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Report No: PAD1702

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$40 MILLION

TO THE

REPUBLIC OF PERU

FOR A

NATIONAL PROGRAM FOR INNOVATION IN FISHERIES AND AQUACULTURE

January 5, 2017

Environment & Natural Resources and Agriculture Global Practices
Latin America and Caribbean Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective October 14, 2016)
Currency Unit = Peruvian Sols Nuevo (PEN)
PEN 3.40 = US$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CONCYTEC	National Council of Science and Technology *(Consejo Nacional de Ciencia y Tecnología)*
CPS	Country Partnership Strategy
GRS	Grievance Redress Service
EIA	Environmental Impact Assessment
ESMF	Environmental and Social Management Framework
HCLME	Humboldt Current Large Marine Ecosystem
HH	Household
ICB	International Competitive Bidding
IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Policy Framework
IRR	Internal Rate of Return
M&E	Monitoring and Evaluation
MEF	Ministry of Economy and Finance (*Ministerio de Economía y Finanzas*)
NCB	National Competitive Bidding
NGO	Non-Governmental Organization
NPA	Natural Protected Area
NPV	Net Present Value
PAD	Project Appraisal Document
PDO	Project Development Objective
PIU	Project Implementation Unit
PNIPA	National Program for Innovation in Fisheries and Aquaculture (*Programa Nacional de innovación en Pesca y Acuicultura*)
PRODUCE	Ministry of Production (*Ministerio de Producción*)
SANIPES	National Service for Fisheries Health (*Organismo Nacional de Sanidad Pesquera)*
SNIPA	National System for Innovation in Fisheries and Aquaculture (*Sistema Nacional de Innovación en Pesca y Acuicultura)*

Regional Vice President:	Jorge Familiar
Country Director:	Alberto Rodríguez
Senior Global Practice Directors:	Julia Bucknall (Acting) and Juergen Voegele
Practice Managers:	Raúl Alfaro Pelico and Laurent Msellati
Task Team Leaders:	Michael Morris and Juan José Miranda Montero

PERU
National Program for Innovation in Fisheries and Aquaculture

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PAD DATA SHEET

Peru

National Program for Innovation in Fisheries and Aquaculture (P155902)

PROJECT APPRAISAL DOCUMENT

LATIN AMERICA AND CARIBBEAN

Environment & Natural Resources and Agriculture Global Practices

Report No.: PAD1702

Basic Information			
Project ID P155902	EA Category B - Partial Assessment		Team Leaders Michael Morris Juan Jose Miranda Montero
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ]		
	Financial Intermediaries [ ]		
	Series of Projects [ ]		
Project Implementation Start Date 25-Apr-2017	Project Implementation End Date 25-Oct-2021		
Expected Effectiveness Date 25-Apr-2017	Expected Closing Date 25-Jan-2022		
Joint IFC	No		
Practice Manager	Senior Global Practice Director	Country Director	Regional Vice President
Raul Alfaro Pelico Laurent Msellati	Julia Bucknall (Acting) Juergen Voegele	Alberto Rodriguez	Jorge Familiar

Borrower: Ministerio de Economia y Finanzas			
Responsible Agency: Ministerio de la Producción - PRODUCE			
Contact:	Hector Soldi	Title:	Vice Minister for Fisheries and Aquaculture, PRODUCE
Telephone No.:	5116162222	Email:	hsoldi@produce.gob.pe

Project Financing Data(in USD Million)					
[X]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[ ]	Credit	[ ]	Grant	[ ]	Other

Total Project Cost:	120.90	Total Bank Financing:	40.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	80.90
International Bank for Reconstruction and Development	40.00
Total	120.90

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021	2022			
Annual	0.14	13.13	15.74	8.60	1.93	0.46			
Cumulative	0.14	13.27	29.01	37.61	39.54	40.00			

Institutional Data

Practice Area (Lead)

Environment & Natural Resources

Contributing Practice Areas

Agriculture

Proposed Development Objective

The objective of the Project is to strengthen the Borrower's capacity in the delivery of innovations in the fisheries and aquaculture value chains. The Project will support the Borrower's purpose to improve the performance of the National Fisheries and Aquaculture Innovation System (SNIPA) and fisheries and aquaculture value chains, to promote the transformation of the Borrower's fisheries and aquaculture sector through reducing reliance on capture fisheries and increasing emphasis on aquaculture.

Components

Component Name	Cost (USD Millions)
Promoting innovation in the fisheries sub-sector	30.80
Promoting innovation in the aquaculture sub-sector	62.60
Strengthening the SNIPA, institutions and policies to improve governance of fisheries and aquaculture	16.50
Project management	11.00

Systematic Operations Risk- Rating Tool (SORT)	
Risk Category	**Rating**
1. Political and Governance	Moderate
2. Macroeconomic	Low
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Other	Low
OVERALL	Moderate

Compliance	
Policy	
Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04	X	
Forests OP/BP 4.36	X	
Pest Management OP 4.09	X	
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10	X	
Involuntary Resettlement OP/BP 4.12		X
Safety of Dams OP/BP 4.37		X
Projects on International Waterways OP/BP 7.50	X	
Projects in Disputed Areas OP/BP 7.60		X

Legal Covenants			
Name	**Recurrent**	**Due Date**	**Frequency**
Reports on Approved Sub-Projects (Schedule 2, Section I.D.5.)	X		Semi-Annual
Description of Covenant			
The Borrower, through PRODUCE, shall, not later than thirty (30) calendar days after the end of each calendar semester during Project implementation (starting with the semester in which the Effective Date falls), prepare and furnish to the Bank, a report (the Subproject Report) listing the approved Subprojects during said calendar semester, including information concerning the location of the same and the activities supported by said Subprojects, including any fisheries or aquaculture species involved, in a form and manner acceptable to the Bank.			
Name	**Recurrent**	**Due Date**	**Frequency**
Hiring of Fiduciary Staff (Schedule 2, Section I.A.1.b)		25-Oct-2017	
Description of Covenant			
The Borrower, through PRODUCE, shall, not later than six (6) months after the Effective Date, ensure that an accounting specialist and treasurer are assigned to work full time within the PIU under terms of reference acceptable to the Bank;			
Name	**Recurrent**	**Due Date**	**Frequency**
Creation of Regional Offices (Schedule 2, Section I.A.1.c)		25-Oct-2017	
Description of Covenant			
The Borrower, through PRODUCE, shall create at least two (2) regional offices during the first year of Project implementation (starting on the year in which the Effective Date falls) and up to four (4) regional offices during the second year of Project implementation, for a total of six (6) regional offices, as further elaborated in the Operational Manual, all responsible for the coordination of Project activities, including the responsibility to ensure integration and quality of activities under the Project.			
Name	**Recurrent**	**Due Date**	**Frequency**
Creation of Scientific Advisory Committee (Schedule 2, Section I.A.2.b)		25-Apr-2019	
Description of Covenant			
The Borrower, through PRODUCE, shall not later than six (6) months after the Effective Date, create, and thereafter maintain throughout the implementation of the Project, a committee (the Scientific Advisory Committee) in charge of providing guidance to the PIU on scientific and technical aspects regarding the innovation agenda, and with functions, responsibilities, resources and competencies acceptable to the Bank, as further defined in the Operational Manual.			

Name	Recurrent	Due Date	Frequency
Signing Sub-project Agreements (Schedule 2, Section I.B.a)	X		Continuous

Description of Covenant

For the purposes of carrying out Parts 1 and 2 of the Project, the Borrower through PRODUCE shall, after having selected a Subproject in accordance with the guidelines and procedures set forth in the Operational Manual, make available to the pertinent Beneficiary a portion of the proceeds of the Loan (the Subproject Funds) pursuant to an agreement ("Subproject Agreement") to be entered into between the Borrower, through PRODUCE, and said Beneficiary, under terms and conditions approved by the Bank and included in the Operational Manual.

Conditions

Source Of Fund	Name	Type
IBRD	Loan Effectiveness	Effectiveness

Description of Condition

The Operational Manual has been adopted by the Borrower.
The Project Implementation Unit has been created by the Borrower and key staff recruited.
The Steering Committee has been created by the Borrower.

Source Of Fund	Name	Type
IBRD	Retroactive Financing	Disbursement

Description of Condition

No withdrawal shall be made for payments made prior to the date of the Loan Agreement, except that withdrawals up to an aggregate amount not to exceed $4,000,000 may be made for payments made prior to the date of the Loan Agreement but on or after November 3, 2016, for Eligible Expenditures.

