality of Project Progress Reports (PPR – see subsection 3.5).
- Supports the LTO and PTF in project implementation and monitoring, if required.

- Supports the LTO and BH in the development of the first draft TOR of the team in charge of the final evaluation. Reviews the composition of the evaluation team and supports the evaluation activity.

The FAO-GEF Coordination Unit acts as Funding Liaison Officer. The FAO-GEF Coordination Unit will review the Project Progress Reports and financial reports and clear budget revisions based on the AWP/B. This unit will review and provide a rating in the annual PIR and carry out supervision missions, as necessary. The PIR will be included in the annual follow-up report of the FAO-GEF portfolio evaluation that the Unit will send to the GEF. The Unit may also participate in mid-term and final evaluations and the development of corrective actions in the project implementation strategy to mitigate eventual risks that may affect the timely and effective implementation of the project. The Unit, in collaboration with the FAO Finance Division, request transfer of project funds from the GEF Trustee, based on semi-annual projections of need for funds.

The FAO Finance Division will provide annual Financial Reports to the GEF Trustee and, in collaboration with the FAO-GEF Coordination Unit, will request project funds on a six-monthly basis to the GEF Trustee.

3.2.3 Decision making mechanism of the project

The Project's Steering Committee (PSC): It brings together the FAO officials and representatives of SUBPESCA and MMA.

The PSC is a collegiate consultative body and its main functions are: i) monitor and support to the NPCU for the correct implementation of the project's components; ii) coordinate and manage institutional in-kind and/or cash contribution agreed by each institution participating in the project, as well as other sources of financing that might have same objectives as the project, iii) review and agree on the project's strategy and methodology presented by the NPCU, as well as changes and modifications generated by its application in field; iv) convene and organize meetings with different stakeholders in national, regional and community levels of the project; v) promote the establishment of agreements and other forms of collaborations with national and international organizations.

Responsibilities: Approve annual work plans, budgets and progress reports prepared by FAO with the assistance of the NPCU. All PSC decisions must be taken under consensus. The PCS shall meet in ordinary session every six months; However, if members consider it necessary, the PSC may convene extraordinary meetings. One of these meetings of the PSC must be carried before 10 December of each year, where the PSC must approve the annual work plan and budget of the project, for the following period.

3.3 PLANNING AND FINANCIAL MANAGEMENT

The total cost of the project is **USD18,237,794** of which **USD2,500,000** will be financed by a SCCF grant and **USD15,737,794** will be co-financed by MMA, SUBPESCA and FAO. FAO, as GEF agency, will be responsible only for the execution of SCCF resources and FAO co-financing.

3.3.1 Financial plan (by component, output and co-financier)

Table 4.2 shows the cost by component, output and co-financier. Table 4.3 shows sources and types of confirmed co-financing. FAO, as GEF implementing agency, shall only be responsible for the execution of the SCCF resources and FAO co-financing.

Table 4.2 Financial plan (by component, output and co-financier).

Component	SUBPESCA	MMA	FAO	SCCF	Total	%
Component 1: Strengthening public and private institutional capacities for effective climate change adaptation.	9,620,682	132,310	101,361	481,329	10,335,682	57%
Component 2: Improving the capacity of adaptation to climate change in local fisheries and aquaculture.	4,825,459	0	0	1,525,659	6,351,118	35%
Component 3: Strengthening knowledge and awareness on climate change in fisheries and aquaculture communities.	69,659	494,746	0	218,514	782,919	4%
Component 4: Project Management, Monitoring and Evaluation (M&E).	34,830	138,709	0	155,450	328,989	2%
Project Management	239,382	80,656	0	119,048	439,086	2%
Project total	14,790,011	846,421	101,361	2,500,000	18,237,794	100%

Table 4.3 Confirmed sources of co-financing

Co-financing source	Name of Co-financier	Type of co-financing	Amount (\$)
National Government	Undersecretariat of Fisheries and Aquaculture (SUBPESCA)	Cash	570.464
	Undersecretariat of Fisheries and Aquaculture (SUBPESCA)	In-kind	14.219.548
National Government	Ministry of Environment (MMA)	Cash	513.976
	Ministry of Environment (MMA)	In-kind	332.445

GEF Agency	FAO	Cash	101,361
Total Co-financing			15,737,794

3.3.2 SCCF contribution

The contributions of the SCCF will be distributed in the four components, and will focus on: i) hiring full-time and part-time consultants that will work in the project management unit; ii) raising awareness at national, regional and local authorities on climate change and its effects on fisheries and aquaculture; iii) training national experts and public servants to update and increase their knowledge in the field of climate change and fisheries and aquaculture; iv) training local monitors, fishermen and fish farmers in climate change, management of environmental information, ecosystem approach and risk maps; v) technical assistance and investments in pilot coves for productive diversification with focus on adaptation to climate change, increased management capacity and livelihood improvement, and vi) activities related to project monitoring and evaluation.

3.3.3 Government contributions

SUBPESCA contributions

SUBPESCA will provide cash and in-kind contributions. Cash contributions are funds specifically assigned to climate change (research studies, specific actions to improve adaptation, information workshops and dissemination of results related to climate change). In-kind contributions are funds to generate the baseline for climate change (studies on environmental variables and the status of stocks and the fisheries and aquaculture situation). In component 1, co-financing will aim at generating knowledge that allows improvement in fisheries management and aquaculture, considering the ecosystem approach under different climate change scenarios. Co-financing will cover studies, workshops and dissemination of information to strengthen the participating institutions, in particular those that will be part of in the climate change interagency working groups. In component 2 co-financing will contribute with studies, technical assistance, monitoring and land management workshops, support to the MEABR vulnerability analysis of coastal communities and support to productive diversification of the artisanal fisheries sector and small scale aquaculture. In component 3, cofinancing will support knowledge and information dissemination on the impacts of climate change on fisheries and aquaculture. Component 4 supports partial and final results dissemination and projects deliverables, in order to build capacity and promote upscaling of successful practices implemented through the project.

MMA contributions

The MMA will provide cash and in-kind contributions. Cash contributions finance actions within ongoing vulnerability and adaptation projects, as well as activities of the NAPCC. In-kind contributions include staff at MMA main office (Climate Change Unit at the MMA), staff from SEREMI of the Tarapacá, Coquimbo, Bío-Bío and Los Lagos regions; and Climate Change focal points of those regions.

3.3.4 FAO contributions

In support to component 1, FAO's contributions in cash responds to the revision of the instruments and international and regional agreements applicable to Fisheries Act, including the principles associated to the ecosystem approaches in fisheries and aquaculture and the

precautionary approach to fisheries and international best practices including climate change adaptation.

Once the tool has been designed, meetings with sectoral, national and regional authorities and other sectoral stakeholders (in focus groups) will be organized to obtain their perception and comments on the gaps and voids of the General Law of fisheries and aquaculture. Later on there will be a gap analysis of the General Law of fisheries and aquaculture in relation to the instruments and international agreements in the field of sustainable management of fisheries resources, and recommendations will be made that allow deletion, shorten or closing of those gaps in the law with regard to instruments, agreements and international guidelines for sustainability and governance of the fisheries sector.

After consultation with the Government and the adequacy of the preliminary recommendations, if any, a public consultation of the preliminary recommendations will be carried out in order to strengthen them and confirm that they are useful and they can be implemented.

3.3.5 Other co-financiers contributions

N/A

3.3.6 Financial management of and reporting on SCCF resources

Financial management and reporting on SCCF resources will be made according to FAO rules and procedures and in accordance with the agreement between FAO and the GEF Trustee. In accordance with the activities detailed in the budget, FAO will undertake disbursement, procurement and contracts for the total amount of SCC resources.

Financial records. FAO shall maintain a separate account in US dollars for the SCCF resources for the project, showing income and expenditures. Expenditures incurred in currencies other than US dollars shall be converted to US dollars at the operational United Nations exchange on the date of the transaction. FAO will manage the project in accordance with its rules, regulations and directives.

Financial reports. The BH shall prepare every six months project expenditure accounts and final accounts for the project, showing amount budgeted for the year, amount expended since the beginning of the year, and separately, the un-liquidated obligations as follows:

1. Details of project expenditures on outcome-by-outcome basis, reported in line with Project Budget (Appendix 3 of this Project document), as at 30 June and 31 December each year.
2. Final accounts on completion of the Project on a component-by-component and outcome-by-outcome basis, reported in line with the Project Budget (Appendix 3 of this Project document).
3. A final statement of account in line with FAO Oracle Project budget codes, reflecting actual final expenditures under the Project, when all obligations have been liquidated.

Financial statements: Within 30 working days as of the end of each semester, that is, on or before July 31 and January 31, the FAO Representative in Chile will issue six-monthly statements of GEF resources expenditures, to be submitted to the Steering and Technical Committees, which will be included in the PPR. The purpose of the biannual financial report is to compare the expenses incurred by the project compared to the budget, thereby monitoring the progress of the project and reconcile the significant progress during the semester. The

financial report shall contain information that will serve as the basis for a periodic budget revision.

The BH will submit these financial statements for review and monitoring by the LTO and the FAO-GEF Coordination Unit. Financial reports for submission to the donor (SCCF) will be prepared in accordance with the provisions of the Financial Procedures Agreement between FAO and the GEF Trustee and submitted by the FAO Finance Division.

Responsibility for Cost Overruns. The BH shall utilize the GEF project funds in strict compliance with the Project Budget (Appendix3) and the approved AWP/B. El BH shall be authorized to make variations of the project budget provided that the total allocated for the specific budgeted project component is not exceeded as per the project Outcomes Framework (Appendix 1). A budget review by the BH will be submitted to the LTO and the FAO-GEF Coordination Unit for approval, at least once a year and through the FPMIS. Cost overruns shall be the sole responsibility of the Budget Holder.

Audit. The project shall be subject to the internal and external auditing procedures provided for in FAO financial regulations, rules and directives and in keeping with the Financial Procedures Agreement between FAO and the GEF Trustee.

The audit regime of FAO consists of an external audit provided by the Auditor-General (or persons exercising an equivalent function) of a member nation appointed by the governing bodies of the Organization and reporting directly to them. An internal audit is headed by the Inspector-General of FAO, who reports directly to the Director-General. This system operates as an integral part of the Organization according to the policies established by the Senior Management, and reports directly to the Governing Body. Both audits are required under the Basic Texts of FAO, which establish a framework of terms of reference of each. Internal audits of the accounts, accounting records, bank reconciliation and asset verification take place at FAO field offices, on a cyclical basis.

3.4 PROCUREMENT

At the request of the Government of Chile, FAO will procure the equipment and services provided for in the detailed budget (Appendix 3 of this Project Document) and in the AWP/B following FAO rules and regulations.

It is necessary a careful planning of procurement and contracts to ensure that goods, services and contracted works are received at the right time and according to the ‘best value for money’ principle and to the rules and regulations of FAO. An analysis of the needs and constraints is required, including a reasonable projection of the time required to conduct a procurement process. Procurement and output delivery for technical cooperation projects follow the rules and procedures of FAO for the procurement of materials, equipment and services (i.e., sections 502 and 507 of the Manual). Section 502 ‘Procurement of Goods, Works and Services’, establishes the principles and procedures that apply to the acquisition of all goods, works and services by the Organization in all its offices, except for procurements described in Appendix A – Procurements that are not governed by section 502 of the Manual. On the other hand, Section 507 of the Manual sets out the principles and regulations governing the use of Letters of Agreement (LOA) on the part of FAO for an adequate procurement of services from eligible

entities in a transparent and impartial manner, considering cost and efficiency to achieve an optimum combination of expected benefits and costs ('best value for money').

The BH shall prepare an annual procurement plan for main services and products, which will be the basis of procurement orders during the implementation. The first procurement plan will be updated during the project inception. The plan should include a description of the goods, services and works to be procured, the estimated budget and the source of funds, the schedule of the procurement process and methodology. When accurate information is not available, the procurement plan shall provide at least reasonable projections, which will be adjusted as the information become available.

Before the commencement of procurement, the Project Coordinator shall submit the project Procurement Plan (Appendix 5) to the Steering Committee for approval. The plan will be reviewed during the inception workshop and shall be approved by the FAO Representative in Chile. The procurement plan shall be updated by the Project Coordinator every six months and submitted to and cleared by the FAO Representative in Chile.

3.5 MONITORING AND REPORTING

Monitoring and evaluation of progress in achieving project outcomes and objectives will be done based on the targets and indicators established in the Project Results Framework (Appendix 1 and described in section 2). The project monitoring and evaluations has been budgeted at USD116.651 (see section 3.4). Monitoring and evaluation activities will follow FAO and GEF/SCCF monitoring and evaluation policies and guidelines. The monitoring and evaluation system will also facilitate learning and replication of project outcomes and lessons in relation to the comprehensive natural resources management.

3.5.1 Oversight and monitoring responsibilities

The monitoring and evaluation roles and responsibilities specifically described in the project Monitoring Table (see below), will be undertaken through: (i) day-to-day monitoring and project progress supervision missions (NPCU); (ii) technical monitoring of indicators to measure progress on adaptation of the fisheries and aquaculture sector to climate change (NPCU in coordination with project partners); (iii) mid-term and final evaluations (independent consultants and FAO Evaluation Office); and (iv) monitoring and supervision (FAO).

At the beginning of project implementation, the NPCU will establish a project progress monitoring system. Participatory mechanisms and methodologies will be developed to support outcome and output indicators monitoring and evaluation. During the inception workshop (see section below), monitoring and evaluation tasks will include: (i) presentation and clarification (if needed) of the Project Outcomes Framework with all project stakeholders; (ii) review of the monitoring and evaluation indicators and their baseline; (iii) draft clauses that have to be included in consultants' contracts to ensure they comply with monitoring and evaluation reporting functions (if appropriate); and (iv) clarification of the respective monitoring and evaluation tasks among the different project stakeholders. The Monitoring and Evaluation Specialist (M&E, see TOR in appendix 6) will prepare a draft of the monitoring and evaluation matrix which shall be discussed and approved by all key stakeholders during the inception workshop. The monitoring matrix shall operate as management instrument for the Project Partners for: i) biannual monitoring of outcome indicators; ii) annual monitoring of outcome

indicators; iii) definition of responsibilities and means of verification; iv) selection of the data processing methodology.

The Monitoring Plan will be prepared by the M&E Specialist during the first quarter of Year 1 and validated by the PSC. The Monitoring Plan will be based on the Monitoring Table (Table 3.4) and the Monitoring Matrix and will include: i) the updated outcomes matrix, with clear indicators disaggregated by year; ii) updated baseline, if necessary, and selected tools for information gathering; iii) a description of the monitoring strategy, including roles and responsibilities for data collection and processing, reporting flow, monitoring matrix and brief analysis of how and when each indicator will be measured. The project activities could coincide with data collection; iv) updated implementation arrangements, when necessary; v) inclusion of indicators of the GEF tracking tools, data collection and monitoring strategy for the mid-term and final evaluation vi) evaluation workshops schedule, including self-assessment techniques.

The continuous monitoring of the project implementation will be the responsibility of the Project Coordinator and will be driven by the preparation and implementation of an AWP/B based on biannual PPRs. The preparation of the AWP/B and biannual PPRs will represent the output of a unified planning process among main project stakeholders. As tools for outcome-based management, the AWP/B will identify the actions put forward for the coming year and provide the necessary details on output and outcome Targets, and the PPRs will report on the monitoring of the implementation of actions and the achievement of output Targets. Specific inputs to the AWP/B and the PPRs will be prepared based on participatory planning and progress review with all stakeholders that will be coordinated and facilitated through project planning and progress review workshops. These contributions will be consolidated by the Coordinator in the draft AWP/B and the PPRs.

An annual project planning and progress review will be held with the participation of the project partners to finish the AWP/B and the PPR. Once finished, the AWP/B and the PPRs will be submitted to the FAO LTO for technical approval and to the Steering Committee for review and clearance. The AWP/B will be developed in a manner consistent with the Project Outcomes Framework to ensure adequate fulfilment and monitoring of project outputs and outcomes.

Following the approval of the Project, the year one AWP/B will be adjusted (either reduced or expanded in time) to synchronize it with the annual reporting calendar. In subsequent years, the AWP/B will follow an annual preparation scheme in line with the reporting cycle as specified in section 3.5.3 below.

3.5.2 Indicators and sources of information

In order to monitor project outputs and outcomes including inputs to global environmental benefits, specific indicators have been established in the Project Outcome Framework (see Appendix 1). The Outcomes Framework indicators and means of verification will be applied to monitor both project performance and impact. Following FAO monitoring procedures and progress reporting formats, data collected will be sufficiently detailed to be able to track specific outputs and outcomes, and flag project risks early on. Output Target indicators will be monitored every six months, and outcome Target indicators will be monitored on an annual basis, if possible, or at least, in the mid-term and final evaluations.

The project output and outcome indicators have been designed to monitor biophysical and socioeconomic impacts and the effective progress in capacity building for adaptation of the fisheries and aquaculture sector to climate change.

Indicators of capacity building processes and land impacts on the field are described below:

Outcome 1.1 Strengthened public and private institutional capacities to implement/improve CC adaptation actions in fisheries and aquaculture (at national and local levels)

- CCA-2 Indicator 9: Number of people trained to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures.
- CCA2-Indicator 10: Capacities of regional, national and sub-national institutions to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures

Outcome 2.1 Local stakeholders have established adaptive systems and invest in innovative adaptation technologies at local level.

- CCA1-Indicator 2: Type and extent of assets strengthened and/or better managed to withstand the effects of climate change, measured by the number of linear kilometers of coastline under better management.
- CCA1-Indicator 3: Population benefiting from the adoption of diversified, climate-resilient livelihood options.

Outcome 3.1 Local coastal communities are aware, knowledgeable and prepared to cope with climate change effects on fisheries and aquaculture

- CCA1-Indicator 5: Public awareness activities carried out and population reached

Main information sources to support the monitoring and evaluation programme: i) the Project participatory monitoring system, ii) participatory workshops for progress review with stakeholders and beneficiaries; iii) in situ monitoring of the implementation of good practices with focus on adaptation to climate change; iv) progress reports prepared by the NPC with inputs from partners, Zone Specialists, specialists of the project and other stakeholders; v) reports from consultancies; vi) training reports; vii) midterm review and final evaluation; viii) financial reports and budget revisions; ix) Project implementation Review prepared by the projects LTO in coordination with the Budget Holder; and x) reports of monitoring missions from FAO.

3.5.3 Reporting schedule

Specific reports that will be prepared under the monitoring and evaluation program are: (i) Project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) Project Progress Reports (PPRs); (iv) Annual Project Implementation Review (PIR); (v) Technical reports; (vi) Co-financing reports; and (vii) Terminal Report. In addition, the SCCF tracking tool for Climate Change Adaptation will be completed and will be used to compare progress with the baseline established during the preparation of the project.

Project Inception Report: after FAO approval of the project, an inception workshop will be held. Immediately after the workshop, the NPCU will prepare a project inception report in consultation with the PTM of FAO office in Chile and other project stakeholders. The report will include a description of the institutional roles and responsibilities and coordinating action of project stakeholders, project progress and inception activities and an update of any changes

in external conditions that may affect project implementation. It will also include a detailed first year AWP/B, a detailed project monitoring plan based on the monitoring and evaluation plan presented in section 4.5.4 (see below). The draft of inception report will be circulated to FAO and the Management and Steering Committees for review and comments before its finalization, no later than three months after project inception. The report shall be cleared by the BH, LTO, and the FAO-GEF Coordination Unit. The BH will upload the AWP/B to the FPMIS.

Annual Work Plan and Budget (AWP/B): the NPCU shall submit to the Project Steering Committee a draft AWP/B no later than 20 January each year. The AWP/B shall include detailed activities to be implemented by project outputs and divided into monthly timeframes and goals and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year shall also be included together with all monitoring and supervision activities required during the year. The PTM will circulate the draft AWP/B to the FAO interdisciplinary Project Task Force for review and shall consolidate and submit the FAO comments and those of the Technical Committee to the NPCU who will incorporate them. The final AWP/B shall be sent to the Regional Steering Committee for approval and to the FAO for final clearance and upload to FPMIS by the PTM.

Project Progress Reports (PPR): The PPRs are used to identify constraints, problems or bottlenecks that impede timely implementation and take appropriate remedial action. PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the Project Results Framework (Appendix 1), AWP/B and M&E Plan. Each semester the National Project Coordinator (NPC) will prepare a draft PPR, and will collect and consolidate any comments from the FAO PTF. The NPC will submit the final PPRs to the FAO Representative in Mexico every six months, prior to 10 June (covering the period between January and June) and before 10 December (covering the period between July and December). The July-December report should be accompanied by the updated AWP/B for the following Project Year (PY) for review and no-objection by the FAO PTF. Once these comments have been incorporated, the LTO will give his/her technical clearance, the BH will approve and remit the final PPR to the Project Steering Committee (PSC) for final approval. The FAO GEF Coordination Unit will upload the PPRs in FPMIS.

Annual Project Implementation Review (PIR): The PC, under the supervision of the LTO and BH, with the support of the PTM and in coordination with the national project partners, will prepare a draft annual PIR report⁴⁴ covering the period July (the previous year) through June (current year) no later than July 1st every year. The LTO will finalize the PIR and will submit it to the FAO-GEF Coordination Unit for review by July 10th. The FAO-GEF Coordination Unit, the LTO, and the BH will discuss the PIR and the ratings⁴⁵. The LTO is responsible for conducting the final review and providing the technical clearance to the PIR(s). The LTO will submit the final version of the PIR to the FAO-GEF Coordination Unit for final approval. The FAO-GEF Coordination Unit will then submit the PIR(s) to the GEF Secretariat and the GEF Independent Evaluation Office as part of the Annual Monitoring Review of the FAO-GEF portfolio. The PIR will be uploaded to FPMIS by the FAO-GEF Coordination Unit.

Technical Reports: technical reports will be prepared as part of project outputs and to document and share lessons learned. The drafts of any technical reports must be submitted by the NPCU to the Regional Steering Committee and to the FAO Representation in Chile who will share it

⁴⁴ Prior to the preparation of the PIR report, the FAO-GEF Coordination Unit will provide the updated format as every year some new requirements may come from the GEF.

⁴⁵ The NPC, the BH, the LTO and the FAO/GEF Coordination Unit should assign ratings to the PIR every year. The ratings can or cannot coincide among the project managers.

with the LTO for review and clearance and with the FAO-GEF Coordination Unit for information and eventual comments, prior to finalization and publication. Copies of the technical reports will be distributed to the Regional Steering Committee, Technical Committee and other project stakeholders, as appropriate. The final reports will be uploaded to the FAO FPMIS by the PTM.

Co-financing Reports: the NPCU will be responsible for collecting the required information on in-kind and cash co-financing provided by current and unforeseen project co-financiers. Each year, the NPCU will submit these reports to the FAO Representation in Chile prior 10 July, covering the period July (the previous year) through June (current year).

SCCF Tracking Tools: following the SCCF policies and procedures, the tracking tools for the Special Climate Change Fund (CCA1 and CCA2) will be submitted to the GEF Secretariat in three stages: (i) with the project document for the GEF Executive Director endorsement; (ii) with the project's mid-term evaluation; and (iii) with the project's final evaluation.

Final Report: within two months prior the end date of the project, the project Coordinator will submit to the National Steering Committee and the FAO Representation in Chile a draft Final Report. The main purpose of the final report is to give guidance to authorities (ministerial or senior government level) on policy decisions required to track the project and to provide the donor with information on how the funds were utilized. Hence, the final report will be a concise account of the main outputs, outcomes, conclusions and recommendations of the Project, without unnecessary background information, narrative or technical details. The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for ensuring sustainability of project outcomes. The final report will provide an evaluation of the activities, a summary of lessons learned and recommendations in terms of their application to future mainstreaming of IAS management, development of conservation and management of biodiversity, in the context of the development priorities at national and regional levels, as well as in terms of practical execution. This report will specifically include the findings of the final evaluation as described in section 4.6. A final project review meeting should be held to discuss the draft final report with the Regional Steering Committee before it is finalized by PMU and approved by the LTO and the FAO-GEF Coordination Unit.

3.5.4 Monitoring and evaluation plan summary

The table 3.4 provides a summary of the main monitoring and evaluation reports, responsible institutions and periodicity:

Table 3.4. Summary of main monitoring and evaluation activities

M&E activity	Responsible institutions	Periodicity	Estimated costs
Inception workshop	PMU; FAO (FAO-CHI with the support of the LTO, BH and the FAO-GEF Coordination Unit)	Three months as of project inception	USD 2.500
Project inception report	PMU and FAO-CHI approved by the LTO, BH and the FAO-GEF	15 days after project inception	-

M&E activity	Responsible institutions	Periodicity	Estimated costs
	Coordination Unit		
Field-based impact monitoring	PMU; institutions and organizations participating in the project	Continuous	USD 16.681 (4% of the NPC, 6% of the Administrative Assistant, technical workshops for identification of indicators, monitoring workshops)
Project supervision and valuation visits in PIR	PMU; FAO (LTO, FAO-GEF Coordination Unit)	Annual, or as requested	FAO missions will be covered by GEF agency fees. Coordination visits to the project sites will be covered by the project budget (USD 5.000)
Project Progress Report (PPR)	PMU, with inputs from the institutions participating in the project	Quarterly	USD 4.604 (1% NPC, 2% Administrative Assistant)
Annual Project Execution Review Report (PIR)	FAO (LTO and FAO-CHI) with the support of the PMU. Approval and submission to the GEF by the FAO-GEF Coordination Unit	Annual	FAO staff time partly covered by fee
Evaluation of technical reports	PMU; FAO (LTO)	As appropriate	USD 1.316 (0,3% NPC, 0,4% Administrative Assistant)
Co-financing reports	PMU with inputs from other co-financing institutions	Annual	
Mid-term Independent Evaluation (MTE)	External consultant, project team, including the GEF Coordination Unit and other stakeholders	Halfway through the project implementation	USD 40.000 for external consultancy
Final Independent Evaluation (FIE)	External consultant, FAO Independent Evaluation Unit in consultation with the project team, including the FAO-GEF Coordination Unit and other stakeholders	At the end of the project implementation	USD 40.000 for external consultancy. Part of FAO staff time and travel costs will be covered by GEF Agency fee.
Final report	PMU; FAO (FAO-CHI, LTO, FAO-GEF Coordination Unit, the Report Unit TSCR)	Three months before the end date of the Execution Agreement	USD 6.550
Presupuesto total			USD 116.651

3.6 EVALUATION PROVISION

After 21 months of project inception, the BH will organize a Mid-Term Evaluation (MTE), in consultation with the Steering Committee, the LTO and the FAO-GEF Coordination Unit. The aim of the MTE is to review the project progress and efficient implementation in terms of the achievement of objectives, outcomes and outputs. The MTE will allow the implementation of corrective measures, if needed. The MTE will provide a systematic analysis of the information included in the Monitoring Plan (see above), with emphasis on the achievement of expected goals and outcomes in terms of expenditures. The MTE will make reference to the project budget (see Appendix 3) and the AWP/B approved for years one and two. The MTE will highlight best practices to replicate and main problems faced during project execution and will suggest mitigation measures to be discussed by the PSC, the LTO and the FAO-GEF Coordination Unit.

An independent Final Evaluation (FE) will be carried out three months prior to the terminal report meeting. The FE will aim to identify the project impacts, sustainability of outcomes and the probability to achieve long-term outcomes. The FE will also indicate future actions needed to expand the project in subsequent phases, mainstream and up-scale its outputs and practices, and disseminate information to management authorities and institutions with responsibilities for IAS management, eradication, control and monitoring as well as the recovery of fragile ecosystems to ensure continuity of the processes initiated by the Project. Both, the MTE and the FE will pay special attention to outcome indicators and to the alignment with the SCCF tracking tool (CCA focal area).

3.7 COMMUNICATION AND VISIBILITY

A number of project activities will approach the visibility of the same and include the mechanisms to ensure that communications in support of the project's messages are effective.

Capacity building activities under Component 1 will have important visibility at the level of national, regional and local authorities, as well as on the numerous public and private beneficiaries with whom the project will interact in planning processes, implementation and monitoring throughout the life of the project

The authorities from Executive and legislative power in charge of budget, regional and communal authorities and shall be beneficiaries of the project's awareness activities. Climate change interagency working groups will be composed by public and private sector stakeholders, fisheries and aquaculture that will also be trained and informed to raise awareness about the effects of climate change on the sector. Information and training materials will support the communication of the key messages of the project in this component, including among others, the scope and impacts of climate change on fisheries and aquaculture and the need to incorporate climate change in decision-making, coordination and inter-agency collaboration, and the need for broad participation of all stakeholders related to the sector.

In component 2, participatory methodologies to promote the participation of fishers and fish farmers of small scale (men, women, youth) will serve to give visibility to the project. Workshops and training materials will be used to transfer knowledge and raise awareness among beneficiaries in relation to the key messages of the project for this component, timely preparation to deal with the effects of climate variability and climate change, as well as the promotion of productive diversification options under an adaptation to climate change

approach, which will help to improve the livelihoods of local fishermen and small-scale farmers.

Under component 3, the project will develop a communication strategy based on the identification of key stakeholders, the development of key messages in the field of climate change and fisheries and aquaculture based on needs and demands for information in the pilot coves and communes and regions of intervention. The preparation of publications, printed materials (posters and others), radio programs, articles in newsletters and magazines, website and social networks will be used to disseminate information on the progress and results of the project as well as information in easy and accessible language on climate change, contributing to raise awareness.

The implementation of a strategy for the exchange of experiences, which include exchange visits between pilot coves with the participation of the beneficiaries of each cove, as well as visits to the pilot coves by fishermen and fish farmers from other coves and communes will serve to transmit know-how to beneficiaries in order to promote the adoption of best practices with focus on resilience.