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Michael Morris	Team Leader (ADM Responsible)	Lead Agriculture Economist	Agriculture	GFA04
Juan Jose Miranda Montero	Team Leader	Environmental Economist	Environment	GENGE
Selene del Rocio La Vera	Procurement Specialist (ADM Responsible)	Procurement Specialist	Procurement	GGO04
Juan Paulo Rivero Zanatta	Financial Management Specialist	Consultant	Financial management	GGO22
Alonso Zarzar Casis	Safeguards Specialist	Sr. Social Scientist	Social safeguards	GSU04
Catarina Isabel Portelo	Counsel	Senior Counsel	Legal	LEGLE

Geise B. Santos	Team Member	Program Assistant	Operations	GEN04
Griselle Felicita Vega	Team Member	Sr. Agricultural Specialist	Agriculture	GFA04
Mara Elena La Rosa	Team Member	Program Assistant	Operations	LCC6C
Maria Virginia Hormazabal	Team Member	Finance Officer	Disbursement	WFALA
Mario I. Mendez	Team Member	Program Assistant	Operations	GFA04
Miguel Angel Jorge	Team Member	Sr. Fisheries Specialist	Fisheries	GENGE
Patricia De la Fuente Hoyes	Team Member	Sr. Financial Management Specialist	Financial management	GGO22
Raul Tolmos	Safeguards Specialist	Environmental Specialist	Environmental safeguards	GEN04
Sylvia Michele Diez	Team Member	Environmental Specialist	Environment	GEN04
Veronica Yolanda Jarrin	Team Member	Operations Analyst	Operations	GEN04

Extended Team

Name	Title	Office Phone	Location
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Dennis Escudero	M&E Specialist	51-1-4472641	Lima
Jogeir Toppe	Fisheries Specialist	+39 06 57051	Rome

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required? Consulting services to be determined

I. STRATEGIC CONTEXT

A. Country Context

1. Over the past two decades, Peru has made significant advances in accelerating growth, reducing poverty, and promoting social development. Peru's three-pillared macroeconomic framework (which combines a flexible exchange rate, inflation targeting, and fiscal prudence) has contributed to a long period of relative macroeconomic stability. From 2000 to 2014, growth averaged 5.3 percent per year, despite a weak external environment and a financial crisis in 2009 during which the economy continued to expand. Employment growth and associated income gains achieved during a period of relative price stability, combined with the implementation of targeted social assistance programs, have helped to reduce the share of Peruvians living in moderate poverty from nearly 60 percent in 2004 to around 21.8 percent in 2015. During the same period, the share of those living in extreme poverty fell from 16 percent to 4.1 percent.

2. Sound macroeconomic management has created the fiscal space needed for countercyclical policies to soften the impacts of occasional economic slowdowns, such as the one that is currently being experienced. Since 2015, sluggish global demand and low international prices for oil, gas, and minerals have put pressure on Peru's exports, which have contracted sharply. Meanwhile, political instability and periodic protests against large-scale mining projects have created some uncertainty in the business climate, possibly contributing to the weakening in private investment. The Government has responded by putting in place countercyclical fiscal policies and stimulus packages to boost growth.

3. Despite the recent gains in growth and poverty reduction, income disparities within the country remain pronounced, particularly between rural and urban areas. In 2015, the national poverty rate stood at 21.8 percent, but in rural areas it was much higher—45.2 percent. Recognizing that further progress is needed in the battle against poverty, the Government has launched an ambitious development agenda designed to accelerate growth and improve equity by boosting productivity and eliminating social disparities. During 2015, known as "the year of productive diversification and strengthening of education," a number of initiatives were launched to encourage innovation and facilitate productive diversification, with the goal of creating new engines of growth in sectors such as fisheries and aquaculture, agriculture, and forestry.

B. Sectoral and Institutional Context

4. Peru ranks among the top fish producing countries in the world, thanks to its location adjacent to the Humboldt Current Large Marine Ecosystem (HCLME). About 18-20 percent of the global fish catch derives from the HCLME, comprising mainly small pelagic species, especially anchoveta. The highly productive HCLME supports other important fishery resources, along with a large population of marine mammals and a vast seabird population. Due to its extremely large size and abundant biodiversity, the HCLME is of global importance.

5. The Peruvian anchoveta fishery—the world's largest fishery by volume—is of significance to the national economy. Over 95 percent of the Peruvian anchoveta catch is processed into fish meal and fish oil before being exported. In 2012, the value of anchoveta exports hit an all-time high of US$3.3 billion, accounting for 11.4 percent of Peru's total exports. Over the past decade, anchoveta exports have accounted for around 7 percent on average of total exports.[1] In recent years, the Government of Peru has

[1] According to official statistics, the fisheries subsector in Peru contributes about 0.5 percent to total gross domestic product, but this figure greatly underestimates the importance of the subsector, since it does not include the value added from the production of fish meal and fish oil, which is included in statistics for the manufacturing sector.

introduced a number of regulatory measures designed to ensure the sustainability of the anchoveta industry, and it continues to invest significant resources in bi-annual stock assessments and other monitoring activities.

6. While the attention directed to the industrial anchoveta fishery seems to be paying dividends, relatively little attention has been directed to other, predominantly artisanal marine capture fisheries and to the nascent marine and fresh-water aquaculture subsectors, where there are significant opportunities for improvement. Artisanal fishing accounts for only about 15 percent of total landings, but it provides jobs for large numbers of people, invigorates local economies, and supplies about 80 percent of the fresh fish and seafood consumed in the domestic market. According to the First National Census of Artisanal Fisheries (carried out in 2012), artisanal capture fisheries provide employment for 12,400 ship owners and 44,000 fishermen. When post-harvest activities such as processing, storage, and wholesale and retail distribution are included, the total employment number swells to around 221,000 people, including large numbers of women. Women play an especially important role in post-harvest activities, including processing and retail distribution, although their contribution is not often recognized. According to a recent study on Peru's fisheries subsector, women are responsible for 50 percent of processing and almost 60 percent of retail marketing of fish products.

7. The importance of fisheries and aquaculture in Peru extends well beyond purely economic considerations. In a country in which portions of the population continue to suffer from hunger and malnutrition, fisheries and aquaculture could also make a significant contribution to improved nutrition, especially among the poor. In 2015, 14.4 percent of Peruvian children under the age of 5 were undernourished, and the rate was much higher in rural areas and among low-income groups (27.7 percent overall in rural areas, and 33.4 percent among the lowest two income quintiles in rural areas). *A Comer Pescado*, a program initiated in 2011 by the Ministry of Production (*Ministerio de Producción*, PRODUCE), is attempting to boost fish consumption in regions where the consumption of fish has traditionally been low. By 2016, the program is expected to reach 500,000 people, mainly in Andean communities. The efforts initiated to date to promote increased fish consumption represent steps in the right direction, but they could be far more ambitious. At a time when overall demand for fish and other seafood products is rising rapidly, driven by population increases, rising incomes, and growing appreciation among consumers of the nutritional benefits, considerable scope exists to make better use of currently overexploited marine capture fisheries and to exploit large opportunities in marine and fresh-water aquaculture.

8. Against this background, the Government of Peru is seeking to expand and diversify the fisheries subsector, with the goal of complementing the large-scale, low-value anchoveta fishery with a diverse set of extractive and productive activities involving both wild and farmed species that can generate high-value products, provide employment, stimulate growth, and help meet rapidly growing domestic and international demand for fish and seafood products. While innovation is clearly needed to drive future growth, the challenges facing marine capture fisheries other than anchoveta and aquaculture are not the same, so different strategies will be needed to unlock their respective potentials.

9. In the case of *marine capture fisheries* other than anchoveta, the principal challenge will be to ensure the sustainability of wild fish stocks in the face of increased fishing efforts. Currently, the main species targeted by larger commercial vessels—hake—is over-exploited, as are most of the numerous near-shore species targeted by artisanal fleets. It is difficult to form a precise picture of the current state of many marine fisheries, however, because data on stock status are limited, regulatory oversight and enforcement is lacking, and compliance with regulations is poor. With innovative management practices that empower local communities and provide incentives to preserve the health of the resource, these fisheries could be rebuilt to the point where they could generate as much value to the economy as the anchoveta industry currently does. Sustainable development of the marine capture fisheries other than anchoveta would also contribute significantly to improving the livelihoods of coastal communities, which include some of the most marginalized members of society.

10. In the case of *aquaculture*, the principal challenge will be to improve productivity and production of existing cultured species and to increase species diversification while avoiding adverse environmental impacts. Marine aquaculture is currently dominated by a small number of species; about three quarters of the value from marine aquaculture derives from shellfish (mainly sea scallops) and shrimp produced in the Coastal region. Development of marine finfish culture will require significant investments in new technology, along with regulatory reforms. Feasibility studies have revealed that a number of marine species have considerable potential to diversify the aquaculture spectrum of the country, such as tuna fish and flat fishes. Inland aquaculture consists mainly of trout production, which takes place in the Andean region and which depends heavily on the importation of fertilized eggs. Production of *tilapia*, which dominates fish culture in many other parts of Latin America, shows great potential particularly among small scale producers, but *tilapia* is produced and consumed on a limited scale at present in Peru. Cultivation of indigenous species (*paco, gamitana, doncella, paiche, sábalo*) is on the rise in the Amazonian region, but the development of economically sustainable production systems will require large investments. Demand in the domestic market remains unstable, and the infrastructure and logistics needed for exports is still underdeveloped.

11. A final underdeveloped fishery resource relates to indigenous freshwater species. Collection of ornamental species in the Amazon region for export to the aquarium trade has grown rapidly in recent years. Because these exports are largely unregulated, some species are threatened with extinction, which in addition to impacting global biodiversity would also impose economic hardship on the communities that derive income from their sale. Research is needed to help local collectors switch to breeding these high value species, relieving pressure on the resource and offering a source of higher and more stable income.

12. The Government's long-term vision for the development of the fisheries and aquaculture sector thus includes two parallel goals. The first goal is to reorient the exploitation strategy for marine capture fisheries by increasing the relative importance of species other than anchoveta while ensuring the sustainability of wild fish stocks. The second goal is to expand the aquaculture subsector, both marine and freshwater, by encouraging investment throughout the value chain in ways that will increase incomes, generate employment, and improve nutritional outcomes. These goals will not be achieved easily or quickly; they will be achieved only through policy reforms, institutional changes, and supporting investments sustained over an extended period.

13. Achievement of the two goals will be particularly challenging given the prospects for global climate change, which is expected to impact both subsectors. Peru's fisheries subsector is vulnerable to climate change, because the size, distribution, and composition of wild fish stocks are influenced by many environmental factors that are affected by climatic conditions, most notably the quality and temperature of ocean waters (in the case of marine fisheries) and the quantity, quality, and temperature of water in rivers and lakes (in the case of inland fisheries). Peru's aquaculture subsector similarly is vulnerable to climate change, because the productivity of marine and inland aquaculture production systems is influenced by environmental factors that are affected by climatic conditions, such as the quantity, quality, and temperature of water in rivers and lakes. Peru's location adjacent to the Humboldt Current leaves both subsectors particularly vulnerable to effects stemming from the El Niño Southern Oscillation, whose frequency and severity is projected to increase in the future as a consequence of accelerating and progressively more imbalanced warming of the tropical Pacific. This will not only impact the abundance of Peru's fishery resources, but it will also increase the frequency and severity of storms that can disrupt operations as well as damage equipment and infrastructure in both subsectors. Ocean acidification, another major climate-driven phenomenon, may also negatively impact the potential for Peru to expand its shellfish aquaculture subsector. Specific measures will be needed in the future to adapt fisheries management and aquaculture production methods to ensure resilience in the face of climate change.

14. In this context, the National Program for Innovation in Fisheries and Aquaculture (PNIPA)[2] is conceived as the initial phase of a multi-phased effort to build a larger, more diversified, more productive, and environmentally sustainable fisheries and aquaculture sector. The Program will be led by the Vice Ministry of Fisheries and Aquaculture within PRODUCE, which holds the overall mandate for developing and managing the fisheries and aquaculture sector. Consistent with the objectives of the Government's Productive Diversification Plan, the vision of PRODUCE´s Multiannual Strategic Sector Plan (PESEM) is a diversified, productive, innovative, and environmentally sustainable fisheries and aquaculture sector, one comprising vibrant and competitive value chains in which value-adding activities are carried out by a diverse set of actors including individuals, producer organizations and cooperatives, small- and medium-scale enterprises, large industrial firms, and conglomerates. A central theme of the Project is to support the Government's strategy to transition from a sector that is focused primarily on industrial exploitation of a single species—anchoveta—to a sector that will be larger, more diversified, and increasingly reliant on productive activities (aquaculture) as opposed to extractive activities (capture fisheries).

15. Transforming Peru's fisheries and aquaculture sector is an ambitious undertaking that will require sustained effort at a large scale on multiple fronts. Rather than attempting to achieve all of its objectives through a single program or project, PRODUCE pragmatically has decided to use an array of focused initiatives, to be supported with different sources of financing. Within this larger strategy, the intended role of PNIPA is to promote innovation and strengthen institutional capacity to support innovation in artisanal capture fisheries and aquaculture. Focusing separately on artisanal fisheries and aquaculture makes sense, because the management strategies appropriate for artisanal fisheries and aquaculture differ from those needed for the industrial fishery, and the capture technologies used by smaller vessels are of limited relevance to the industrial fleet.

16. By design, PNIPA is not intended to play a major role in the parallel effort being pursued by the Government of Peru to improve the management of industrial marine capture fisheries, which involves a different set of activities (industrial fishing of pelagics, primarily anchoveta), targets a different set of actors (the industrial fishing fleet, fish meal and fish oil manufacturers, fish meal and fish oil exporters), and requires a different set of instruments (policies relating to industrial fishing practices, catch quotas, industrial manufacturing processes, and export regulations). It should be noted, however, that the activities to be supported under Component 3 to strengthen institutional capacity within PRODUCE and other public agencies will benefit the entire sector, including both artisanal and industrial fisheries.

C. Higher Level Objectives to which the Project Contributes

17. By simultaneously pursuing natural resource preservation and sustainable economic growth, the Project is consistent with the FY12-FY16 Peru Country Partnership Strategy (CPS), which was discussed by the World Bank Group Executive Directors on February 1, 2012 (Report No. 66187-PE). The Project will support two key challenges outlined in the CPS: (a) boost productivity and address environmental challenges as the basis for sustainable development; and (b) explore options for addressing environmental vulnerabilities and reducing the adverse impacts of climate change. The Project will also support another CPS pillar by contributing to the reduction of chronic malnutrition. The Project will contribute to both of the twin goals: it will help to reduce extreme poverty by providing new sources of employment and income for poor fishers and aquaculture producers, and it will promote shared prosperity by contributing to increased competitiveness and sustainability of a dynamic fisheries and aquaculture sector that supports the livelihoods of a wide range of actors at all stages of the value chain.

[2] The National Program for Fisheries and Aquaculture Innovation (*Programa Nacional de Innovación en Pesca y Acuicultura*, PNIPA) is considered by the Government of Peru to be an investment program consisting of three investment projects plus a management unit. The same operation is considered by the World Bank to be an investment project consisting of four components.

18. The Project is well aligned with the Government's National Plan for Productive Diversification (*Plan Nacional de Diversificación Productiva,* PNDP) in that it seeks to promote productive diversification, increase productivity, boost non-traditional exports, reduce regional and sectoral disparities, and discourage informality (for details of this national plan, see Supreme Decree 004-2014-PRODUCE).

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

19. The objective of the Project is to strengthen the Borrower's capacity in the delivery of innovations in the fisheries and aquaculture value chains. The Project will support the Borrower's purpose to improve the performance of the National Fisheries and Aquaculture Innovation System (SNIPA) and fisheries and aquaculture value chains, to promote the transformation of the Borrower's fisheries and aquaculture sector through reducing reliance on capture fisheries and increasing emphasis on aquaculture.

B. Project Beneficiaries

20. Consistent with government requirements, a study was commissioned as part of the preparation process to identify the target population for the Project. The study identified the main types of potential beneficiaries, provided detailed estimates of their numbers and physical location throughout the country, described their innovation needs, and assessed their proclivity to participate in innovation subprojects. Results of the study were used to identify the different categories of beneficiaries to be targeted by the Project, decide the types of innovation activities to be funded through subprojects, and determine the total number of beneficiaries to be targeted by each type of subproject.

21. Project beneficiaries will include productive agents in fisheries and aquaculture value chains, innovation agents in fisheries and aquaculture value chains, and consumers as follows:

(a) **Productive agents** are individuals, producer groups, and firms involved in the capture, culture, processing, and distribution of aquatic species. This category includes artisanal fishers, small-scale marine and freshwater aquaculture producers, owners of artisanal fishing vessels, and all others who participate directly in post-harvest value-adding activities.

(b) **Innovation agents** are institutions, organizations, associations, communities, universities, research institutes, firms, nongovernmental organizations (NGOs), governmental agencies, and international organizations (all having legal status recognized by the Peruvian state) that are engaged in innovation activities, as well as individual professionals and technicians who are engaged in innovation activities.

(c) **Consumers** are those who will gain access, as a result of Program-supported investments, to enhanced supplies of higher quality and/or lower-priced fisheries and aquaculture products.

22. The three categories of Project beneficiaries described above can be divided into two groups. *Direct beneficiaries* are those who participate directly in Project-supported activities and include individual productive agents (end-of-Project target = 12,758), institutional innovation agents (end-of-Project target = 261), and individual innovation agents (end-of-Project target = 9,550). *Indirect beneficiaries* are those who do not participate directly in Project-supported activities but who derive benefits through technology spillovers, enhanced supplies of higher quality and/or lower-priced fisheries and aquaculture products, and so on. Consumers of fisheries and aquaculture products are considered indirect beneficiaries.

23. In addition, the Project is expected to generate knowledge that will benefit many groups in society, including policy makers and program administrators who as a result of Project-supported activities will gain an improved understanding of the fisheries and aquaculture sector, as well as have access to improved information upon which to base decisions about the management of the resource base on which fisheries and aquaculture depend.

24. The Project will promote strategic alliances among and between direct beneficiaries at different stages in the fisheries and aquaculture value chains. Selection criteria for competitive grant funds have been designed to encourage participation in subprojects by direct beneficiaries from disadvantaged and/or vulnerable groups, including indigenous people, women, and youth.