Component 4 will contribute to communication and visibility through the systematization of experiences and lessons learned, which will be published and disseminated. In addition, the project will ensure mechanisms to give maximum dissemination to the documentation generated by the project, and in particular the Final report, technical reports and mid-term and final evaluation reports.

SECTION 4 – SUSTAINABILITY OF PROJECT OUTCOMES

The project has been designed to remove the identified barriers and create an enabling environment for the implementation of a model to build institutional and community capacities, for the adaptation of the Chilean fisheries and aquaculture sector to the adverse effects of climate change.

It is expected that from year 3 of the project, institutions, communities and stakeholders are able to continue with the activities undertaken by the project.

Factors that will facilitate social, environmental and economic sustainability and capacity building are detailed below.

4.1 SOCIAL SUSTAINABILITY

The social sustainability of project outcomes is achieved through an ecosystem approach and adaptation to climate change, whose benefits will lay the foundation for social sustainability by improving the resilience of artisanal fisheries and small-scale aquaculture farmers and their organizations. The implementation of the project will include the definition of factors that ensure social sustainability:

- **Capacity development** (see Sub-section 4.4)
- **Gender mainstreaming:** The project will mainstream gender issues in all its components. The participation of women in the pilot coves varies in each case; however, in general it is significant in most of them, and takes different and varied forms, either as seashore collectors (seaweed, Chilean mussels, clams, razor clams), seaweed and oyster farming, preparation of collectors for Chilean mussel seeds collection, tourism, fish products processing, fish stalls and small family restaurants in the coves. The project will emphasize the participation of women, empowering them to improve their participation in planning and taking decisions and to improve their productivity, incomes and livelihoods. The participation of women and youth will also be promoted through workshops and consultation and validation processes to be carried out as part of project intervention strategy. Training activities will be carried at times when women can participate without disturbing their daily activities. Training activities will be carried out at times when women can participate in such a way to not significantly affect your daily activities. At the institutional level (Component 1), the participation of at least 33% of women in capacity building activities will be encouraged through self-learning courses and workshops for national experts, and national, regional and municipal authorities. In Component 2, at least 30% of women will participate in training activities for local monitors and trainings on ecosystem approach, risk maps and environmental and climate information management. The design of productive diversification activities carried out in each pilot cove and focused on resilience, will take into account the activities currently undertaken by women, as well as potential activities that may be of interest to them, such as the incorporation of best practices to fisheries and aquaculture with special focus on resilience; create income opportunities, such as adding value to fishery and aquaculture products (e.g., improved techniques for the manufacturing of artisanal fishery products for human consumption and use of

residues), and carry out complementary activities that contribute to improve their livelihoods (e.g., gastronomy, recreational fishing, tourism). The participation of women is variable in each cove, depending on the type of activity (for example, in El Manzano 40% of workers are unionized, while in Tongoy is 2%) with a global average of 10%. The awareness campaigns of Component 3 aimed at the general population of coves and regions will reach a large number of women and young people with information on climate change. Likewise, the mechanism to disseminate experiences through exchange visits will incorporate women beneficiaries who will have the opportunity to observe the activities of adaptation in the pilot coves. Data will be disaggregated by gender to monitor the differentiated impacts of the project, and women will be involved and represented in all project activities.

- **Food security:** Considering that the proposed adaptation measures can improve the supply of fish products through actions aimed at diversification in the use and exploitation of new resources, improvement of current fisheries operations and better use of fisheries and aquaculture products, the project will contribute to local and national food security, given that the population will have better physical, social and economic access to safe and nutritious food and availability of products from fisheries and aquaculture to meet their nutritional requirements and food preferences
- **Ownership of project processes by local institutions, producers' associations and communities** (see Sub-section 4.4).

Regarding indigenous peoples, the fishermen's organisations in El Manzano pilot site (Los Lagos Region in the South) have some individual members that belong to indigenous communities. In addition, there are some areas outside the project intervention sites in which indigenous people live. According to the FAO Environmental and Social Management Guidelines, IPs will duly participate in the Free, Prior and Informed Consent process before starting project field activities in Project Year 1 (PY1). The Environmental and Social Screening Checklist is included in Appendix 9. During project implementation, the indigenous members of the fishermen's organizations may transfer the knowledge acquired through the project to their communities. Thus, indigenous communities would be indirect beneficiaries of the adaptive measures envisaged under Component 2.

4.2 ENVIRONMENTAL SUSTAINABILITY

The environmental sustainability will be ensured through the implementation of ecosystem, precautionary and adaptation to climate change approaches, which are at the core of the project intervention strategy. The project will contribute to increase the availability of information about climate change effects on fisheries and aquaculture, to take decisions, adopt the climate change adaptation approach in the sector and increase knowledge and understanding of the type of exposure, sensitivity and adaptive capacity of fisheries and aquaculture communities and investments required to face the problem. The increase in capacities to manage environmental information, local monitoring and early warning system will improve the production, safety and prevention conditions of artisanal fishers and small-scale aquaculture farmers. The input of new resources and/or technologies to fishing and aquaculture activities, including complementary activities and value addition, improving management and administration of its operations under an ecosystem approach and adaptation to climate change, will increase the sustainability of fisheries and the stability of income of artisanal fishers and small-scale aquaculture farmers.

The communication strategy will serve to raise awareness of the importance of the adverse effects of climate change on fisheries, aquaculture and livelihoods. This will contribute to greater resilience to the impacts of climate change, to maintain or improve livelihoods, productive means and other sources of income.

4.3 FINANCIAL AND ECONOMIC SUSTAINABILITY

The financial and economic sustainability of the project activities will be achieved to the extent that these activities are financially and economically viable for the parties involved, including artisanal fishers and small-scale aquaculture farmers and their families, organizations and communities.

Increased capacities of artisanal fishers and small-scale aquaculture farmers, along with investments promoted by the project for adaptation to climate change such as innovations in fishing methods, fishing gear, aquaculture designs, product diversification, and complementary activities such as adding value to fishing products, tourism and gastronomy, will result in increased sustainability of fisheries and stability of income of artisanal fishers and small-scale aquaculture farmers, thus, ensuring the sustainability of livelihoods and socio-economic benefits of the beneficiaries.

The public sector has various funds (FIP, FAP, IFAP, etc.) to fund initiatives directly or indirectly associated with adaptation to climate change. In addition, the National Adaptation Plan to Climate Change and the Adaptation Plan to Climate Change for Fisheries and Aquaculture include initiatives (some of them under execution) to secure the present and future financing of the baseline in the field of climate change. Actions to strengthen institutional capacities will help to increase awareness and training authorities, including decision makers in financial matters at the government level, will be reflected in the integration of climate change in the decisions taken in the sector administration (fisheries and aquaculture management, operational and budgetary regulations, among others), ensuring continuity of funding and focused on relevant aspects related to the sector adaptation to climate change.

4.4 SUSTAINABILITY OF CAPACITIES DEVELOPED

Capacity development (CD) represents one of the key pillars to ensure sustainability of the project both in terms of the areas of intervention and the institutional environment. CD conceived as a core function that crosses the three components of the Project, being an integral part of their respective outcomes.

The project will address two dimensions of the capacity development according to the approach developed by FAO on sustainability: i) individuals (artisanal fishers, small-scale aquaculture farmers, members of their families and communities); and, ii) institutions (public and private, national, regional and local). The interaction between community members and national, regional and local government institutions, and between institutions will also be addressed.

The project will strengthen the institutional capacities to create an enabling environment for the adaptation of the fisheries and aquaculture sector to climate change. This will be achieved by increasing knowledge about vulnerability and adverse effects of climate change in the sector; improving availability and access to information on that subject; including climate change

management mechanisms; management and monitoring of fisheries and aquaculture; and developing the capacity to plan, lead, manage and support initiatives of adaptation to climate change to ensure that the expertise will be incorporated into local systems and processes in a sustainable manner. Inter-institutional Working Groups, made up of public and private actors (government agencies, private sector organizations, universities, research centers, local organizations) will help to improve participation, coordination and collaboration between stakeholders at national, regional and local levels, and the appropriation of the actions undertaken by the project at all levels.

The project will develop technical skills in the field of sustainable fisheries and aquaculture based on an ecosystem approach of adaptation to climate change, improving the knowledge base on climate change, measures and strategies of adaptation to climate change and livelihoods in a context of climate variability and climate change. At the local level, the project will strengthen the practical and theoretical knowledge of fishers, aquaculture farmers and their organizations, through workshops, training activities and participation in the design and implementation of project activities. The project will use the learning by doing methodology, through playful and practical activities which, by experience, will be incorporated to fishers' daily activities. Thus, beneficiaries will learn something new and incorporate this to their daily activities. Training activities will be scheduled to ensure the participation of beneficiaries, especially women. It will take into account the fishing seasons to ensure the widest possible participation of fishers. Partnerships with the private sector (e.g., universities and research centers) will contribute to strengthen local capacities through the dissemination of researches done on climate change and fisheries and aquaculture, and the implementation of adaptation strategies and measures in pilot coves.

The communication strategy of the project will support the capacity development throughout the whole project by raising awareness, understanding and knowledge of climate change, to increase resilience of the fisheries and aquaculture sector to climate change. The systematization of lessons learned will also contribute to the sustainability of capacities to be installed.

4.5 APPROPRIATENESS OF TECHNOLOGY INTRODUCED

The project will promote tested and cost-efficient production practices with a focus on resilience. These practices include the design of capture methods that include selectivity and minimization criteria; technology upgrade for seeds production in *hatchery*; cultivation (algae); repopulation of benthic resources; risk mapping; value added to fisheries and aquaculture products; develop a seal that endorses implementation and compliance with climate change adaptation practices, sustainable fishing and aquaculture; alternative activities (tourism, stalls, gastronomy, recreational fishing); experimental reefs design. Appendix 8 includes a detailed list of best practices identified that could potentially be implemented.

Training and technical assistance methodologies currently in use by FAO will be employed; methodologies that are known and accepted by both technicians and producers. In addition, the technical assistance and training will consider aspects related to the incorporation and dissemination of local wisdom of fishers and aquaculture farmers' communities

The technical feasibility is based on the presence of organizations with technical expertise in the regions and towns/cities of intervention, capable to transfer technologies and innovations for adaptation, namely: SUBPESCA, SERNAPESCA, universities (Pontifical Catholic University of Valparaiso, University of Concepcion, University Austral de Chile, Catholic University del Norte, University of La Serena, University Arturo Prat) and research centres (CIAM, CEAZA, INPESCA, INTESAL).

Cost-efficiency

As stated in subsection 4.6, the project's focus on capacity building, coordination mechanisms, articulation between stakeholders, best practices and appropriate technologies, are innovative and one example in South America that will help reduce vulnerability to climate change on the fisheries and aquaculture sector. The project strategy of increasing resilience and reducing vulnerability to climate change impacts in the fisheries and aquaculture sector in Chile, through introduction of adaptation measures in fisheries management and capacity building of fishers and aquaculturists, as well as in fisheries management and mainstreaming of climate change, was selected given the need to enforce stakeholders' abilities to face climate change and manage their fisheries and aquaculture resources in an efficient manner.

During the project design phase, this approach proved cost-efficient because is based on baseline initiatives, national and local competences and infrastructure, and national policies, mainly on the Plan for Climate Change Adaptation in Fisheries and Aquaculture (PACCPA), whose main objective is to strengthen the capacity of adaptation of fisheries and aquaculture to the challenges and opportunities of climate change, considering a precautionary and ecosystem approach. Several strategies and complementary and synergistic methodologies were identified, which are a cost-efficient way to remove barriers and face threats to adaptation benefits detailed in Sub-sections 1.2.1 and 1.2.3. These strategies and methodologies are described below *vis à vis* the alternatives:

Component	Strategies and methodologies adopted by the project	Alternatives that were considered
1. Strengthening public and private institutional capacities for effective climate change adaptation	<p>i) Strengthening coordination and collaboration among multiple actors at national, regional and local levels, through the public-private Inter-institutional Working Groups on climate change, which will enhance synergies, avoid duplication of efforts and reduce implementation costs.</p> <p>ii) The participation of key stakeholders will ensure that decisions and project implementation will be aligned with the priorities of regional and local development and public financing mechanisms.</p> <p>iii) Training and awareness of technical and management staff and national, regional and local authorities will contribute to the integration of climate change in the decision-making process (fisheries and aquaculture management, operational and budgetary regulations).</p>	<p>Without coordination and knowledge, the institutional sector would lack the common vision to address the sustainable development of fisheries and aquaculture sector, which would result in excessive fragmentation in decision-making and a low effective participation of local actors in matters related to climate change.</p> <p>Lack of proper participation and information reduces the availability of financial resources to support new investments, technologies and innovations aimed at the adoption of adaptation measures. Thus the project investment would not be continued.</p> <p>The scenario of doing nothing would result in an institutional sector weak in addressing the impact of climate change on the fisheries and aquaculture sector.</p>

	among others), ensuring continuity of direct assistance to beneficiaries, as well as funding and guidance on those relevant aspects related to the adaptation of the sector to climate change, ensuring long-term financial sustainability	
2. Improving the capacity of adaptation to climate change in local fisheries and aquaculture communities	<p>i) Training and awareness of artisanal fishers and small-scale aquaculture farmers and the application of ecosystem approaches of adaptation to climate change, will contribute to sustainable production and use of appropriate technologies, and increase fisheries and aquaculture sustainability and income stability of the same.</p> <p>ii) The learning by doing methodology that will be used to train fishers and aquaculture farmers, will contribute to the appropriation of the best fishing and aquaculture practices under a resilience approach.</p>	<p>Without the EAFM-CCA approach, fishers and fisheries communities would be unable to identify and respond to climate change threats in a systematic manner. The alternative to the adoption of EAFM-CCA approaches was to leave current fisheries management and CCA planning approaches unchanged and ad-hoc.</p> <p>Fishermen and fishfarmers could move to agriculture and most likely (it has and it is happening) they would need to migrate to the main cities away from the coast. This is a common response in the absence of alternative livelihoods that allow them to remain and make the best use of resources. It is possibly the greatest cost benefit improvement provided by the project at local level.</p>
3. Strengthening knowledge and awareness-raising on climate change in fisheries and aquaculture communities	<p>i) The exchange and dissemination of experiences among fishers and aquaculture farmers will contribute to the dissemination of best practices under a resilience approach, ensuring cost-effective scaling up.</p> <p>ii) The systematization of experiences and lessons learned available to the project partners and the different stakeholders will also contribute to a cost-efficient project outcomes replication throughout the country.</p> <p>iii) The communication strategy will reach society in different levels, thus generating awareness of CC impacts.</p>	<p>The alternative to the adoption of a systematic replication and upscaling strategy would be to develop ad-hoc responses to capacity development needs, which would unlikely address the key/main barriers.</p> <p>Without awareness in the coastal communities of the threats posed by climate change, there is no possibility of adoption and implementation of adaptation measures, making it unlikely to have a more sustainable and efficient use of fisheries and aquaculture resources in the long term.</p>

Regarding cost-efficiency of adaptation investments and technologies to be promoted by the Project, during full project preparation diverse climate change adaptation on the ground investments and best practices were analysed and selected with a view to assess their cost/effectiveness and suitability for application in the four selected sites. Below an example of the best practices the project will promote through SCCF and co-financing resources in order to address climate change adaptation and increase fisher communities' resilience in the project intervention sites:

- Make thematic-dynamic maps that include CC effects that will generate and keep information to support local decisions in order to plan actions aimed at avoiding, resist and, eventually take advantage of CC impacts.