C. PDO Level Results Indicators

25. Three key results will be used to monitor the success of the Project:

(a) Increased supply of validated innovations that can improve performance in the fisheries and aquaculture value chains

(b) Increased access by beneficiaries to validated innovations that can improve performance in the fisheries and aquaculture value chains

(c) Strengthened capacity of public and private institutions to support innovation in the fisheries and aquaculture sector

26. Six PDO indicators will be used to monitor the success of the Project:

- PDO Indicator 1: Innovations in fisheries developed through collaborative research arrangements that meet defined minimum criteria and are validated by the Ministry of Production (number) (disaggregation by governance; management)
- PDO Indicator 2: Innovations in aquaculture developed through collaborative research arrangements that meet defined minimum criteria and are validated by the Ministry of Production (number) (disaggregation by production; health; environmental standards; cost-effectiveness)
- PDO Indicator 3: Innovations made available through the Project for use by actors in fisheries and aquaculture value chains (number) (disaggregation by fisheries; aquaculture; actors)
- PDO Indicator 4: Share of artisanal fishermen and aquaculture producers with access to at least one innovation developed or made available through the Project (percentage) (disaggregation by fisheries; aquaculture; actors)
- PDO Indicator 5: Coordinating bodies at the national and macro-regional level strengthened for the prioritization, planning, and preparation of rules, plans, procedures, and instruments for the governance of the SNIPA (number)
- PDO Indicator 6: Communities involved in planning, implementation, and/or evaluation of research programs in fisheries and aquaculture (number) (citizen engagement indicator)

III. PROGRAM DESCRIPTION

A. Project Components

Component 1. Promoting innovation in the fisheries subsector (US$30.8 million, including US$11.9 million from IBRD)

27. With the goal of enhancing the economic viability and environmental sustainability of fisheries activities, Component 1 will strengthen the Borrower's capacity in the delivery of innovations in the capture fisheries subsector. It will finance a competitive grant mechanism and supporting services to assist beneficiaries in developing proposals and implementing subprojects funded through successful proposals. The competitive grants mechanism will feature four windows designed to support (a) upstream applied research to design and test new fisheries management systems, best practices, organizational arrangements and planning methods that contribute to the sustainability of the fishery; (b) downstream adaptive research designed to tailor fisheries management approaches, practices and technologies to local circumstances (including those that have proven effective and viable in other countries); (c) extension advisory services to help introduce or scale up effective tools and practices; and (d) capacity building to strengthen the community of applied fisheries research and extension advisory service providers. Activities that could potentially be funded under Component 1 include: testing the effectiveness of fisheries management schemes based on the assignment of territorial user rights, testing new approaches designed to incentivize accurate catch reporting, use of market analysis methods to determine the potential to improve profits by modifying fishing practices, testing technologies to improve compliance with fishing norms, and testing technologies to permit traceability of the catch. Component 1 is expected to provide climate change co-benefits by supporting the development, piloting, and/or scaling up of innovations whose purpose is to enable the adaptation of fisheries management systems to changes in the environment caused by climate change.[3] Component 1 will also promote knowledge exchanges among Project beneficiaries. The overall portfolio of subprojects will be monitored to ensure that approved subprojects are sensitive to the needs of the entire target population, including vulnerable groups such as women and indigenous people.

Component 2. Promoting innovation in the aquaculture subsector (US$62.6 million, including US$24.1 million from IBRD)

28. With the goal of enhancing the productivity and profitability of aquaculture activities, Component 2 will strengthen the Borrower's capacity in delivery of innovations in the aquaculture subsector. It will also support the generation of knowledge and the development of innovations needed to launch new aquaculture activities. Component 2 will finance a competitive grant mechanism and supporting services to assist beneficiaries in developing proposals and implementing subprojects funded through successful proposals. The competitive grants mechanism will feature four windows designed to support (a) upstream applied research designed to assess the potential of native aquatic species, fill technological gaps, and/or better understand socio-economic contexts to allow their economically viable cultivation; (b) downstream adaptive research designed to adapt innovative aquaculture management and zoning practices, organizational models, and technological approaches (including those that have proven viable in other

[3] Since the demand-driven subprojects to be financed through competitive grants under Components 1 and 2, and the activities designed to strengthen the SNIPA to be financed under Component 3, cannot be known in advance, precise assessment of expected climate co-benefits is not possible at Board approval stage. However considering the types of innovations likely to be of interest to subproject beneficiaries (Components 1 and 2), as well as the policy reforms and institutional strengthening measures that are needed to improve the productivity and sustainability of the fisheries and aquaculture sector (Component 3), it is estimated that 50 percent of the financing for Components 1, 2, and 3 will generate climate co-benefits.

countries) so they can solve problems that currently limit productivity and undermine competitiveness in aquaculture value chains; (c) extension advisory services to help scale up effective tools and practices; and (d) capacity building to strengthen the community of applied aquaculture research and extension service providers. Component 2 is expected to provide climate change co-benefits by supporting the development, piloting, and/or scaling up of innovations whose purpose is to enable the adaptation of aquaculture production methods to changes in the environment caused by climate change.[3] Component 2 will also promote knowledge exchanges among project beneficiaries.

Component 3. Strengthening the SNIPA, institutions, and policies to improve governance of fisheries and aquaculture (US$16.5 million, including US$4.0 million from IBRD)

29. With the goal of increasing productivity, enhancing profitability, and ensuring sustainability of fishing and aquaculture production activities, Component 3 will strengthen the capacity of the national fisheries and aquaculture innovation system (*Sistema Nacional de Innovación en Pesca y Acuicultura*, SNIPA) to deliver innovations in the fisheries and aquaculture sector. Component 3 will focus on (a) the strengthening of policies, regulatory frameworks, processes, and procedures, including those related to production, handling, transformation and consumption of fish and seafood products, and those related to productive and sustainable management of fisheries and aquaculture resources and (b) establishing a new organizational and institutional model for the fisheries and aquaculture sector. These activities will be undertaken in pursuit of the Government's vision of creating a decentralized, open, and dynamic system comprising both public and private actors to promote innovation in the sector and improve the knowledge needed to ensure efficient and sustainable management of the resource base on which fishing and aquaculture depend. Component 3 is expected to provide climate change co-benefits by strengthening the knowledge base and the analytical capacity needed to design and put in place governance mechanisms that will facilitate the adaptation of fisheries management systems and aquaculture production methods to changes in the environment caused by climate change. [3]

Component 4. Project management (US$11.0 million, including US$0.0 million from IBRD)

30. Component 4 will strengthen the institutional and organizational capacity of the Vice Ministry of Fisheries and Aquaculture within PRODUCE required for the successful implementation of Project-supported activities, including compliance with procurement, safeguards, financial management, and monitoring and evaluation (M&E) requirements. A Project Implementation Unit (PIU) with administrative and financial autonomy will be established within PRODUCE to implement the Project. The PIU will be led by an Executive Director who will be supported by an Operations Director and will host technical, administrative, fiduciary, legal, safeguards, and M&E specialists, along with the necessary support staff. The PIU will endeavor to recruit and maintain both male and female staff members.

B. Project Financing

31. The Project will be financed through a five-year Investment Project Financing of US$40.0 million to the Government of Peru. The Government of Peru will make a contribution of US$80.9 million through resources from the Treasury. The engagement of the Government of Peru and its commitment to building a pluralistic innovation system will ensure the sustainability of the SNIPA beyond the life of the Project.

Project Cost and Financing

Project Components	Project Cost (US$, millions)	IBRD Financing (US$, millions)	Government Financing (US$, millions)	IBRD Financing (%)
1. Promoting innovation in the fisheries subsector	30.8	11.9	18.9	38.6
2. Promoting innovation in the aquaculture subsector	62.6	24.1	38.5	38.5
3. Strengthening the SNIPA, institutions, and policies to improve governance of fisheries and aquaculture	16.5	4.0	12.5	24.2
4. Project management	11.0	0.0	11.0	00.0
Total Project Costs	**120.9**	**40.0**	**80.9**	**33.1**
Front-End Fees*	0.0	0.0	0.0	0.0
Total Financing Required	**120.9**	**40.0**	**80.9**	**33.1**

Note: * Front-end fee of US$100,000 to be paid by the Ministry of Economy and Finance (*Ministerio de Economía y Finanzas*) (MEF) from a separate source; not included in project financing.

C. Lessons Learned and Reflected in the Project Design

32. The project design has benefited from lessons learned in Peru and in other countries through the implementation experience of earlier projects and programs that similarly were designed to promote demand-driven innovation through the use of competitive grants funding.[4]

(a) Productive agents and innovation agents are capable of forming effective partnerships to deliver innovations.

(b) Competitive funds mechanisms can be effective in inducing demand-driven innovations that address the priorities of productive agents.

(c) Selection of subprojects through an open, competitive process based on clearly defined technical evaluation criteria can be crucial for establishing credibility among stakeholders and avoiding political interference.

(d) Accompanying subproject implementation agents over an extended period while they grow and mature is crucial for ensuring long-term success.

(e) A decentralized implementation structure is essential for responding quickly to local needs and can help reach marginalized fishing and aquaculture communities.

(f) Strong M&E capacity is needed to allow real-time assessment of progress being achieved and facilitate mid-course corrections to overcome bottlenecks and improve outcomes.

[4] Projects that have been particularly rich sources of experiential learning about the promotion of innovations through competitive grants include Peru Agricultural Research and Extension APL1 and 2 (P047690, P082588), Peru National Agricultural Innovation (P131013), Bolivia Agricultural Innovation and Services (P106700), West Africa Agricultural Productivity Program (P094084), East Africa Agricultural Productivity Program (P112686), and Agricultural Productivity Program for Southern Africa (P094183).

(g) Innovation is more likely in the presence of a conducive enabling environment and effective governance of the global innovation system.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

33. The organizational structure, implementation arrangements, and staffing needs of the Project were determined based on the results of an institutional assessment carried out during preparation. To ensure that the implementation agency will be able to carry out its duties effectively, resources have been earmarked for capacity building of PIU staff and for a full range of implementation support activities, including project administration, human resources management, procurement, financial management, safeguards compliance, and M&E. The organizational structure and implementation arrangements of the Project are described in detail in Annex 4.

34. The Borrower of the Loan will be the Republic of Peru, represented by MEF, which will transfer loan proceeds to PRODUCE. Within PRODUCE, the Project will be managed by the Vice Ministry of Fisheries and Aquaculture, which holds the mandate to develop and manage the fisheries and aquaculture sector, including playing the key role of coordinating with regional and local governments to ensure that national fisheries and aquaculture policies are effectively implemented. In its capacity as implementing agency, PRODUCE will be responsible for the implementation of all Project activities, internal and external communications, procurement, financial management, compliance with safeguards policies, and M&E.

35. A lean PIU with administrative and financial autonomy will be established within PRODUCE to implement the Project. The PIU will be led by an Executive Director and will include planning and budget specialists, fiduciary specialists, environmental and social specialists with responsibility for safeguards compliance, and associated support staff (for additional details, see Annex 4). Creation of the PIU and recruitment of key staff is a condition of effectiveness.

36. The Operational Manual describes the Project's institutional setup and provides details regarding its administrative, financial management, procurement, safeguards, and M&E procedures. Approval of the Operational Manual by the World Bank is a condition of effectiveness. The PIU will be staffed with female and male professionals and consultants to ensure adequate capacity for project implementation. The Operational Manual details the roles and responsibilities of PRODUCE (the implementing agency), as well as other institutions involved in carrying out the activities of the Project.

37. The implementation time frame of the Project is expected to be five years.

B. Results Monitoring and Evaluation

38. Overall responsibility for the M&E function of the Project will be held by the Planning, Budget, and Monitoring Unit within the PIU. This unit will lead on all activities related to data collection, retrieval, analysis, and presentation. To support these activities, a management information system will be established that in addition to handling management data and information will also monitor the indicators from the Project’s results framework (see Annex 1) and be used to track progress towards the PDO. Data needed to monitor the indicators will be collected from multiple sources, including surveys, Project records, and official government reports. Specialized tracking tools will be used as necessary to compile information on Project activities and outputs. M&E information and data will be used by the PNIPA Steering Committee, PRODUCE, and the World Bank to assess progress and introduce corrective measures in the event that progress is determined to be lagging. M&E information and data will also serve learning, transparency, and accountability purposes and will serve as inputs to policy formulation.

39. The Planning, Budget and Monitoring Unit will be responsible for developing and operating this management information system at the national and regional level. The system must be compatible with the management information systems used by PRODUCE and the World Bank. For this purpose, a planning, monitoring and evaluation module within the Operational Manual details the information needs, data collection activities, reporting modalities, and roles and responsibilities of different participants.

40. The management information system will be based on a multi-level, multi-user, geo-referenced computing platform, which will be accessible through a website. This software will be developed based on the structure of the Project's results framework and will allow the online monitoring of each subproject that will be financed by the competitive funds. This system will be used to report information on financial indicators, output and outcome indicators, and compliance with social and environmental safeguards. The computing platform will be developed so as to be compatible with the information parameters and security protocols established by the Information Systems Unit of PRODUCE.

41. A mid-term review will be carried out during the first semester of the third year of implementation to evaluate the progress achieved by the Project at that time. A final evaluation will be conducted during the last year of implementation in order to evaluate the overall accomplishments of the Project. These evaluations will be focused on the analysis of the indicators set out in the results framework, and will assess the relevance, efficiency, efficacy and sustainability of the Project. The recommendations emerging from the mid-term review will be used to make adjustments to the implementation arrangements of the Project. An impact evaluation will be conducted to measure the high-level indicators proposed in the logical framework of the *factibilidad* (feasibility) document. This study will be carried out at Project closing.

42. To facilitate the M&E process, a baseline study will be conducted during the first year of the project implementation. This study will generate an initial set of information about the without-Project performance of the actors that make up the SNIPA, as well as the activities of the productive agents and innovation agents that are expected to benefit from Project-supported activities.

C. Sustainability

43. **Subproject investments.** Competitive grant funds can be effective instruments for directing resources to specific, well-defined needs, but their effect may be lost once the flow of resources stops. The competitive grants mechanism to be used under PNIPA has three features that are designed to increase the likelihood that innovation activities funded under Components 1 and 2 will be sustainable. First, all subproject proposals must originate with productive agents and innovation agents, which makes it very likely that the activities to be supported under the subprojects respond to real demand. Second, the subproject proposals will include a cost-benefit analysis to show that the innovations being sought are likely to be economically viable. Third, recipients of competitive grants are required to contribute significant amounts of co-funding, which they are unlikely to do if they are not fully committed.

44. **Institutional structures.** The operation described in this Project Appraisal Document (PAD) is conceived by the Government of Peru and by the World Bank as the first phase of what is expected to be a multi-phase intervention whose ultimate goal is to achieve a transformation of the national innovation system for fisheries and aquaculture. As articulated in the letter of sectoral policy currently being prepared by PRODUCE, the Government of Peru through its Ministry of Economy and Finance is committed to providing resources to follow-on operations whose purpose will be to consolidate and deepen the institutional reform process for which the current operation is expected to lay the foundation.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

45. The overall risk rating of the Project is assessed as Moderate. The main sources of risk are described below.

46. **Political and governance risk** is deemed Moderate. Elections in Peru can lead to changes in policy priorities and result in leadership changes within key government agencies, which could undermine enthusiasm for supporting innovation in the fisheries and aquaculture subsector. Because both PRODUCE and the MEF have expressed a long-term commitment to promoting innovation in the fisheries and aquaculture sector, a change in policy priorities seems unlikely in the short run. In addition, institutional rivalries can lead to differences in opinion about the roles and responsibilities of different actors responsible for implementation. To manage the coordination complexities and help ensure widespread buy-in from key actors, the implementation arrangements have been designed clearly to define the roles and responsibilities of the participating organizations and to ensure close coordination with regional and local governments.

47. **Institutional capacity for implementation and sustainability risk** are deemed Substantial. The main implementing agency, PRODUCE, has limited capacity and experience in implementing World Bank-financed projects, while the agency that will provide oversight, the MEF, tends to take an active role in the implementation of donor-financed projects. Both of these factors could increase the time needed during implementation to build consensus and take decisions. In addition, cumbersome regulations relating to public sector procurement and financial management processes could slow down implementation. To manage these risks, a PIU will be established within PRODUCE containing the full range of technical and administrative staff needed to ensure effective implementation.

48. **Fiduciary risk** is deemed Substantial. Fiduciary risk stems mainly from the limited capacity of PRODUCE and its lack of experience implementing World Bank-financed projects. Financial Management and Procurement Assessments have been undertaken to identify capacity gaps within the PIU and ensure that appropriate training and technical assistance is provided to overcome these gaps.

49. **Technical design of project risk** is deemed Moderate. Depending on the number and quality of subproject proposals that are received from different parts of the country, competitive grant funding could be distributed unevenly across geographical locations. To avoid undesirable concentrations of grant funding, the distribution of competitive grant funding will be monitored closely. After the first round of competitive grant awards has been completed, Departments in which disproportionally low numbers of subprojects were awarded will be targeted for extra promotional efforts. In addition, to ensure that the Project has an active presence throughout the national territory, the PIU will establish six decentralized offices (one in each macro-region) and five smaller decentralized units to liaise with local authorities and support Project-financed activities. Where relevant, the criteria used to evaluate subproject proposals will take into account regionally defined development priorities.

50. **Environment and social risk** is deemed Moderate. The Project will finance activities (for example, applied and adaptive research, extension and knowledge transfer, capacity building, policy design and regulatory reform) that if poorly managed could result in adverse environmental and social impacts. To mitigate the risk of adverse environmental and social impacts, seven safeguards policies have been triggered. Consistent with these policies, PRODUCE has prepared and disclosed an Environmental and Social Management Framework (ESMF) and an Indigenous Peoples Planning Framework (IPPF) laying out guidelines, procedures, and principles to be followed by the groups implementing subprojects to prevent or minimize adverse environmental and social impacts.

51. **Stakeholders risk** is deemed Moderate. The Project will attempt to encourage stakeholders to collaborate in new and unfamiliar ways, and some are likely to adhere to their current familiar practices.

Consequently, coordinating the activities of multiple stakeholders at the national, regional, and local levels could be challenging. Traditional rivalries between the public agencies responsible for managing fisheries resources and longstanding mistrust of the industrial fishing subsector may also require time to overcome. To mitigate the challenges of ensuring collaboration multiple partners and stakeholders, the Project will carry out consultations at various levels during the preparation and implementation. To reduce the risk that women will not participate in project activities to the desired level, efforts will be made to ensure that women are aware of the opportunities available through the Project and that they receive additional support, when necessary, in preparing proposals for competitive grants targeting women's needs.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

52. Ex-ante economic and financial analysis was carried out to provide reassurance that investments made under the Project will generate attractive rates of return compared to alternative investment opportunities that may be available in Peru.

53. Activities financed through the Project are expected to generate four main benefit streams:

(a) Increased value of production in the fisheries subsector

(b) Increased value of production in the aquaculture subsector

(c) Nutritional and health benefits from a strengthened health and safety regulatory system

(d) Increased value of improved governance capacity

54. Some of these benefit streams lend themselves more readily to evaluation than others. The economic and financial analysis focuses on the first, second, and third benefit streams, which are somewhat easier to measure and value. The economic and financial analysis did not consider the fourth stream, which is much more difficult to measure and value.

55. The ex-ante economic and financial analysis suggests that Project-supported investments will generate substantial benefits for beneficiaries in areas served by the Project, as well as substantial benefits for Peruvian society as a whole. Overall, the net present value (NPV) is projected to reach US$62 million (11 percent discount rate) / US$82 million (6 percent discount rate). The investments evaluated for the economic and financial analysis will generate an internal rate of return of 55 percent. The economic and financial analysis thus shows that if Project implementation is effective and efficient, Project-supported investments will bring substantial financial and economic benefits to fishermen and aquaculture producers in the Project area and to Peruvian society in general (see Annex 5 for details).