- Seaweed farming in management areas (experimental aquaculture), which will allow farmers to take advantage of new and/or better environmental conditions to implement other productive activities (diversification), in order to improve the resistance of coastal communities to CC.
- Programme of technical support to mytilidae seeds collection in the cove (seeds collection technologies, collectors transfer, etc.), which will allow for planning and implementing timely and permanent actions to improve the collection of natural mussel seeds under CC conditions.
- Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change, which will allow diversification of the local community activities, incorporating complementary actions to collect, rescue and disseminate the fisheries and aquaculture heritage of these communities.
- Repopulation of benthic resources in MEABRs (a kind of mollusc that is part of the Management Plan of the MEABRs), which will improve the productivity of MEABRs and ensure the sustainability of target living aquaculture resources in those areas.

As per other strategies, the diversification to other livelihoods would be another solution. However, broadly speaking, it is more cost effective to ensure resilience and adaptation within the fisheries sector, as transitioning the fisheries-dependent communities to other livelihood sectors would require substantially greater capacity building and investment than to build on current capacities and livelihood strategies, especially for households with limited access to land and in the face of limited alternatives.

On the other hand, relying on global fisheries models would be another option, since current modelling exercises on the impacts of climate change on the marine ecosystem are mostly global in nature. They can project the impacts of climate change on global fish production by 2050, yet the projections cannot be easily downscaled to national or local level. While the global models generate very interesting insights it can therefore not provide insights into the impacts of climate change for key species in the selected coves and guide policy.

There is great uncertainty in the nature and direction of changes and shocks to fisheries as a result of climate change. Investments in adaptive capacity and resilient fisheries systems seem to be a good strategy to support future adaptations which are not currently foreseen. Better managed fisheries with flexible, equitable institutions are expected to have greater adaptive capacity. For example, implementation of the EAF could make an important contribution to adaptation in preparation for the effects of climate change.

4.6 INNOVATIVENESS AND REPLICABILITY

The project is innovative in terms of mainstreaming adaptation to climate change in the fisheries and aquaculture sector. While the Chilean legal framework promotes sustainable fisheries and aquaculture through the ecosystem and precautionary approaches and has developed the Adaptation Plan to Climate Change for Fisheries and Aquaculture, the sector still has not sufficiently incorporated climate change considerations, nor developed mechanisms to ensure adaptation in the sector, specifically, at artisanal fishers and small-scale aquaculture farmers level, and local governments, who are the ones finally make up the community and support their productive activities in a manner more direct.

As mentioned in Sub-section 1.1.2, the pilot coves selected are representative of the coves along the Chilean coast. The actions of the project on capacity building, coordination mechanisms, articulation between stakeholders, best practices and appropriate technologies, are innovative and help reduce vulnerability to the adverse effects of climate change on the fisheries and aquaculture sector. These actions will be replicated in other areas of the country. For the first time, vulnerability assessment at the cove level will be done, which will help to lay the foundations to use this tool in other coves in the country and assess the sites that are in need of mechanisms for adaptation to climate change and prioritize actions. The participation and coordination mechanism consisting of public-private Inter-institutional Working Groups on climate change can be replicated in other fisheries and aquaculture communities and regions, which may form their own regional and local groups. The project will launch a mechanism for sharing experiences through exchange visits to facilitate the introduction and replication of approaches, practices and cost-efficient technologies for resilient fisheries and aquaculture.

The replicability potential of the project is high, given its complementarity with policies, plans and programs (see Sub-section 1.2.2). The systematization of experiences and lessons learned will serve to promote replication of project outcomes at national and international level.

The FAO Representation in Chile will disseminate information on the outcomes and lessons learned with other FAO projects in the country, and through the Regional Office for Latin America and the Caribbean (RLC) with other countries in the region with similar characteristics and problems.

APPENDICES

APPENDIX 1 : PROJECT RESULTS FRAMEWORK

Results chain	Indicators	Baseline	Mid-term Target	Final Target	Means of verification	Assumptions
Project Objective: To reduce vulnerability and increase the adaptive capacity to climate change in Chile's Fisheries and Aquaculture Sector						
Component 1: Strengthening public and private institutional capacities for effective climate change adaptation						
Outcome 1.1 Strengthened public and private institutional capacities to implement/improve CC adaptation actions in fisheries and aquaculture (at national and local levels).	<u>Indicator 9 (CCA-2):</u> Number of people trained to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures. <u>Indicator 10 (CCA-2):</u> Capacities of regional, national and sub-national institutions to identify, prioritize, implement, monitor and evaluate adaptation strategies and measures	Indicator 9: 0 Indicator 10: 1 (one) institution: Undersecretariat of Fisheries and Aquaculture Capacity score: 2 (measured through SCCF tracking tool)		Indicator 9: Target: 100 government officials, 60 national experts, and 240 decision-makers from national, regional and municipal level Indicator 10: 1 (one) institution: Undersecretariat of Fisheries and Aquaculture Capacity score: 6 (measured through SCCF tracking tool)	Annual Project Implementation Review (PIR) Mid-term Evaluation and final evaluation	Political will of public, private institutions and civil society to improve their capacities, coordinate and collaborate in the adaptation to climate change in fisheries and aquaculture
Output 1.1.1: Coordinating/advisory bodies on climate change, fisheries and aquaculture working	National Public and Private Inter-institutional Working Groups IWG) for	SUBPESCA has an internal Advisory Committee on Climate	1 (one)		Working groups formation agreement	

Results chain	Indicators	Baseline	Mid-term Target	Final Target	Means of verification	Assumptions
at national, regional and local level ¹ .	<p>Fisheries, Aquaculture and Climate Change (operational)</p> <p>Regional Public and Private Inter-institutional Working Groups (IWG) for Fisheries, Aquaculture and Climate Change (4 regions) (operational)</p> <p>Inter-institutional Working Groups (IWG) for Fisheries, Aquaculture and Climate Change of local level (2 towns) (operational)</p>	<p>Change formed by researchers.</p> <p>The NAPCC proposes a management structure with national, regional and local levels.</p> <p>At national level, an Inter-ministerial Technical Team for CC in charge of drawing up an annual report on the status of CC in Chile; there is a representative of SUBPESCA</p> <p>At the regional level the NAP proposes the creation of the Regional Committee on Climate Change (CORECC) of intersectoral character with SEREMI and municipalities responsible for actions implementation.</p> <p>Tarapaca has a public-private Regional Committee to deal with El Niño effects (SUBPESCA,</p>	<p>4</p> <p>2 (Tomé, Hualaihue)</p>		<p>Work plans</p> <p>Meeting Minutes</p> <p>Meetings participants list</p> <p>Project Progress Reports (PPR)</p>	

¹ This will be integrated into to the structure proposed by the National Adaptation Plan

Results chain	Indicators	Baseline	Mid-term Target	Final Target	Means of verification	Assumptions
		<p>SERNAPESCA, GORE, SEREMI, Universities.</p> <p>There are Regional Commissions for the Coastline Use in Coquimbo, Tarapaca. Technical Secretariat of the Regional Committee for the Coastline Use.</p> <p>There are local offices in Iquique and Coquimbo to deal with fisheries and aquaculture formed by stakeholders. They will act as Working Groups.</p>				
Output 1.1.2: Interoperable information base system that integrates fisheries, aquaculture and climate change data, to generate information for end-users and decision-makers.	<p>Database with variables of Fisheries, Aquaculture and Climate Change integrated to national, regional and local information</p> <p>Number of quarterly reports on Climate Change indicators in sectoral monitoring of fisheries and aquaculture</p>	<p>IFOP has database and perform monitoring. There are biological, oceanographic, fisheries and economic indicators; however, there are no sectoral indicators of climate change.</p> <p>There is information scattered in various research centres and institutions. The information is neither systemized nor integrated. A consulting office is being implemented under the NAP to develop</p>	<p>Available information, identified and with exchange protocols</p> <p>2 (two) (during the 2nd semester of PY2)</p>	<p>1 (one) (Integrated fisheries, aquaculture and climate change database)</p> <p>8 (eight)</p>	<p>Document of database design and implementation plan</p> <p>Database</p> <p>Document of indicators and implementation plan</p> <p>Quarterly reports</p> <p>Design proposal report</p>	

Results chain	Indicators	Baseline	Mid-term Target	Final Target	Means of verification	Assumptions
		indicators of climate change.				
Output 1.1.3: Capacity development programme for public officials, national experts, and regional and local decision-makers	Number of people trained to identify, prioritize, implement, monitor and assess adaptation measures and strategies at institutional level	Limited knowledge of the scope and effects of climate change in fisheries and aquaculture. Few professionals in the fisheries and aquaculture sector specialized in climate change	<p>40 regional and municipal authorities (at least 20% women)</p> <p>45 national and local experts (at least 25% women)</p> <p>60 national decision makers in charge budget allocation (at least 30% women)</p> <p>60 regional authorities (at least 25% women)</p>	<p>80 regional and municipal authorities (at least 20% women)</p> <p>100 public officials (at least 30% women)</p> <p>60 national and local experts (at least 25% women)</p> <p>100 regional authorities (at least 25% women)</p>	<p>Programme document</p> <p>Training and raising awareness contents and materials</p> <p>Participants list</p> <p>Data disaggregated by gender</p> <p>PPR</p>	
Component 2: Improving the capacity of adaptation to climate change in local fisheries and aquaculture communities						
Outcome 2.1: Local stakeholders have established adaptive systems	<u>Indicator 2 (CCA-1):</u>	0 linear kilometers of coastline managed to		709,3 linear km of coastline managed to address the		The effects of climate change are maintained in the predetermined

Results chain	Indicators	Baseline	Mid-term Target	Final Target	Means of verification	Assumptions
and invest in innovative adaptation technologies at local level	Type and extent of assets strengthened and/or better managed to withstand the effects of climate change <u>Indicator 3 (CCA-1):</u> Population benefiting from the adoption of diversified, climate-resilient livelihood options.	address the effects of climate change 0		effects of climate change 4550 (at least 25% women)	Annual Project Implementation Review (PIR) Mid-term Evaluation and final evaluation	range and natural production conditions are maintained. Community actors are aware of the potential effects of climate change and are willing to actively participate in project activities and implement adaptation measures.
Output 2.1.1: Pilot programme to strengthen and develop adaptive capacities of fisheries and aquaculture communities and organizations in four coves (Riquelme, Tongoy, Coliumo and El Manzano-Hualaihue).	Number of fishers and aquaculture farmers trained to identify, prioritize, implement, monitor and assess adaptation measures and strategies at community level	Weak local leadership to drive actions of adaptation to climate change, and insufficient knowledge and understanding of the effects of climate change at the local level	20 local monitors (at least 30% women) 80 fishers and aquaculture farmers (at least 30% women)		Programme document Training and raising awareness contents and materials Participants list Data disaggregated by gender Photographs PPR	

Output 2.1.2: Pilot programme to monitor climate change adaptation in 4 coves ¹	Designed and implemented local monitoring programme	There is local monitoring experience based on observations of fishers	1		Document of monitoring programme design and implementation plan	
	Quick vulnerability assessment implemented in each cove (baseline and final)	0	4	4	Vulnerability assessment reports PPR	
Output 2.1.3: Strengthened programmes for development and productive diversification with a climate change adaptation approach (in 4 coves).	Number of fishers and aquaculture farmers who adopt technologies/ adaptation practices to climate change	0		910 (at least 10% women)	Documents of design and implementation plans of best practices	
	Number of best fisheries practices that increase resilience to climate change	0 (see Appendix 8 of the Prodoc with baseline detailed by cove)		1	Training contents and material Participants list	
	Number of best aquaculture farming practices that increase resilience to climate change	0 (see Appendix 8 with baseline detailed by cove)		6	Data disaggregated by gender Photographs	
		0 (see Appendix 8 with baseline detailed by cove)		4	PPR	

¹ This output is related to the information system created under Output 1.1.2.

	Number of best practices that promote other livelihoods					
Component 3: Strengthening knowledge and awareness-raising on climate change in fisheries and aquaculture communities						
Outcome 3.1: Local coastal communities are aware, knowledgeable and prepared to cope with climate change effects on fisheries and aquaculture	<u>Indicator 5 (CCA-1):</u> Public awareness activities carried out and population reached			22,594 beneficiaries by communication and awareness-raising activities (5% of the total population from the areas of the pilot sites – Total population of the 4 towns/cities: 451,878 inhabitants - 50% women)	Annual Project Implementation Review (PIR) Mid-term Evaluation and final evaluation	The effects of climate change are maintained in the predetermined range and natural production conditions are maintained. Community actors are aware of the potential effects of climate change and are willing to actively participate in project activities and implement adaptation measures.
Output 3.1.1: Project communication strategy, designed and implemented.	Number and type of designed and disseminated communication materials	0	24 national news bulletins 1 Basic Climate Change Guideline (towns – schools)	42 News bulletins 1 media campaign on the radio Project Fan Page	News bulletins Radio programmes Basic Climate Change Guideline Children's book on Climate Change Posters	

	Number of regional stakeholders aware about CC	0	1 Children's book on Climate Change (town – school) 2 media campaigns on the local radio 500 posters at local level Fan Page of the national project 270 (at least 25% women)	450 (at least 25% women)	Fan Page Workshop reports / Participants list Photographs PPR	
Output 3.1.2: Mechanism to disseminate field adaptation measures, implemented.	Number of fishers and aquaculture farmers who participate in experience exchange visits	0		160 neighboring communities (at least 15% women) 36 pilot communities (at least 20% women)	Visits programme Participants list Data disaggregated by gender Photographs PPR	
Component 4: Project Management, Monitoring and Evaluation (M&E)						
Outcome 4.1: Project implemented, lessons learned and best practices documented and disseminated	Outcomes of the project showing sustainability		52% outreach in outcomes attainment	100% outreach in outcomes attainment	PPR PIR Mid-term Evaluation and final evaluation report	Project M&E system including monitoring of activities, verification mechanisms of outcomes and output indicators compliance and

						M&E responsibilities, terms and budgets.
Output 4.1.1: Project management, monitoring and evaluation system operating and providing systematic information on progress in reaching expected outcomes and targets	Project outcomes framework with outcomes and outputs indicators, baseline and Targets		6 biannual progress reports (3 PPR and 3 PIR)	14 biannual progress reports (7 PPR and 7 PIR)	PPR PIR	
Output 4.1.2: Mid-term Evaluation and final evaluations, implementation and sustainability strategies adjusted to the recommendations	1 Mid-term Evaluation and 1 Final evaluation		1 Mid-term evaluation report	1 Final evaluation report	Mid-term evaluation report Final evaluation report	
Output 4.1.3: Publication of best practices and lessons learned	Number of annual publications on best practices and lessons learned		2 Technical reports	3 Technical reports	Publications PPR / PIR	