B. Technical

56. The theory of change underpinning the Project stems from the observation that a robust innovation system can introduce contextually novel technologies, management techniques, governance mechanisms, and organizational structures, among others, that have the capacity—when taken to scale—to increase the productivity, sustainability, and/or profitability of fisheries and aquaculture systems. When an innovation system is successful, it can serve as the initiating mechanism for transformational change throughout an entire sector and beyond.

57. Because many of Peru's wild fisheries are currently in poor status, and given the significant untapped potential for expanding aquaculture in the country, there is a significant latent demand for innovations that can boost productivity, enhance sustainability, and increase profitability in the fisheries and aquaculture sector. At the same time, many potential suppliers of innovations (including government

research centers, academic institutions, private firms, and NGOs) are unaware of the demand or lack the capacity to respond effectively.

58. Building a marketplace of diverse actors in which the demand for innovations can be linked effectively to the supply of innovations will take time, as only through hands-on collaboration and experiential learning will productive agents and innovation agents learn to understand and respond to rapidly evolving needs and opportunities. While the Project will provide a platform for bringing together both sides, consolidation of the market for innovations will require time—likely 10 years or more. In recognition of this time frame, the Project therefore is conceived as the first phase in what is expected to be a multi-phase effort to drive technological change in the fisheries and aquaculture sector, institute sweeping institutional reforms, overhaul governance mechanisms, and realize the Government's vision of transitioning from a sector that currently is focused primarily on industrial exploitation of a single species—anchoveta—to a sector that will be larger, more diversified, and increasingly reliant on productive activities (aquaculture) as opposed to extractive activities (capture fisheries).

C. Financial Management

59. A Financial Management Assessment was carried out to determine the adequacy of the financial management arrangements currently being used by PRODUCE. It is expected that the Vice Ministry of Fisheries and Aquaculture within PRODUCE will create a PIU, with administrative and financial autonomy, to carry out the financial management functions of the Project. The PIU will be responsible for the administrative and financial activities of the Project, including registering and executing the budget. The financial management arrangements of the Project will include: budgeting and planning, internal controls, flow of funds, accounting and financial reporting, and external audit. These duties will be under the responsibility of the Administrative Unit and the Planning, Budget and Monitoring Unit. The main office of the PIU will be located in Lima. To provide close implementation support to the many subprojects that will be financed throughout the country, the PIU will create six regional offices in the six macro-regions of the country. The six regional offices will be supported by a similar number of decentralized sub-units located in areas in which subprojects are concentrated. An action plan has been prepared with the activities required to establish FM arrangements that meet the World Bank's minimum fiduciary requirements (for details, see Annex 3).

D. Procurement

60. A Procurement Assessment was carried out to assess PRODUCE's capacity to implement procurement actions for the Project. Details of the assessment, as well as the proposed risks mitigation actions are described in the Annex 3. It is expected that the Vice Ministry of Fisheries and Aquaculture within PRODUCE will create a PIU, with administrative and financial autonomy, to carry out the procurement functions of the Project. Procurement activities for the Project will be carried out using the procedures prescribed in the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services" dated January 2011 and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, as well as any additional provisions stipulated in the Legal Agreement.

E. Social (including Safeguards)

61. The Project has potential to benefit the rural population of Peru, including indigenous communities in the Andean highlands and in the Upper and Lowland Amazon basins. The Project aims to improve competitiveness in the fisheries and aquaculture sector by strengthening capacity to deliver innovation. The demand-driven Project will be national in scope and will give priority to areas in which aquaculture and fishing activities are already established. Rural communities, including indigenous peoples' communities, could benefit directly or indirectly from the Project. Indigenous peoples' communities could benefit directly whenever organized producers associations or small enterprises in

these communities receive funding to implement subprojects. Indigenous peoples' communities could benefit indirectly whenever private sector entrepreneurs partner with local organizations or share benefits with them through agreements that confer mutual benefits. Recognizing that some indigenous communities have limited experience applying for competitive grants and may lack capacity in preparing strong proposals, the Project will make a special effort to reach out to indigenous communities and provide additional technical assistance to support preparation of subproject proposals, for example by preparing informational materials in indigenous languages and conducting subproject preparation workshops in indigenous languages.

62. The Project triggers OP/BP 4.10 (Indigenous Peoples) due to the potential presence of indigenous peoples in the project area (which includes all rural areas throughout the country). Since the specific locations in which the Project will operate could not be identified prior to appraisal and will become known only at the time when subprojects are identified, PRODUCE has prepared, with guidance from the World Bank, an IPPF that complies with OP/BP 4.10 and that is acceptable to the World Bank. The IPPF was consulted with several nationally representative indigenous peoples organizations in February 2016 and following revisions to the document relating to outreach efforts to be made using indigenous languages was published through the World Bank external website on September 3, 2016 and made publicly available through the PRODUCE website on September 20, 2016. The IPPF identifies two potential adverse impacts: use of indigenous territories by private producers and concentration of employment. It provides mitigating measures to ensure adequate implementation and turning these potentially adverse effects into positive ones. If fisheries and aquaculture subprojects are carried out by private agents in partnership with indigenous people within their territories, the IPPF stipulates that written agreements will be required showing that community consultations have taken place and that the partnerships have the support of the community. To ensure that employment generated by Project-financed investments benefits a broad spectrum of people within participating indigenous communities, a rotational local hiring policy will be implemented.

63. The Project does not trigger OP/BP 4.12 (Involuntary Resettlement) for several reasons. The scope and scale of investments made through subprojects supported under Components 1 and 2 will be extremely limited; most subproject grants (which will benefit groups expected to range from several dozen to several hundred members) will range from US$25,000 to US$30,000 on average and will involve little or no investment in infrastructure, apart from upgrading of existing facilities. All subprojects supported under the Project will be implemented within the property of the beneficiaries (for example, producers, producer associations, community groups, firms). No involuntary taking of land will be needed. In addition, there will be no involuntary restrictions in access to land. Furthermore, due to the small footprint of these investments, beneficiaries usually will have ample choices for siting new facilities to avoid areas that are already being used, so no involuntary taking of land will be needed. In rare cases where displacement of existing users would be unavoidable, Project funding will not be provided.

64. Restrictions in access to fishery resources could be introduced through subprojects financed under Components 1 and 2, but any such restrictions would be introduced only for the purposes of ensuring environmentally sound and sustainable management of the resource, which is allowable under OP 4.12. Furthermore, any restrictions in access to fisheries resources introduced under the Project will not occur in natural protected areas (NPAs), as this would trigger OP 4.12. Activities in NPAs are explicitly excluded from project support. Some fisheries management schemes piloted under the Project would be expected to limit access to fisheries resources to enhance the productivity of these resources and ensure their sustainability. In these cases, the Project will support only subprojects conducted in a community-based context, and any restrictions will have been discussed and agreed through an adequate participatory decision-making process, as allowed under Footnote 6 of OP 4.12.

65. Activities financed under Component 3 will include the strengthening of policy and regulatory frameworks, which may have safeguards implications, including temporal or spatial limitations on access to fisheries to enhance their productivity and ensure their sustainability as allowed under Footnote 8 of

OP 4.12. Safeguards implications of policy and regulatory frameworks strengthened under the Project will be assessed and addressed when appropriate. Environmental and social dimensions will be considered when these are relevant, including in study design and policy analysis, and consultations with civil society and potentially affected people will be carried out when appropriate.

F. Environment (including Safeguards)

66. The Project aims to improve the livelihoods of local communities whose economic activities depend upon aquaculture and fisheries. Socio-environmental management of Project-supported activities is required due to potential adverse environmental impacts on environmentally sensitive areas or natural habitats, to environmental risks related to marine and fresh water aquaculture subprojects and wild capture fish subprojects, and to potential adverse occupational health and safety impacts. These impacts will be readily mitigated as they are likely to be site-specific, preventable and reversible.

67. With respect to OP/BP 4.01 (Environmental Assessment), the Project is classified as Category B. Given the nature, scale, and scope of the subprojects to be funded under Components 1 and 2, it is expected that most subprojects will require an Environmental Impact Statement or a partial (semi-detailed) Environmental Impact Assessment (EIA). The Project will not provide funding to subprojects that require a full (detailed) EIA; under the national EIA system, this category of environmental assessment is required for activities deemed to pose a high level of environmental risk.

68. With respect to OP/BP 4.04 (Natural Habitats), the policy is triggered because of the potential negative impacts on terrestrial, freshwater, and marine ecosystems that could result from expansion of fisheries and aquaculture production. For example, some applied research and development activities, and some extension and knowledge transfer activities, could involve interventions in sites located close to natural habitats in NPAs (for example, national reserves or other areas with lower levels of protection in which some economic activity is allowed and compatible with protection purposes).

69. With respect to OP/BP 4.36 (Forests), the policy is triggered because the Project could indirectly support expansion of fresh water aquaculture production into critical forest ecosystems, such as mangroves on the northern coast, and tropical forests in the Amazon region. The Project will not provide funding to subprojects involving conversion of mangroves or other critical forest ecosystems in the Amazon region. Subprojects promoting conversion of wetlands will also not be funded.