APPENDIX 2: WORK PLAN

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3				Year 4	
			T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2
Component 1: Strengthening public and private institutional capacities for effective climate change adaptation																
Output 1.1.1: Coordinating/advisory bodies on climate change, fisheries and aquaculture working at national, regional and local level.	Design of private-public Interinstitutional Working Groups (IWG)	CNP / EP SUBPESCA MMA, others														
	Functioning of the national IWG	CNP / EP SUBPESCA MMA, others														
	Functioning of regional IWG	CNP / EP SUBPESCA MMA, others														
	Functioning of local IWG	CNP / EP SUBPESCA MMA, others														
Output 1.1.2: Interoperable information base system that integrates fisheries, aquaculture and climate change data, to generate information for end-users and decision- makers..	Indicators definition	CNP / CDP / SUBPESCA														
	Data availability and origin, systematization	CNP / CDP / SUBPESCA														
	Design of the information system content	CNP / CDP / SUBPESCA														
Output 1.1.3: Capacity development programme for public officials, national experts, and regional and local decision-makers	Programme design	CNP / Research Centres (CI) /Universities														
	Online course	CNP / CI / Universities														
	National experts training meetings	CNP / CI / Universities														
	Workshops for regional authorities	CNP / CI / Universities														
	Workshops for decision makers	CNP / Universities														
	Workshops for regional and municipal authorities	CNP / EP / Universities														
Component 2: Improving the capacity of adaptation to climate change in local fisheries and aquaculture																

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3				Year 4	
			T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2
Output 2.1.1: Pilot programme to strengthen and develop adaptive capacities of fisheries and aquaculture communities and organizations in four coves (Riquelme, Tongoy, Coliumo and El Manzano-Hualaihue)	Programme design	CNP / EP / Universities														
	Training workshops local monitors	CNP / EP / Universities														
	Training workshops fishers and aquaculture farmers	CNP / EP / Universities														
Output 2.1.2: Pilot programme to monitor climate change adaptation in 4 coves	Programme design	CNP / EP														
	Local monitoring implementation	CNP / Monitors local / Community														
	Quick vulnerability assessments	CNP / Zonal Technicians Local Monitors locales														
Output 2.1.3: Strengthened programmes for development and productive diversification with a climate change adaptation approach (in 4 coves).	Best practices design with focus on resilience	CNP / EP / Universities Research centres														
	Best practices training workshops with focus on resilience	CNP / EP / Universities / Research centres														
	Best practices implementation	CNP / EP / Universities / Research centres														
	Best practices monitoring	CNP / EP / Universities / Research centres														
Component 3: Strengthening knowledge and awareness on climate change in fisheries and aquaculture communities																
Output 3.1.1: Project communication strategy, designed and implemented.	Monthly news bulletin	CNP / EP														
	Radio campaigns	CNP / EP														
	Basic Guide on Climate Change	CNP / EP														
	Children's book on climate change	CNP / EP														
	Inception awareness workshops	CNP / EP														
	Mid-term awareness workshops	CNP / EP														
	Closing awareness workshops	CNP / EP														
	Workshops for schools	CNP / EP														

Output	Activities	Responsible Institution	Year 1				Year 2				Year 3				Year 4	
			T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2
	Press, web, social networks	CNP / EP														
Output 3.1.2: Mechanism to disseminate field adaptation measures, implemented.	Exchange visits between pilot coves	CNP / EP														
	Exchange visits to neighbouring coves	CNP / EP														
Component 4: M&E and dissemination of the information																
Output 4.1.1: Project management, monitoring and evaluation system operating and providing systematic information on progress in reaching expected outcomes and targets.	Inception workshop	CNP DNP														
	Preparation and validation of the PTPA	CNP DNP														
	Preparation and validation of the M&E plan	CNP DNP														
	Systematic monitoring of outcomes y outputs indicators and Targets	CNP EP														
	Preparation project progress report (PPR)	CNP DNP														
	Preparation annual reports (PIR)	OTL CNP DNP														
Output 4.1.2: Mid-term Evaluation and final evaluations, implementation and sustainability strategies adjusted to the recommendations	Mid-term evaluation	Independent consultant, FAO CNP														
	Final evaluation	Independent consultant, FAO CNP														
Output 4.1.3: Publication of best practices and lessons learned	Preparation technical reports on best practices and lessons learned	CNP FAO														

APPENDIX 3: PROJECT BUDGET

Codigo ORACLE/descripción	Unit	Unit no	Unit cost	Component 1: Outcome 1.1. Capacity building	Component 2: Outcome 2.1 Good practices	Component 3: Outcome 3.1 Communications	Component 4: Outcome 4.1 M&E	PMC	GEF	Year 1	Year 2	Year 3	Year 4
5300 Salaries professionals													
National Operations Officer								119.048	119.048	34.014	34.014	34.014	17.007
5300 Sub-total salaries professionals				0	0	0	0	119.048	119.048	34.014	34.014	34.014	17.007
				0									
International consultants													
Information systems expert CC/FA	Days	12	830	8.300	0	0	0		8.300			8.300	
Information systems expert FA/CC	Days	12	830	8.300	0	0	0		8.300			8.300	
Sub-total International Consultants				16.600	0	0	0	0	16.600	0	0	16.600	0
National consultants									0				
National project Coordinator	Month	42	4.000	120.000	25.000	13.000	10.000		168.000	48.000	48.000	48.000	24.000
Technical- administrative assistant	month	42	1.200	12.600	12.600	12.600	12.600		50.400	14.400	14.400	14.400	7.200
Communications expert	month	24	2.300	0	0	55.200	0		55.200	15.771	15.771	15.771	7.886
M&E expert	month	6	2.300				13.800		13.800	13.800			
Zone specialist El Manzano-Hualaihue	month	38	2.300	0	87.400	0	0		87.400	24.971	24.971	24.971	12.486
Zone specialist Tongoy	month	38	2.300	0	87.400	0	0		87.400	24.971	24.971	24.971	12.486
Zone specialist Coliumo	month	38	2.300	0	87.400	0	0		87.400	24.971	24.971	24.971	12.486
Zone specialist Riquelme	month	38	2.300	0	87.400	0	0		87.400	24.971	24.971	24.971	12.486
Climate change information system	month	10,5	4.000	42.000	0	0	0		42.000	12.000	12.000	18.000	
Design/implementation fishers trainig program	global	1	176.000	0	176.001	0	0		176.001	50.286	50.286	50.286	25.143
Local monitoring program design and implemenation	global	1	22.858	0	22.858	0	0		22.858	11.429	3.810	3.810	3.810
Good practices under adaptation approach fisheries and aquaculture	global	1	183.057	0	183.057	0	0		183.057	33.057	60.000	50.000	40.000
Digital bulletin design	deliverable	1	500	0	0	500	0		500	500			
CC basic guide content	deliverable	1	5.000	0	0	5.000	0		5.000	5.000			
CC childrens book content	deliverable	1	6.000	0	0	6.000	0		6.000	6.000			
Sub-total national Consultants				174.600	769.116	92.300	36.400	0	1.072.416	310.129	304.153	300.153	157.981
5570 Sub-total consultants				191.200	769.116	92.300	36.400	0	1.089.016	310.129	304.153	316.753	157.981
5650 Contracts									0				

Layout, editing and printing CC basic guide (500)	contract	1	10.000	0	0	10.000	0		10.000	10.000			
Layout, editing and printing CC children book (500)	contract	1	20.000	0	0	20.000	0		20.000	20.000			
Publicity campaign contracts for two radio campaigns on each cove	contract	1	8.000	0	0	8.000	0		8.000	8.000			
Poster layout and printing (1000)	contract	1	1.000	0	0	1.000	0		1.000	1.000			
Fun page campaign (publicity contact)	contract	1	600	0	0	600	0		600	600			
Project image design	contract	1	12.000	0	0	12.000	0		12.000	12.000			
CC in fisheries and aquaculture information management	contract	1	52.500	52.500	0	0	0		52.500	21.000	21.000	10.500	
Information system implementation arrangements	contract	1	30.000	30.000	0	0	0		30.000	6.000	12.000	12.000	
Training manuals	contract	1	5.714	0	5.714	0	0		5.714	5.714			
Midterm review	contract	1	40.000	0	0	0	40.000		40.000		40.000		
Final evaluation	contract	1	40.000	0	0	0	40.000		40.000				40.000
Final report	lump sum	1	6.550	0	0	0	6.550		6.550				6.550
5650 Sub-total Contracts				82.500	5.714	51.600	86.550	0	226.364	84.314	73.000	22.500	46.550
5900 Travel													
National project coordinator travel	travel	42	493	4.000	10.706	1.000	5.000		20.706	5.916	5.916	5.916	2.958
Zones specialists travel to Pto. Montt, Concepción, Coquimbo	travel	792	200	0	158.400	0	0		158.400	45.257	45.257	45.257	22.629
Zones specialists travel to Santiago	travel	21	493	0	10.350	0	0		10.350	2.957	2.957	2.957	1.479
National CC working group setting up travel	travel	12	192	2.304	0	0	0		2.304	768	768	768	
Regional CC working group setting up travel	travel	24	347	8.328	0	0	0		8.328	4.164	2.776	1.388	
Local CC working group setting up travel	travel	24	385	9.240	0	0	0		9.240	4.620	3.080	1.540	
Information systems consultant travel	travel	2	750	1.500	0	0	0		1.500		1.500		
Fishermen training program consultants travel	global	1	6.857	0	6.857	0	0		6.857	2.286	2.286	2.286	
Fishermen travel to training	days/person	3600	21	0	75.600	0	0		75.600	18.900	18.900	18.900	18.900

Local monitoring consultants travel Viajes consultores monitoreo local	Global	1	8.571		8.571				8.571	2.857	2.857	2.857	
Consultants diversification under resiliencia approach (travel)	Global	1	39.714	0	39.714	0	0		39.714	11.347	11.347	11.347	5.673
Communications expert travel (3 times a year, 3 days at each cove)	DSA	36	76	0	0	2.736	0		2.736	684	684	684	684
Communications expert travel (3 times a year, 3 days at each cove)	ticket	12	230	0	0	2.760	0		2.760	690	690	690	690
Communications expert travel for awareness workshops (8 workshops, 3 days)	travel per person	24	76	0	0	1.824	0		1.824	456	456	456	456
Communications expert management travel (3 times per year, 3 days per cover)	ticket	8	230	0	0	1.840	0		1.840	460	460	460	460
Travel to participate in scientific workshops (one at the end or PY3)	travel per person	3	76	0	0	228	0		228		228		
Travel to participate in scientific workshops (one at the end or PY3)	ticket	1	230	0	0	230	0		230		230		
5900 Sub-total travel				25.372	310.198	10.618	5.000	0	351.188	101.362	100.392	95.506	53.929
5023 Training and workshops													
CC/FA information systems international workshop	workshop	1	4.500	4.500	0	0	0		4.500			4.500	
Public servants self-learning CC/FA course	course	1	15.000	15.000	0	0	0		15.000		15.000		
Training on vulnerability analysis for zone experts	workshop	1	3.000		3.000	0	0		3.000	3.000			
Regional/ local courses on CC/FA	course	4	5.650	22.600	0	0	0		22.600		11.300	11.300	
National experts training meetings	meeting	4	11.530	46.120	0	0	0		46.120	11.530	23.060	11.530	
Workshop for authorities in charge of budget.	workshop	2	5.000	10.000	0	0	0		10.000		10.000		
Workshop for zones authorities	workshop	3	17.654	52.962	0	0	0		52.962	17.654	17.654	17.654	

Experts workshop to design contents for training at the coves	workshop	1	5.000	0	5.000	0	0		5.000	5.000			
Training workshops for local monitors	workshop	16	1.250	0	20.000	0	0		20.000	5.714	5.714	5.714	2.857
Fishers training workshops on CC	global	1	11.714	0	11.714	0	0		11.714	3.905	3.905	3.905	
Local monitoring validation/revision workshop	workshop	3	2.857	0	8.571				8.571	2.857	2.857	2.857	
Fishermen training workshop on productive diversification under resilience approach	Global	1	41.429	0	41.429	0	0		41.429	11.837	11.837	11.837	5.918
Inception workshop	workshop	1	2.500	0	0		2.500		2.500	2.500			
Regional awareness workshop (start)	workshop	4	2.000	0	0	8.000	0		8.000	8.000			
Regional awareness workshop (mid-term)	workshop	4	2.000	0	0	8.000	0		8.000		8.000		
School workshops (two per cove per year)	workshop	24	300	0	0	7.200	0		7.200	1.800	1.800	1.800	1.800
Press events to present guide (1 on each region's capital)	workshop	4	1.000	0	0	4.000	0		4.000	4.000			
Workshop on lessons learned (1 per year per cove)	workshop	12	2.000	0	24.000	0	0		24.000		8.000	8.000	8.000
Closing project workshop (national and 4 regional)	workshop	5	2.000	0	0	0	10.000		10.000				10.000
Fishermen exchange visits	visit	8	4.312	0	0	34.496	0		34.496			21.560	12.936
5023 Sub-total training				151.182	113.714	61.696	12.500	0	339.092	77.797	119.127	100.657	41.512
6000 Expendable procurement									0				
supplies	global	1	25.200	25.200	0	0	0		25.200	8.400	8.400	8.400	
Labb supplies (local monitoring)	global	1	10.000		10.000				10.000	3.333	3.333	3.333	
Suuplies for good practices F/A	global	1	50.000		55.000				55.000	15.714	15.714	15.714	7.857
Roller ups per coves	unit	4	200		0	800	0		800	800			
Brochures	unit	1500	1		0	1.500	0		1.500	1.500			
Good practices and lessons learned publications (3 technical memoirs, 250 each)	unit	750	20		0	0	15.000		15.000		5.000	5.000	5.000

6000 Sub-total expendable procurement				25.200	65.000	2.300	15.000	0	107.500	29.748	32.448	32.448	12.857
6100 Non-expendable procurement													
CC/FA information system equipment	global	1	3.000	3.000	0	0	0		3.000	3.000			
Local monitoring equipment (hardware and software, audiovisual, oceans sampling, biological sampling, basic laboratory)	global	1	25.000		25.000				25.000	25.000			
Investment on adaptation measures in pilot coves	global	1	241.917	0	236.917	0	0		236.917	67.691	67.691	67.691	33845,29
6100 Sub-total non-expendable procurement				3.000	261.917	0	0	0	264.917	95.691	67.691	67.691	33.845
6300 GOE budget													
Miscellaneous including contingencies	lump sum	1		2.875					2.875	821	821	821	411
6300 Sub-total GOE budget				2.875	0	0	0	0	2.875	821	821	821	411
TOTAL				481.329	1.525.659	218.514	155.450	119.048	2.500.000	733.875	731.645	670.389	364.091

SUBTOTAL Comp 1	481.329	19,3%
SUBTOTAL Comp 2	1.525.659	61,0%
SUBTOTAL Comp 3	218.514	8,7%
SUBTOTAL Comp 4	155.450	6,2%
Subtotal	2.380.952	
SUBTOTAL Project Management	119.048	4,8%
TOTAL GEF	2.500.000	100,0%



CHI SCCF final budget

APPENDIX 4: RISK MATRIX

	Risk Description	Impact ¹	Likelihood ¹	Mitigation measures	Responsible
1	Institutional risk Changes in institutional and organizational administrations could affect the prioritization of commitments or development objectives and affect the continuity of the adaptation measures implementation	MH: The decision-making processes are mainly affected in terms of the continuity of the adaptation measures implementation and scaling them.	ML	The project will increase awareness and knowledge of key stakeholders and other groups regarding the importance and relevance of climate change and its effects on fisheries and aquaculture. The incorporation of climate change indicators to the information systems and monitoring processes will be supported, and decision makers will have access to specific information on climate change, that will be useful to improve regulatory, operational, administrative and budgetary processes. Cooperation mechanisms will be strengthened through public-private Inter-Institutional Working Groups, who will support the continuity of the processes in the event of institutional changes. At the local level, adaptation measures will be implemented with the participation of more than one artisanal organization in each pilot site, in order to ensure the permanence of leaders and fishers who participated in the project generation in each site. To the extent that fishers and aquaculture farmers have more knowledge and awareness about climate change, they will support the continuity of actions undertaken and will be highly interested in incorporating adaptation measures.	Project Steering Committee
2	Institutional risk: Change of priorities among public and private institutions, to share and /or provide access to information available on climate change.	MH: Existing information on climate change would continue dispersed in the numerous institutions that produce them (government agencies, universities, research centres, private sector) so it would not serve to support better decisions regarding climate change.	ML	Public-Private Interinstitutional Working Groups will bring together key players in the fisheries and aquaculture sector, including those institutions generating information. Members of the groups will be entrusted awareness campaigns and training, what will contribute to their willingness to share information. Likewise, each group will develop its own Annual Operating Plan which may be considered as an activity to share information that will serve to build the project information system.	National Project Coordination Unit (NPCU)

¹ H: High, MH: Moderately High; ML: Moderately Low, L: Low

	Risk Description	Impact¹	Likelihood¹	Mitigation measures	Responsible
3	Institutional risk: Insufficient interinstitutional coordination, both at national and local levels, and poor cooperation mechanisms with the private sector and artisanal fishers	MH: Delay in the implementation of project activities, especially the implementation of adaptation measures in the pilot coves	ML	The project will strengthen the channels and mechanisms for interinstitutional coordination and cooperation with the private sector and artisanal fishers to adequately address the issue of climate change in the fisheries and aquaculture through the Working Groups, to address adaptation to climate change, on three levels: national; regional; and local. The groups will help to improve the current levels of participation.	NPCU
4	Political-institutional Risk: Financial sustainability, to scaling CC adaptation measures (developed in the pilot project areas)	H: Coastal communities will continue to be vulnerable without adapting to the adverse effects of climate change	ML	It is expected that awareness and training of authorities and decision makers of financial matters will be reflected in the integration of climate change to decisions made in the sector (fisheries and aquaculture management, operational and budget regulations, among others), ensuring the continuity of funding towards those relevant aspects related to the adaptation of the sector to climate change, including the scaling of adaptation measures for the various fishing and aquaculture areas.	Project Steering Committee
5	Social Risk: Lack of interest or scepticism of artisanal fishers and small-scale aquaculture farmers in pilot coves	MH: Low levels of participation that result in failure to achieve the training objectives, ownership, motivation and future sustainability of adaptation measures introduced by the project.	ML	Communities have been consulted during the preparation of the project and have demonstrated their interest and willingness to participate in activities. The Inter-Institutional Working Groups, as local coordinators, ensure the involvement of local actors. Training strategies and communication activities (awareness, training, consultation and validation, exchange mechanisms, communication materials) promote the participation and interest of the beneficiaries.	NPCU
6	Economic Risk: Presence of (national and / or international) economic crisis, could reduce institutional budgetary allocations and the participation of various stakeholders.	ML: Co-financing could be affected.	B	International economic crises have an effect on domestic economies, which could mean reductions in the budgets of the various institutions (public and private), and thus a reduced ability of participation of various stakeholders. In this regard, most of the initiatives supported by the public sector in the project have been rated high priority for the relevant institutions, and climate change is a topic which has also been relayed by the private sector. In this context, the effects of any economic crises would be minimized by the level of commitment of public and private sector. The activities included in this project are aligned with current Adaptation	Project Steering Committee

	Risk Description	Impact ¹	Likelihood ¹	Mitigation measures	Responsible
				Plans (national and sectoral), which reaffirm and reinforce the country commitment in terms of change.	
7	Weather contingencies Risk: Possibility of extreme events (El Niño) and natural disasters (tidal waves, storms, earthquakes, tsunamis, climate variability and others) throughout the development of the project, implying significant changes in the conditions of natural baseline of the project.	ML: The selection of adaptation practices can be modified as a result of special environmental conditions during the project.	ML	The project will incorporate measures to build risk maps in pilot localities and develop local monitoring systems. In this way, a priority for the project will be to strengthen simple early warning systems that could be applied nationally and locally. Best fisheries and aquaculture practices will contribute to resilience against climate variability.	NPCU
8	Social risk: Indigenous peoples participating in fisherfolk organizations and living outside direct project intervention areas refuse project activities.	Low: indigenous peoples members of fisherfolk organizations have participated in the project preparation activities and validation workshops and have accepted project proposed activities. The project is expected to generate positive impacts in those IPs and the livelihoods of IPs living in areas near the direct project intervention areas.	Low	IP will duly participate in a Free, Prior and Informed Consent (FPIC) process in PY1 before starting operations in El-Manzano-Hualaihue site and nearby areas. According to FAO Policy on Indigenous and Tribal Peoples ² and the Environmental and Social Management Guidelines ³ , a Free, Prior and Informed Consent process should be conducted, and a Grievance Mechanism will be made available.	NPCU

² <http://www.fao.org/docrep/013/i1857e/i1857e00.htm>

³ <http://www.fao.org/3/a-i4413e.pdf>

APPENDIX 5: PROCUREMENT PLAN

Reference	Item description	Unit	Estimated amount	Estimated cost	Unit price	Request method ⁵¹	Purchase method ⁵²	Buyer ⁵³	Estimated call for tender date	Estimated contract date	Estimated delivery date	Final destination and delivery terms	State ⁵⁴	Other considerations

⁵¹Request quotation, request proposals, invitation to tender.

⁵²Direct purchase, reutilization of tender products, United Nations framework, etc.

⁵³CSAP, Out the headquarters, Procurement mission.

⁵⁴This column will be updated in the phase of implementation and follow up.

APPENDIX 6: TERMS OF REFERENCE

Draft⁵⁵

N°1: Terms of Reference Draft: NATIONAL PROJECT COORDINATOR

Under the general supervision of the National Project Director and FAO Representative in Chile, and the technical guidance of the Lead Technical Officer (OTL) of FAO, the National Project Coordinator (NPC) will act as leader of the National Project Coordinating Unit (NPCU) and Secretary of the Steering Committee and shall be responsible for overall planning, daily management, technical supervision and coordination of all project activities, and in particular, will be responsible for implementing Component 1 of the Project, carrying out the following activities:

- Participate in the inception workshop, the annual project progress review and planning workshops with local actors and executing partners for the preparation of the Annual Work Plan and Budget (AWPB).
- Provide technical supervision and guidance to the executing partners in the implementation of project activities.
- Conduct regular field visits and provide advice to the executing partners present in the intervention areas, zonal technicians and others involved in the project.
- Ensure implementation of the Fisheries Ecosystem Approach throughout project implementation, and alignment with the Code of Conduct for Responsible Fisheries (CCRF) and the Voluntary Guidelines to achieve Sustainable Small-scale Fisheries (SSF Guidelines)
- Prepare terms of reference and technical specifications for hiring services and /or signing Letters of Agreement for the implementation of Component 1 activities, such as the design and implementation of the capacity building programme for public and private actors; the design of the organizational structure of the public-private Interinstitutional Working Groups on climate change; and the design and implementation of the information system on climate change. Coordinate the work of the consultants hired for the implementation of activities.
- Support the SUBPESCA in the process of set up the public-private Interinstitutional Working Groups on climate change at the national, regional and community levels.
- Supervise zonal technicians in the preparation of terms of reference and technical specifications for the procurement of services and/or sign Letters of Agreement for the implementation of project activities (Components 2 and 3).
- Monitor the risks in accordance with the risk matrix (see Appendix 4) and ensure the implementation of mitigation measures.
- Prepare Project Progress Reports (PPR) in coordination with project specialists.
- Support the LTO in preparing the Annual Project Implementation Review (PIR).
- Support SUBPESCA and MMA in preparing reports on co-financing in cash and in kind provided by the co-financiers and other partners that were not foreseen in the Project Document.
- In consultation with the Project Steering Committee, the Evaluation Office of FAO, the LTO and FAO-GEF Coordination Unit, support the organization of mid-term and final evaluations.

⁵⁵ Terms of Reference of consultants shall be reviewed and validated in the project inception phase.

- Coordinate and conduct M & E including: i) regular M & E visits to project intervention sites, ii) monthly M & E of progress in achieving outputs and outcomes indicators, iii) providing technical and operational support to institutions staff participating in the project; iv) propose possible changes in project implementation strategies if necessary.
- Plan, organize and participate in meetings of the Steering Committee, acting as Secretary.
- Make the necessary arrangements to facilitate, through interinstitutional agreements and partnerships, the project development and fulfilment of , s.
- To supervise the vulnerability assessments of the pilot coves at the beginning and of the project. Complete the SCCF tracking tool (Focal Area Climate Change Adaptation) in the middle and at the of the project.

Minimum requirements:

- University degree with training in fisheries, aquaculture, environment or other related specialty.
- At least 6 years of professional experience managing projects funded by international cooperation in the above areas. Knowledge about adaptation to climate change, fisheries, aquaculture and risk management.
- Knowledge and experience in results-based management, development and implementation of budgets, preparation of technical and financial reports and M & E.
- Proven capacity to work with technical and management staff of government and non-governmental institutions.
- Proven team leader and teamwork capacities in developing countries.
- Excellent written and oral skills.
- Experience in project management. Desirable experience in FAO execution and evaluation projects is desirable.

Duration: 42 months

Location: *[to fill in]* Regular trips to intervention areas

Languages: Spanish and Basic English (not restrictive)

Nº2: Terms of Reference Draft: ZONAL TECHNICIANS (4)

Under the general supervision of the National Project Director and FAO Representative in Chile, and the direct supervision of the National Project Coordinator, the Zonal Technician shall be responsible for providing technical assistance, coordination, supervision and monitoring and evaluation for the proper implementation of Components 2 and 3 of the Project. In particular, it shall perform the following activities:

- Prepare the annual work plan and budget corresponding to the activities of Components 2 and 3 to be developed during the year and contribute to the preparation of the Annual Work Plan and Budget for the project.
- Draw up periodical reports on the activities and contribute to the development of the Project Progress Report (PPR).
- Support the regular Monitoring and Evaluation (M & E) of the project, collecting information related to compliance of indicators of the Outcomes Framework and their means of verification, and identification of lessons learned.
- Ensure Implementation of the Fisheries Ecosystem Approach in the interventions zones and the alignment with the Code of Conduct for Responsible Fisheries (CCRF) and the Voluntary Guidelines of Sustainable Small-scale Fisheries (SSF Guidelines)
- Develop terms of reference and technical specifications for hiring of consulting services and /or signing agreements for the implementation of project activities, such as training, and best aquaculture and fisheries practices with focus on resilience (Component 2) Supervise the execution of contracts and / or Letters of Agreement in the field.
- Support the preparation of information and training materials, as well as organizing and conducting training workshops for local monitors, artisanal fishers and small-scale aquaculture farmers (Component 2).
- Make regular visits to beneficiaries and hold meetings with them for support, technical assistance, supervision and monitoring of project activities, in particular the implementation of best fisheries and aquaculture practices with focus on resilience (Component 2).
- To support the organization of exchange visits among fishers and aquaculture farmers of pilot coves and to neighbouring coves (Component 3).
- Maintain regular communication and coordination with institutional actors in the coves and involved in project implementation (e.g., Municipality, universities, research centres, SUBPESCA Regional Directorates, etc.).
- Provide technical inputs about the risks that may arise during project implementation and propose mitigation measures that may be necessary to reduce the impacts of such risks.
- Perform vulnerability assessment of the pilot coves at the beginning and end of the project.
- To support the National Coordinator in organizing and conducting midterm evaluation and final evaluation missions, and fill the SCCF tracking tool (Focal Area Climate Change Adaptation) at the middle and at the end of the project.
- Support de National Coordinator in the process of set up regional and municipal public-private Interinstitutional Working Groups, on climate change.

Minimum requirements:

- University degree with training in fisheries, aquaculture, environment or other related specialty.

- At least 5 years of professional experience in project management, draw up technical and financial reports in the aforementioned areas.
- Knowledge about adaptation to climate change, fisheries, aquaculture and risk management.
- Proven capacity to work in the field, team work to establish relations with institutions from the central, local government and civil society organizations.
- Working experience in Tarapaca, Bio Bio, Coquimbo and Los Lagos, according to the application is desirable.
- Excellent written and oral skills.

Duration: 38 months

Location: Iquique, Concepción, Coquimbo, Puerto Montt, with trips to Santiago/Valparaíso

Language: Spanish

N°3: Terms of Reference Draft

TECHNICAL ADMINISTRATIVE ASSISTANT

Under the general supervision of the National Project Director and FAO Representative in Chile, and the direct supervision of the National Project Coordinator, the Technical-Administrative Assistant shall support the National Project Coordinator in the administrative and financial management of the project. He/she will coordinate with Zonal Technicians and the Representative of FAO in Chile to perform the following tasks:

- Support the preparation of the Annual Work Plan and Budget (AWPB).
- Daily management of the project budget, including monitoring the availability of funds, budget preparation and review to be revised by the National Coordinator.
- Hold regular meetings with the National Coordinator in relation to project management, and maintain regular contact with the Zonal Technician for administrative and financial matters.
- Ensure accurate recording of all relevant operational, financial monitoring, and data based on outcomes.
- Ensure that the relevant reports on expenditure, forecasts, progress against plans, project closure, be prepared and submitted in accordance with the procedures and reporting formats, presentation calendars and communication channels of FAO and the SCCF/GEF.
- Take accurate and timely action to meet the operational requirements related to personnel, project logistics, procurement of equipment and material, and field disbursements.
- Prepare correspondence relating to administrative and financial matters.
- Support the National Coordinator in the organization of the midterm evaluation and final evaluation, and provide input regarding budgetary issues of the project.
- Perform other duties as required.

Minimum requirements:

- University degree in Business Administration and /or Accounting.
- Professional experience of at least 5 years in the field of project management and accounting.
- Knowledge and experience in administrative and financial management of projects.
- Knowledge of FAO projects management system is desirable.
- Capacity for teamwork.
- Computer skills.
- Excellent oral and written communication skills.