70. With respect to OP/BP 4.09 (Pest Management), the policy is triggered because some applied research and development activities, and some extension and knowledge transfer activities, could involve the use of disinfectants, antibiotics, anti-fouling, and other pest management chemicals that are typically used in commercial aquaculture. Tanks and pond cleaning may require disinfectants, as well as antibiotics to prevent fish mortality due to diseases and parasites. Also, in some cases chemical substances may need to be used to control aquatic weeds. Use of these substances is common practice in aquaculture, so it is possible that some subprojects will be required to prepare a Pest Management Plan (PMP) for the control of parasites and/or weeds. The need for developing a PMP for a given subproject will be identified during the subproject screening and evaluation process.

71. With respect to OP/BP 4.11 (Physical Cultural Resources), the policy is triggered given the rich cultural heritage of Peru and the country-wide focus of the Project. Some applied research and development activities, and some extension and knowledge transfer activities, could be undertaken in localities or locations in or adjacent to physical cultural resources. Moreover, some of the rivers and lakes selected for sitting aquaculture subprojects, particularly in the Andean region, may have a spiritual value for local indigenous people, in which case the presence of Project-supported activities could be perceived as intrusive.

72. Adverse environmental impacts that could occur if adequate mitigation measures are not put in place relate mainly to aquaculture subprojects and include (a) degradation of the lake bed and release of

nutrients into the water column (these benthic impacts are relevant only in the case of cage farming in lakes, given the potential of this method to result in the deposit of large quantities of fecal and waste feed material); (b) release of nutrient-rich materials (for example, feed, fecal and excretory products) from cage farming, water flow out of ponds and flow-through hatchery and ponds to receiving water bodies such as rivers, irrigation channels and lakes, potentially affecting water quality; (c) damage to species or habitats of conservation importance, including sensitive sites; (d) restricted access by other users of the water sources and/or land base; (e) negative visual impact; (f) excessive noise from generators or machinery, when these are used during construction, operation, or deconstruction of sites where project-supported activities are carried out; (g) waste generation; (h) curtailed recreational use; and (i) increased traffic and transport.

73. Since the specific locations in which the Project will operate cannot be identified prior to implementation and will become known only at the time when subprojects are identified, PRODUCE has prepared, with guidance from the World Bank, an ESMF that complies with the safeguards policies that have been triggered, as well as all applicable national regulations. The ESMF is acceptable to, and has been cleared by, the World Bank. The ESMF describes environmental risks and adverse environmental impacts that could potentially result from Project-supported activities, and it provides a checklist that will be used to screen subproject proposals to identify if these risks are present. The ESMF also specifies the environmental management instruments (for example, semi-detailed EIA, Environmental Impact Assessment) that will need to be prepared for each type of subproject, in accordance with the national regulations applicable to small-scale fresh water and marine aquaculture and marine and inland capture fisheries. Subprojects to be supported under the Project will follow the WBG Environment, Health, and Safety Guidelines, as well as the IFC Environmental, Health, and Safety Guidelines for Aquaculture. In the case of technical assistance activities financed under Component 3 to support the development of policies and regulatory frameworks, the terms of reference for consulting assignments will ensure that consideration be given to environmental and social risks, as required by the World Bank Guidelines on the Application of Safeguard Policies to Technical Assistance (TA) Activities in World Bank-Financed Projects. The draft ESMF was consulted through a workshop and via a mail survey with potential partners and stakeholders. Details of the consultations are included in an annex to the ESMF.

74. In January-August 2016 and October 2016, the ESMF underwent two rounds of consultations with Project partners and stakeholders, including representatives from potential beneficiary groups, civil society organizations, and key government agencies at national and regional level. The ESMF was published through the World Bank external website on August 30, 2016 and made publicly available through the PRODUCE external website on September 20, 2016.

75. To ensure that PRODUCE has the capacity to prepare, implement, and supervise Environmental and Social Management Plans (ESMPs) for subprojects, should such plans be needed during implementation, PRODUCE will recruit environmental and social specialists to be based at its headquarters. Recruitment of the environmental and social specialists should occur within the first semester after loan effectiveness, to ensure effective supervision of the implementation of environmental and social safeguards policies. Detailed institutional arrangements for the preparation, clearance, implementation, and supervision of the environmental and social safeguards instruments are described in the ESMF and IPPF and are briefly summarized in Annex 3.

G. Other Safeguards Policies Triggered

76. The Project triggers OP/BP 7.50 (Projects on International Waterways), because some aquaculture subprojects could rely on water from Lake Titicaca (shared between Peru and Bolivia) or from rivers that are shared with Bolivia, Brazil, Colombia, and Ecuador. On January 20, 2016, the World Bank, on behalf of the Government of Peru, notified the Governments of Bolivia, Brazil, Colombia, and Ecuador regarding the Project. After the deadline to respond had passed, responses were received from Bolivia (which had requested an extension of the deadline) and Brazil (which had not requested an

extension of the deadline). No responses were received from Colombia and Ecuador. Bolivia and Brazil requested to be notified about the nature and location of Project-supported interventions, once these are known. In this regard, the World Bank will coordinate with Project management to ensure that the relevant agencies in the Governments of Brazil and Bolivia are bi-annually provided with a list of the approved subprojects including information concerning the location and nature of activities to be supported by the approved subprojects, as well as the fisheries or aquaculture species involved. An appropriate covenant to this effect is included in Section I.E.5 of Schedule 2 of the Loan Agreement. The Operational Manual describes the process to be followed in the unlikely event that a downstream riparian objects to any subproject. The information to be provided to Brazil and Bolivia will also be made publicly available through the PRODUCE external website. The World Bank is satisfied that the Project will not cause appreciable harm to the other riparians or be appreciably harmed by other riparians' possible water use since (a) the Project activities are not expected to have adverse effects on water quantity or quality of the transboundary waters and (b) the risk of accidental introduction of exotic species into international waterways will be mitigated by the application of the Project's ESMF.

H. World Bank Grievance Redress

77. Communities and individuals who believe that they are adversely affected by a World Bank-supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project-affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate GRS, please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

PERU: National Program for Innovation in Fisheries and Aquaculture (P155902)

Results Framework

Project Development Objectives								
PDO Statement The objective of the Project is to strengthen the Borrower's capacity in the delivery of innovations in the fisheries and aquaculture value chains. The Project will support the Borrower's purpose to improve the performance of the National Fisheries and Aquaculture Innovation System (SNIPA) and fisheries and aquaculture value chains, to promote the transformation of the Borrower's fisheries and aquaculture sector through reducing reliance on capture fisheries and increasing emphasis on aquaculture.								
These results are at	Project Level							
Project Development Objective Indicators								
Indicator Name	**Baseline**	**Cumulative Target Values**						
		YR1	**YR2**	**YR3**	**YR4**	**YR5**	**End**	
PDO 1. Innovations in fisheries developed through collaborative research arrangements that meet defined minimum criteria and are validated by the Ministry of Production (Number)	0	0	11	30	49	49	49	
PDO 2. Innovations in aquaculture developed through collaborative research arrangements that meet defined minimum criteria and are validated by the Ministry of Production (Number)	0	0	50	110	170	170	170	
PDO 3. Innovations made available for use by actors in fisheries and aquaculture value chains (Number)	0	0	151	328	504	532	532	

PDO 4. Share of artisanal fishermen and aquaculture producers with access to at least one innovation developed or made available through the Project (Percentage)	0.00	0.00	0.00	30.00	50.00	60.00	70.00
PDO 5. Coordinating bodies at the national and macro regional level strengthened for the prioritization, planning, preparation of rules, plans, procedures and instruments for the governance of SNIPA (Number)	0	1	3	5	7	7	7
PDO 6. Communities involved in planning, implementation and/or evaluation of research programs in fisheries and aquaculture (Number)	0	0	36	83	130	130	130

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values					
		YR1	YR2	YR3	YR4	YR5	End
IRI 1.1. Subprojects in fisheries subsector financed using competitive funds completed (disaggregated by type of subproject) (Number)	0	164	362	560	614	614	614
IRI 1.1a. Applied research fisheries subprojects (Number)	0	15	40	65	65	65	65
IRI 1.1b. Adaptive research fisheries subprojects (Number)	0	6	16	26	26	26	26
IRI 1.1c. Extension fisheries subprojects (Number)	0	1	206	309	363	363	363
IRI 1.1d. Capacity building fisheries subprojects (Number)	0	40	100	160	160	160	160
IRI 1.2. Public and private institutions of the fisheries value chain engaged in the planning, monitoring and evaluation of the competitive funds (Number)	0	164	362	560	614	614	614

IRI 1.3. Professionals and technicians hired and trained to provide technical assistance to the beneficiaries of the competitive funds in fisheries (Number)	0	248	523	799	908	908	908
IRI 2.1. Subprojects in aquaculture subsector financed using competitive funds completed (disaggregated by type of project) (Number)	0	350	860	1,370	1,370	1,370	1,370
IRI 2.1a. Applied research aquaculture subprojects (Number)	0	20	45	70	70	70	70
IRI 2.1b. Adaptive research aquaculture subprojects (Number)	0	30	65	100	100	100	100
IRI 2.1c. Extension aquaculture subprojects (Number)	0	200	450	700	700	700	700
IRI 2.1d. Capacity building aquaculture subprojects (Number)	0	100	300	500	500	500	500
IRI 2.2. Public and private institutions of the aquaculture value chain engaged in the planning, monitoring and evaluation of the competitive grants (Number)	0	350	800	1,370	1,370	1,370	1,370
IRI 2.3. Professionals and technicians hired and trained to provide technical assistance to the beneficiaries of the competitive funds in aquaculture (Number)	0	499	1,119	1,740	1,740	1,740	1,740
IRI 3.1. Staff of public and private institutions of SNIPA trained in specialized topics related to innovation in fisheries and aquaculture (Number)	0	60	120	180	240	300	300
IRI 3.2. Rules, procedures, protocols, instruments proposed for improving the SNIPA, including the system for maintaining sanitary standards in fisheries and aquaculture (Number)	0	0	3	6	8	10	10
IRI 3.3. Information systems developed and operational for the decision-making on governance of SNIPA (Number)	0	0	1	2	3	3	3