Duration: 42 months

Location: [to be filled]

Languages: Spanish

N°4: Terms of Reference Draft:

COMMUNICATION EXPERT (PART-TIME)

Under the general supervision of the National Project Director and the direct supervision of the National Project Coordinator, the Communication Expert shall be responsible for developing the communication strategy and dissemination of the project, providing technical assistance, supervision, monitoring and evaluation. He/she will be in charge of coordinating with the project team and the Representative of FAO in Chile, to perform the following activities:

- Prepare the annual work plan and budget corresponding to the activities to be developed during the year and contribute to the preparation of the Annual Work Plan and Budget for the project.
- Draw up periodical reports on the activities performed and contribute to the development of the Project Progress Report (PPR).
- Support the regular Monitoring and Evaluation (M & E) of the project, collecting information related to compliance of indicators of the Outcomes Framework and their means of verification, and identification of lessons learned.
- Design the communication strategy including communication and dissemination activities, formats and contents adapted to the different audiences (e.g., government, beneficiaries, general public, schools). The communication strategy will mainstream the gender perspective, including interventions and specific contents.
- Develop terms of reference for hiring services within the communication strategy framework such as: Project image, design of information material, basic guide on climate change, children's book on climate change, radio campaigns). Supervise contracts.
- Prepare and distribute monthly news bulletins and other information material.
- Organize media campaigns.
- Manage the Website and social networks of the project (Facebook, Twitter).
- Make a follow up and document the use of information and materials of the project by groups of users, as well results and impact of the use of the information.
- Document lessons learned.

Minimum requirements:

- University degree in Communication, Journalism or similar.
- At least 5 years of professional experience in the communications field.
- Knowledge and experience in design and development of communication strategies.
- Proven capacity to work in the field, team work to establish working relations with government institutions and civil society organizations.
- Working experience in regions is desirable.
- Excellent written and oral communication skills.

Duration: 24 months distributed along the project

Location: [to be filled]

Languages: Spanish

SHORT TERM EXPERT IN MONITORING AND EVALUATION (M&E)

Under the general supervision of the National Project Director and FAO Representative in Chile, and the direct supervision of the National Project Coordinator, the Expert in M&E shall be responsible for designing and implementing the M&E system of the project. The M&E System will be used by the National Coordinator for M&E activities, including: i) periodical M&E visits to the intervention sites of the project, ii) monthly M&E of the progress in compliance with outcomes and outputs indicators, iii) provide technical and operational support to the staff of participating institutions, iv) propose changes to project implementation strategies, if needed. Specifically, the M&E expert shall perform the following activities:

- In collaboration with the National Coordinator, SUBPESCA and the MMA, will facilitate the tasks related to M&E during the inception workshop of the project, including: i) presentation and clarification (if necessary) of the Project Outcomes Framework to stakeholders; ii) review the M&E indicators and their baseline values; iii) drafting of clauses that may be included in contracts of consulting services to ensure that they fulfil their responsibilities to report to M&E (if relevant); iv) update the project risk matrix and mitigation measures, and v) clarify the different actors in the project, their respective tasks and responsibilities of M & E, including mitigation measures.
- Design the M&E system in consultation with the project team, participating institutions and stakeholders, based on the outcomes of the project and the M & E plan.
- Define the methodology of gathering, delivery and processing the information required to feed the indicators.
- Define tools for systematization and processing of information obtained from the project implementation.

Minimum requirements:

- University degree with training in fisheries, aquaculture, environment or other related specialty.
- At least 5 years of experience in project/programmes M&E.
- Knowledge about adaptation to climate change, fisheries, aquaculture and risk management is desirable.
- Excellent written and oral skills.
- Capacity to take initiatives and work under minimum supervision.
- Experience in gender impact monitoring is desirable.
- Experience in projects funded by international cooperation.

Duration: 6 months

Location: [to be filled]

Languages: Spanish

N°6: Terms of Reference Draft: NATIONAL OPERATIONS OFFICER

Under the general supervision of the FAO Representative in Chile (Budget Holder) and in close collaboration with the National Project Coordinator and the executing partners, the National Operations Officer shall be responsible for timely delivery of project outcomes and, in particular, of the following:

1. Ensure timely implementation of project activities in support of the plan based on the outcomes, through operational and administrative procedures according to FAO rules and standards;
2. Coordinate project operational arrangements through contractual agreements with key project partners;
3. Make the necessary arrangements for the signing and execution of the letters of agreement (LOA) and government cooperation program (GCP) in accordance with relevant partners in the project;
4. Maintain links between FAO departments to liaise with donors, finance, human resources and other units as needed;
5. Manage the project budget on a daily basis, including monitoring the availability of cash, preparation the budget that must be reviewed by the National Coordinator and National Project Director;
6. Ensure accurate records of all data relevant for the operational and financial supervision based on outcomes;
7. Ensure that the relevant reports on expenditures, forecasts, progress against work plans, project closure, are prepared and submitted in accordance with FAO and SCCF/GEF procedures and report formats, schedule and communications, as necessary;
8. Execute accurate and timely action on all operational requirements dealing with personnel, equipment and material and field disbursement;
9. Participate and represent project in the collaborative meetings with project partners and the Steering Committee, as required;
10. Carry out supervision missions to monitor outcomes based budget and to resolve outstanding operational issues, as appropriate;
11. Be responsible for the outcomes obtained within his/her work area and ensure that issues affecting project implementation and success are brought to the attention of higher-level authorities through the Budget Holder, in a timely manner,
12. In consultation with the Office of Evaluation of FAO, LTO and the FAO-GEF Coordination Unit, to support the organization of mid-term and final evaluations and provide inputs in terms of project budget;
13. Other tasks that are required.

Minimum requirements:

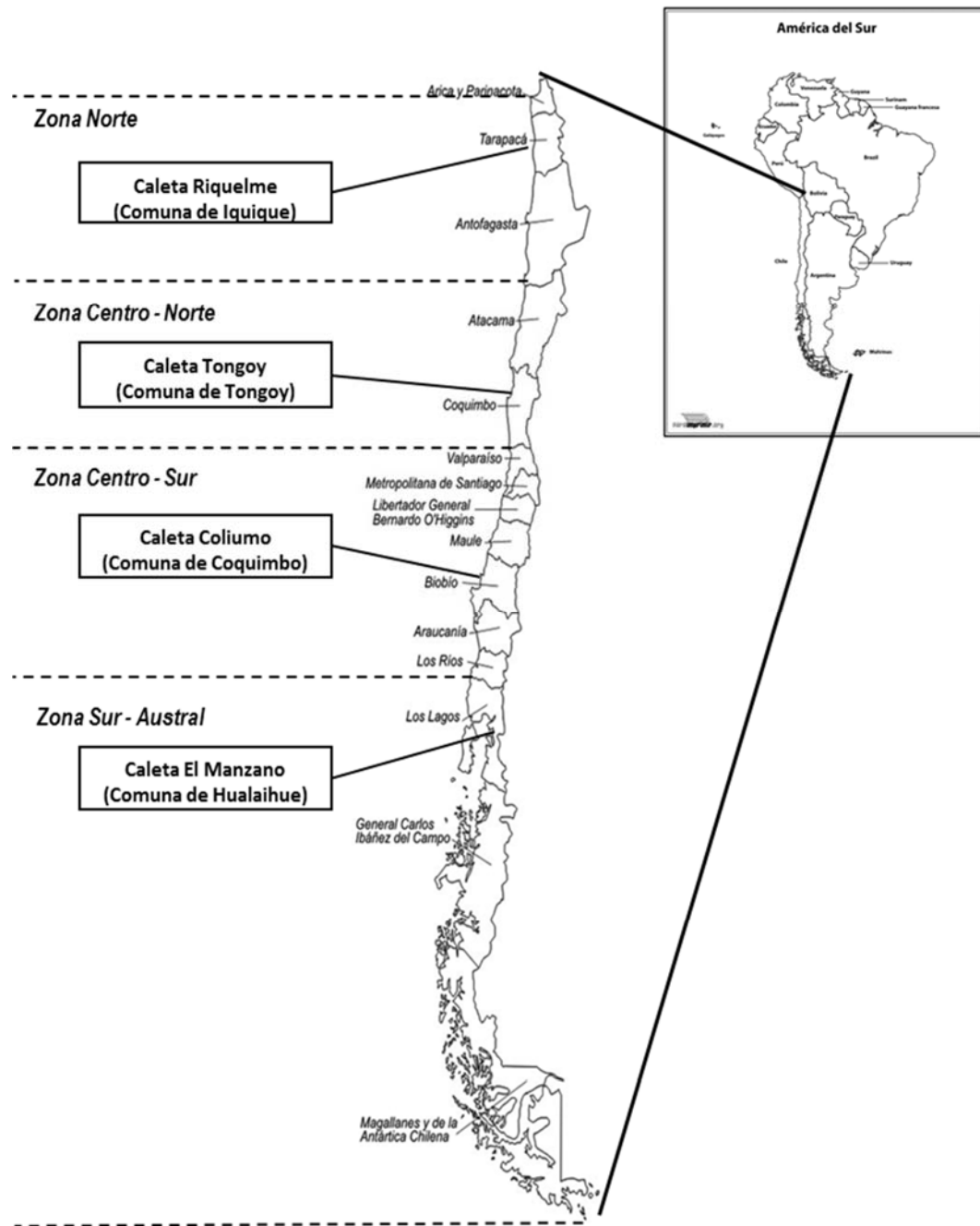
- Graduate in economics, business administration or alike.
- At least 5 years of experience in projects management in the area of natural resources, including field experience in developing countries.
- Proven capacity to establish working relations with representatives of government institutions and NGOs.
- Knowledge about management systems of FAO projects.

Duration: 42 months

Location: Santiago de Chile

Languages: Spanish

APPENDIX 7: MAP OF THE INTERVENTION ZONES



APPENDIX 8: CLIMATE-RESILIENT BEST PRACTICES AND TECHNOLOGIES

Pilot Cove	Current situation (baseline)	Major threats of Climate Change	Proposed measure	Effect of the adaptation measure
Riquelme (Northern macro zone)	Pelagic fishery resources: Albacore, Silver fish, Shark, Mahi-Mahi. There are management committees for Chilean seabass, sword fish, mahi-mahi. Benthic resources in MEBRs (brown seaweed). There are three unions organized under Caleta Riquelme Corporation. A dock managed by this corporation with stalls where women sell various things and food (eateries).	<ul style="list-style-type: none"> • Rise in sea surface temperature that affects the distribution and availability of pelagic fish (anchovy) and brown seaweeds. • Change in migratory behaviour and space distribution of living aquatic resources due to CC (reduction of OMZ and an increase of SST) • Extreme natural events (El Niño, strong winds, heavy seas, earthquakes, heavy rains, and others) that may alter upwelling processes and, with that, the productivity of the ocean and the spawning and recruitment zones, among others, 	<ul style="list-style-type: none"> • Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change. 	Enable local communities to take advantage of changes in the availability of living aquatic resources due to CC, in a rational and timely manner.
			<ul style="list-style-type: none"> • Make thematic-dynamic maps that include CC effects 	Generate and keep information to support local decisions in order to plan actions aimed at avoiding, resist and, eventually take advantage of CC impacts.
			<ul style="list-style-type: none"> • Seaweed farming in management areas (experimental aquaculture) 	Take advantage of new and/or better environmental conditions to implement other productive activities (diversification), in order to improve the resistance of coastal communities to CC.
			<ul style="list-style-type: none"> • Add value to fisheries and aquaculture products using a common brand to highlight the origin of the product. 	Mitigate the reduction in income of fisheries communities due to the lower availability of living aquatic resources, through the treatment, use and processing of raw materials to get better prices for fisheries and aquaculture products.
			<ul style="list-style-type: none"> • Design a seal to endorse best local fisheries and aquaculture practices in terms of adaptation to climate change. 	This measure, together with the previous one, includes the adoption and implementation of appropriate, permanent and sustainable practices, supported by protocols /seals of commitment to an environmentally friendly production. (e.g., SIPAM seal in agriculture) These practices will contribute to improving ecosystem resilience.
			<ul style="list-style-type: none"> • Identify and design a package of tourist initiatives including: stalls, 	Diversification of the local community activities, incorporating complementary actions to collect, rescue and disseminate the

Pilot Cove	Current situation (baseline)	Major threats of Climate Change	Proposed measure	Effect of the adaptation measure
			gastronomy, recreational fishing, and others.	fisheries and aquaculture heritage of these communities.
			<ul style="list-style-type: none"> Assessment, design and identification of legal and administrative requirements for the installation of reefs in management areas. 	Diversify productive alternatives and increase the production in the MEABRs
Tongoy (Central-North macro zone)	<p>Pelagic, demersal and benthic fisheries resources. The cuttlefish and related aquaculture activities is the main resource. Aquaculture resources: Northern scallop, abalone, oysters. Other benthic resources in MEABRs of interest: red sea squirt and brown seaweeds. They are grouped in a trade association with female members who sale fish/sea food and perform aquaculture activities.</p>	<ul style="list-style-type: none"> Changes in migratory behaviour and space distribution of living aquatic resources due to CC effects (reduction of OMZ and increase of SST) Presence of extreme natural phenomena (El Niño, red tide, strong winds, high seas, earthquakes, tsunamis, heavy rains, and others) that may alter upwelling processes and, with that, the biological productivity of the ocean and the spawning and reproduction zones, among others Alteration of the dynamics of the estuaries and coastal zones, as well coves, due to the increase in the msl 	<ul style="list-style-type: none"> Technology upgrade to produce scallops' seeds in <i>hatchery</i> 	Incorporate technology to improve and increase the production of Northern scallop seeds in a controlled environment to make up for the reduced availability of natural seed, due to climate change.
			<ul style="list-style-type: none"> Make thematic-dynamic maps that include CC effects. 	Generate and keep information to support local decisions in order to plan actions aimed at avoiding, resist and, eventually take advantage of CC impacts.
			<ul style="list-style-type: none"> Seaweed farming in management areas (experimental aquaculture) 	Take advantage of new and/or better environmental conditions to implement other productive activities (diversification), in order to improve the resistance of coastal communities to CC.
			<ul style="list-style-type: none"> Add value to fisheries and aquaculture products using a common brand to highlight the origin of the product. 	Mitigate the reduction in income of fisheries communities due to the lower availability of living aquatic resources, through the treatment, use and processing of raw materials to get better prices for fisheries and aquaculture products.
			<ul style="list-style-type: none"> Design a seal to endorse best local fisheries and aquaculture practices in terms of adaptation to climate change. 	This measure, together with the previous one, includes the adoption and implementation of appropriate, permanent and sustainable practices, supported by protocols /seals of commitment to an environmentally friendly production. (e.g., SIPAM seal in agriculture) These practices will contribute to improving ecosystem resilience.

Pilot Cove	Current situation (baseline)	Major threats of Climate Change	Proposed measure	Effect of the adaptation measure
		<ul style="list-style-type: none"> Possible effects of the acidification of the oceans (not measured yet), on the calcification of the living aquaculture resources, mainly molluscs, crustaceans and echinoderms. 	<ul style="list-style-type: none"> Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change. 	Diversification of the local community activities, incorporating complementary actions to collect, rescue and disseminate the fisheries and aquaculture heritage of these communities.
			<ul style="list-style-type: none"> Assessment, design and identification of legal and administrative requirements for the installation of reefs in management areas. 	Diversify productive alternatives and increase the production in the MEABRs.
Coliumo (Central-South macro zone)	<p>Pelagic, demersal and benthic fisheries resources: Chilean hake and conger eel (collapsed or depleted). Pacific pomfret (treated as in full exploitation) Sardine (in full exploitation) Seashore collection of seaweed and molluscs. Aquiculture resources: Gigartina radula type pig skin (lugas y chicoria) The trade association group together six unions that manage the port. Women work in recollection and</p>	<ul style="list-style-type: none"> Rise in sea surface temperature that affects the distribution and availability of pelagic fish (anchovy and sardine) and brown seaweeds. Changes in migratory behaviour and space distribution of living aquatic resources due to CC effects (reduction of OMZ and increase of SST) Presence of extreme natural phenomena (El Niño, red tide, strong winds, high seas, earthquakes, tsunamis, heavy rains, and others) that may alter upwelling processes and, with that, the biological productivity of the ocean and the spawning and 	<ul style="list-style-type: none"> Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change. 	It will enable local communities to take advantage of changes in the availability of living aquatic resources due to CC, in a rational and timely manner.
			<ul style="list-style-type: none"> Repopulation of benthic resources in MEABRs (a kind of mollusc that is part of the Management Plan of the MEABRs) 	Improve the productivity of MEABRs and ensure the sustainability of target living aquaculture resources in those areas.
			<ul style="list-style-type: none"> Make thematic-dynamic maps that include CC effects. 	Generate and keep information to support local decisions in order to plan actions aimed at avoiding, resist and, eventually take advantage of CC impacts.
			<ul style="list-style-type: none"> Seaweed farming in management areas (experimental aquaculture). 	Take advantage of new and/or better environmental conditions to implement other productive activities (diversification), in order to improve the resistance of coastal communities to CC.
			<ul style="list-style-type: none"> Add value to fisheries and aquaculture products using a common brand to highlight the origin of the product. 	Mitigate the reduction in income of fisheries communities due to the lower availability of living aquatic resources, through the treatment, use and processing of raw materials to get better prices for fisheries and aquaculture products.
			<ul style="list-style-type: none"> Design a seal to endorse best local fisheries and aquaculture practices in terms of adaptation to climate change. 	This measure, together with the previous one, includes the adoption and implementation of appropriate, permanent and sustainable

Pilot Cove	Current situation (baseline)	Major threats of Climate Change	Proposed measure	Effect of the adaptation measure
	repopulation of seaweed, processing, eateries, tourism in pelagic and boat owners' unions. Mussels farmers (are not unionized)	reproduction zones, among others • Alteration of the dynamics of the estuaries and coastal zones, as well coves, due to the increase in the msl.		practices, supported by protocols /seals of commitment to an environmentally friendly production. (e.g., SIPAM seal in agriculture) These practices will contribute to improving ecosystem resilience.
			• Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change.	Diversification of the local community activities, incorporating complementary actions to collect, rescue and disseminate the fisheries and aquaculture heritage of these communities.
			• Assessment, design and identification of legal and administrative requirements for the installation of reefs in management areas.	Diversify productive alternatives and increase the production in the MEABRs
El Manzano (Southern macro zone)	Pelagic, demersal and benthic fisheries resources: Southern hake (over exploited) Golden kingclip (collapsed or depleted). Rays. Seashore collection of seaweed and molluscs. Aquiculture resources: collection of mussel seed. Repopulation of Gigartina radula type pig skin.	<ul style="list-style-type: none"> • Rise in sea surface temperature that affects the distribution and availability of pelagic fish (anchovy and sardine) and brown seaweeds • Changes in migratory behaviour and space distribution of living aquatic resources due to CC effects (reduction of OMZ and increase of SST) • Presence of extreme natural phenomena (El Niño, red tide, strong winds, high seas, earthquakes, tsunamis, 	• Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change	It will enable local communities to take advantage of changes in the availability of living aquatic resources due to CC, in a rational and timely manner.
			• Repopulation of benthic resources in MEABRs (a kind of mollusc that is part of the Management Plan of the MEABRs)	Improve the productivity of MEABRs and ensure the sustainability of target living aquaculture resources in those areas.
			• Make thematic-dynamic maps that include CC effects.	Generate and keep information to support local decisions in order to plan actions aimed at avoiding, resist and, eventually take advantage of CC impacts.
			• Programme of technical support to mytilidae seeds collection in the cove (seeds collection technologies, collectors transfer, etc.)	The programme allows for planning and implementing timely and permanent actions to improve the collection of natural mussel seeds under CC conditions.
			• Bivalve molluscs health programme (BMHP).	Expand and improve commercial opportunities for the coastal localities according to environmental and health factors.

Pilot Cove	Current situation (baseline)	Major threats of Climate Change	Proposed measure	Effect of the adaptation measure
	<p>The Huailahue Federation has 33 unions that participate in five management committees. High percentage of women in 4 unions (40%), who work preparing collectors and other activities. Strong work alliance with the municipality. Industrial aquaculture: Salmon Incorporate tourism and share the work with women (trekking). Attempts to get a certification for hake.</p>	<p>heavy rains, and others) that may alter upwelling processes and, with that, the biological productivity of the ocean and the spawning and reproduction zones, among others</p> <ul style="list-style-type: none"> • Alteration of the dynamics of the estuaries and coastal zones, as well coves, due to the increase in the msl. • Possible effects of the acidification of the oceans (not measured yet), on the calcification of the living aquaculture resources, mainly molluscs, crustaceans and echinoderms. 	<ul style="list-style-type: none"> • Add value to fisheries and aquaculture products using a common brand to highlight the origin of the product. 	<p>Mitigate the reduction in income of fisheries communities due to the lower availability of living aquatic resources, through the treatment, use and processing of raw materials to get better prices for fisheries and aquaculture products.</p>
			<ul style="list-style-type: none"> • Design a seal to endorse best local fisheries and aquaculture practices in terms of adaptation to climate change. 	<p>This measure, together with the previous one, includes the adoption and implementation of appropriate, permanent and sustainable practices, supported by protocols /seals of commitment to an environmentally friendly production. (e.g., SIPAM seal in agriculture) These practices will contribute to improving ecosystem resilience.</p>
			<ul style="list-style-type: none"> • Identification, adaptive exploitation and alternative processing of bycatch whose presence is temporary due to climate change. 	<p>Diversification of the local community activities, incorporating complementary actions to collect, rescue and disseminate the fisheries and aquaculture heritage of these communities.</p>
			<ul style="list-style-type: none"> • Assessment, design and identification of legal and administrative requirements for the installation of reefs in management areas. 	<p>Diversify productive alternatives and increase the production in the MEABRs.</p>

APPENDIX 9: ENVIRONMENTAL AND SOCIAL RISK ANALYSIS

PROJECT ENVIRONMENTAL AND SOCIAL SCREENING (ESS) CHECKLIST -For Risk Classification use during Project Identification

For each question only 1 of 4 boxes must be checked: Not Applicable (N/A), No, Yes or Unknown⁵⁶.

Would the project, if implemented?	Not Applicable	No	Yes	Unknown
I. FAO VISION/STRATEGIC OBJECTIVES				
Be in line with FAO's vision?			x	
Be supportive of FAO's strategic objectives?			x	
II. FAO KEY PRINCIPLES FOR SUSTAINABILITY IN FOOD AND AGRICULTURE				
Improve efficiency in the use of resources?			x	
Conserve, protect and enhance natural resources?			x	
Protect and improve rural livelihoods and social well-being?			x	
Enhance resilience of people, communities and ecosystems?			x	
Include responsible and effective governance mechanisms?			x	
ESS 1 NATURAL RESOURCES MANAGEMENT				
❖ Management of water resources and small dams				
Include an irrigation scheme that is more than 20 hectares or withdraws more than 1000 m3/day of water?	x			
Include an irrigation scheme that is more than 100 hectares or withdraws more than 5000 m3/day of water?	x			
Include an existing irrigation scheme?	x			
Include an area known or expected to have water quality problems?	x			
Include usage of non-conventional sources of water (i.e. wastewater)?	x			

⁵⁶ "Show stopper" questions are marked in red colour. If any issues are identified in answering these questions then the project is no longer a low risk project and needs to be brought to the attention of relevant technical divisions and the ESM unit.

Would the project, if implemented?	Not Applicable	No	Yes	Unknown
Include a dam that is more than 5 m. in height?	x			
Include a dam that is more than 15 m. in height?	x			
Include measures that build resilience to climate change?			X	
❖ Tenure				
Negatively affect the legitimate tenure rights of individuals, communities or others ⁵⁷ ?		x		
ESS 2 BIODIVERSITY, ECOSYSTEMS AND NATURAL HABITATS				
Make reasonable and feasible effort to avoid practices that could have a negative impact on biodiversity, including agricultural biodiversity and genetic resources?			X	
Have biosafety provisions in place?			X	
Respect access and benefit-sharing measures in force?			x	
Safeguard the relationships between biological and cultural diversity?			x	
❖ Protected areas, buffer zones and natural habitats				
Be located such that it poses no risk or impact to protected areas, critical habitats and ecosystem functions?			X	
ESS 3 PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE				
❖ Planted forests				
Have a credible forest certification scheme, national forest programmes or equivalent or use the Voluntary Guidelines on Planted Forests (or an equivalent for indigenous forests)?	x			
ESS 4 ANIMAL - LIVESTOCK AND AQUATIC- GENETIC RESOURCES FOR FOOD AND AGRICULTURE				
Involve the procurement or provision of pesticides?	x			
❖ Aquatic genetic resources				
Adhere (Aligned) to the FAO Code of Conduct for Responsible Fisheries (CCRF) and its related negotiated instruments?			x	
Be aligned, where applicable, with FAO's strategic policies established in the FAO Technical Guidelines for Responsible Fisheries (including aquaculture)?			x	
❖ Livestock genetic resources				

⁵⁷ In accordance with Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT)
<http://www.fao.org/docrep/016/i2801e/i2801e.pdf>

Would the project, if implemented?	Not Applicable	No	Yes	Unknown
Be aligned with the Livestock Sector Strategy including the animal disease, public health and land degradation provisions?	x			
ESS 5 PEST AND PESTICIDES MANAGEMENT				
Involve the procurement or provision of pesticides?	x			
Result in increased use of pesticides through expansion or intensification of production systems?	x			
Require the disposal of pesticides or pesticide contaminated materials?	x			
ESS 6 INVOLUNTARY RESETTLEMENT AND DISPLACEMENT				
Avoid the physical and economic displacement of people?		X		
ESS 7 DECENT WORK				
Adhere to FAO's guidance on decent rural employment, promoting more and better employment opportunities and working conditions in rural areas and avoiding practices that could increase workers' vulnerability?			x	
Respect the fundamental principles and rights at work and support the effective implementation of other international labour standards, in particular those that are relevant to the agri-food sector?			x	
ESS 8 GENDER EQUALITY				
Have the needs, priorities and constraints of both women and men been taken into consideration?			x	
Promote women's and men's equitable access to and control over productive resources and services?			x	
Foster their equal participation in institutions and decision-making processes?			x	
ESS 9 INDIGENOUS PEOPLES AND CULTURAL HERITAGE				
Are there any indigenous communities in the project area?			x	
Are project activities likely to have adverse effects on indigenous peoples' rights, lands, natural resources, territories, livelihoods, knowledge, social fabric, traditions, governance systems, and culture or heritage (tangible and intangible)?		x		
Are indigenous communities outside the project area likely to be affected by the project?		x		
Designed to be sensitive to cultural heritage issues?	x			

RISK CERTIFICATION FORM

After completing the Environmental and Social (E&S) Screening Checklist, the Lead Technical Officer (LTO) completes and certifies this Certification Form and attached the E&S Screening Checklist to this form.

Project symbol: GCP/CHI/039/SCF

Project title: FORTALECIMIENTO DE LA CAPACIDAD DE ADAPTACIÓN EN EL SECTOR PESQUERO Y ACUICOLA CHILENO AL CAMBIO CLIMÁTICO

A. RISK CLASSIFICATION

☐ Low ☒ Moderate ☐ High

1. Record key risk impacts from the E&S Screening Checklist

A. There are minimum or negligible risks/ potential impacts on ecosystem services and biodiversity through aquaculture and coastal fisheries. In all cases measures are ensured to minimize those and maximize benefits to coastal communities

B. There are minimum or negligible risks related to indigenous communities and the project document is already addressing those. Indigenous communities will rather benefit from the project

2. Has the project site and surrounding area been visited by the compiler of this form?

☒ Yes ☐ No

B. STAKEHOLDER CONSULTATION/ENGAGEMENT

Identification of Stakeholder(s)	Date	Participants	Location
Consultation workshop	14/4/2015	Government officials, civil society organizations, universities, community leaders	Valparaiso
Logical framework workshop	17-18/11/2015	Ministry of Environment, Fisheries Undersecretary, community leaders, National Fisheries Institute.	Valparaiso

1. Summarize key risks and impacts identified from the stakeholder engagement

Stakeholders mentioned that inter-institutional articulation is essential, as well as permanent communication. Failure of either of these two elements would pose a risk on the appropriateness and effectiveness of the adaptation strategy.

2. Have any of the stakeholders raised concerns about the project?

Other concern of the stakeholders was that economic alternatives should be envisaged particularly in the most CC-vulnerable zones, so that if fisheries/aquaculture are to be affected, alternative economic activities are in place for former fisher folk and aquaculturists.

Artisanal fishermen organisations have some members that belong to indigenous communities. When asked if the presence of indigenous people in the fishermen organisations required the need to carry out an indigenous consultation, the Fisheries Undersecretary⁵⁸ stated that the project selected areas have already been declared fisheries management areas under article 55 of the Fisheries General Law, and have been granted to fishermen's organizations for their sustainable use. These are not territories that belong to indigenous communities. And therefore consultation in this regard did not apply.

The indigenous community members that are also part of fishermen's organizations will be able to replicate in their communities, the knowledge obtained through the project. Thus, indigenous communities would be indirect beneficiaries of the adaptive measures envisaged in component 2. During project year 1, representatives of indigenous groups that are part of the fishermen's organizations will also be invited to the inception workshop

The LTO confirms the information above

Date _____

Signature _____

Alejandro FLORES

SENIOR FISHERY AND AQUACULTURE OFFICER, FAORLC

Annex 1



Statement from the
FU



Minute



Certification form
signed

⁵⁸Annex 1 the minute of the meeting between the Fisheries Undersecretary and FAO that took place during the project design. Also the statement FAO received from the Fisheries Undersecretary that resulted from that meeting.

APPENDIX 11 OFFICIAL NOTE FOR THE ADMINISTRATION OF RESOURCES



Government request