Beneficiaries Indicators							
Indicator Name	**Baseline**	**Cumulative Target Values**					
		YR1	**YR2**	**YR3**	**YR4**	**YR5**	**End**
B1. Direct project beneficiaries - Productive agents (Number)	0	3,628	7,863	12,100	12,750	12,758	12,758
B1a. Female project beneficiaries - Productive agents (Number)	0	726	1,573	2,420	2,552	2,552	2,552
B2. Direct project beneficiaries - Innovation agents: Institutions (Number)	0	71	166	261	261	261	261
B3. Direct project beneficiaries - Innovation agents: Professionals / technicians (Number)	0	2,207	5,764	9,321	9,490	9,550	9,550
B3a. Direct project beneficiaries - Innovation agents: Female professionals / technicians (Number)	0	883	2,306	3,728	3,796	3,820	3,820

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Innovations in fisheries developed through collaborative research arrangements that meet defined minimum criteria and are validated by Ministry of Production	Cumulative target. Innovations are understood as new technologies, processes, instruments, tools, supplies, etc. generated for use in the value chain in fisheries as a result of support of competitive funds. To be considered as an innovation these should accomplish with minimum criteria in terms of technical, economic, social, and potential to be adopted and be replicated. The minimum criteria for the validation and diffusion of the innovation will be given by a Scientific Committee of PNIPA. The targets have been calculated assuming that at least 75% of applied research subprojects financed through competitive grants will generate innovations in fisheries.	Annual	Review of the official report of the Scientific Committee of PNIPA on innovations against the defined minimum criteria	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Innovations in aquaculture developed through collaborative research arrangements that meet defined minimum criteria are and validated by Ministry of Production	Cumulative target. Innovations are understood as new technologies, processes, instruments, tools, supplies, etc. generated for use in the value chain in aquaculture as a result of support of competitive funds. To be considered as an innovation these should accomplish with minimum criteria in terms of technical, economic, social, and potential to be adopted and be replicated. The minimum criteria for the validation and diffusion of the innovation will be	Annual	Review of the official report of the Scientific Committee of PNIPA against the defined minimum criteria	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
	given by a Scientific Committee of PNIPA. The targets have been calculated assuming that 100% of applied research subprojects and adaptive research subprojects financed through competitive grants will generate innovations in aquaculture.			
Innovations made available for use by actors in fisheries and aquaculture value chains	Cumulative target. All types of innovations available in the market in fisheries and aquaculture which are released and promoted by the PNIPA in extension subprojects financed by the Competitive Funds. The annual targets have been calculated assuming that at least 50% of extension subprojects financed through competitive grants benefit from at least one new innovation in fisheries and aquaculture.	Annual	Review of official documents of PRODUCE where the innovations are promoted in the extension and capacity building subprojects	PNIPA Governance Unit - Monitoring and Evaluation Unit/Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Share of artisanal fishermen and aquaculture producers with access to at least one innovation developed or made available through the Project	Cumulative target. A representative sample of the universe of total beneficiaries (productive agents) will be taken to calculate this indicator. The data will be collected annually for the PNIPA M&E team. The sample size will be determined applying the stratified sampling method.	Annual	Annual field-based survey taking into the consideration a representative sample of total beneficiaries (productive agents)	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production
Coordinating bodies at the national and macro regional level strengthened for the prioritization, planning, preparation of rules, plans, procedures and	Includes coordinating bodies at macro-regional (6) and national level (1) that are supported directly by PNIPA, e.g., macro regional councils, thematic working groups, and intersectoral committees. These coordinating bodies will be	Annual	Official documents of meetings of the Coordinating bodies/Aide-memories of training sessions	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
instruments for the governance of SNIPA	supported by PNIPA to discuss and elaborate regional or national priorities in fisheries and aquaculture, as well as develop strategies and plans.			
Communities involved in planning, implementation and/or evaluation of research programs in fisheries and aquaculture	Number of local communities engaged in any type of prioritizing, planning, preparation, implementation, monitoring and evaluation of applied research and adaptive research subprojects financed with the help of the Project's competitive grants. The targets have been calculated assuming that in 50% of the above-mentioned subprojects, local communities will be directly involved in any type of prioritizing, planning, preparation, implementation, monitoring and evaluation. Note: The term "local community" includes indigenous groups, rural communities, producer organizations, and other recognized local groups that may be affected by the subproject.	Annual	Review of official documents of PNIPA that register the participation of communities in at least one step of the competitive funds.	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Subprojects in fisheries subsector financed using competitive funds completed (disaggregated by type of subproject)	All types of fisheries sub projects financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Applied research fisheries subprojects	All fisheries sub projects of applied and experimental research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Adaptive research fisheries subprojects	All fisheries sub projects of adaptive research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Extension fisheries subprojects	All fisheries sub projects of adaptive research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Capacity building fisheries subprojects	All fisheries sub projects of capacity building financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Public and private institutions of the fisheries value chain engaged in the planning, monitoring and evaluation of the competitive funds	Public and private institutions including communities, associations, organizations, etc. at local, regional and/or national level involved in the evaluation and monitoring of the competitive funds. The annual targets are calculated considering that at least one institution participate in each type of subprojects financed by the competitive funds.	Semester	Database of beneficiaries of PNIPA M&E	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Professionals and technicians hired and	Professionals and technicians who are trained by the PNIPA to provide technical	Semester	Database of beneficiaries of PNIPA M&E	PNIPA Governance Unit - Monitoring and Evaluation

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
trained to provide technical assistance to the beneficiaries of the competitive funds in fisheries	assistance to the subprojects financed by the competitive funds in fisheries. To calculate the annual targets it is assumed that for each subprojects financed by the competitive funds three professionals or technicians are directly trained by PNIPA			/Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Subprojects in aquaculture subsector financed using competitive funds completed (disaggregated by type of project)	All types of aquaculture sub projects financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Applied research aquaculture subprojects	All aquaculture sub projects of applied and experimental research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Adaptive research aquaculture subprojects	All aquaculture sub projects of adaptive research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Extension aquaculture subprojects	All aquaculture sub projects of adaptive research financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Capacity building aquaculture subprojects	All aquaculture sub projects of capacity building financed and completed by PNIPA	Semester	PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Public and private institutions of the aquaculture value chain engaged in the planning, monitoring and evaluation of the competitive grants	Public and private institutions including communities, associations, organizations, etc. at local, regional and/or national level involved in the evaluation and monitoring of the competitive funds. The annual targets are calculated considering that at least one institution participate in each type of subprojects financed by the competitive funds.	Semester	Database of beneficiaries of PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Professionals and technicians hired and trained to provide technical assistance to the beneficiaries of the competitive funds in aquaculture	Professionals and technicians who are trained by the PNIPA to provide technical assistance to the subprojects financed by the competitive funds in aquaculture. To calculate the annual targets it is assumed that for each subprojects financed by the competitive funds at least three professionals or technicians are directly trained by PNIPA.	Semester	Database of beneficiaries of PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Staff of public and private institutions of SNIPA trained in specialized topics related to innovation in fisheries and aquaculture	Professionals who work for public institutions of SNIPA that participated in specialized training programs. To calculate the annual targets, it is assumed that for each institution, at least two professionals will be trained by PNIPA.	Semester	Database of beneficiaries of PNIPA M&E System	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Rules, procedures, protocols, instruments proposed for improving the SNIPA, including the system for maintaining sanitary standards in fisheries and aquaculture	All rules, procedures, protocols and instruments which be oriented to improve the sanitary system in fisheries and aquaculture. All of them must be developed according to the SANIPES' priorities.	Semester	Official documents of rules, procedures, protocols and instruments	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Information systems	The progress of this indicator will be	Semester	Information system	PNIPA Governance Unit -

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
developed and operational for the decision-making on governance of SNIPA	reported considering the progress made in the development of the following systems: (a) M&E system of SNIPA, (b) prospective and technological monitoring system of SNIPA and (c) knowledge management system of SNIPA.		developed on website	Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Direct project beneficiaries - Productive agents	(Productive Agents) Includes artisanal fishers, small-scale marine and freshwater aquaculture producers, owners of artisanal fishing vessels, and all others who participate directly in post-harvest value-addition -activities. The annual targets have been calculated taking into the consideration that each extension subproject will benefit 25 producers.	Annual	Database of beneficiaries of PNIPA M&E system	PNIPA Governance Unit - Monitoring and Evaluation /Vice Ministry of Fisheries and Aquaculture-Ministry of Production
Female project beneficiaries - Productive agents	Assuming that 20% of total beneficiaries will be women.	Annual	Database of beneficiaries of PNIPA M&E system	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production
Direct project beneficiaries - Innovation agents: Institutions	Includes all private and public institutions that benefit directly from applied and adaptive research subprojects. The annual targets have been calculated assuming that at least one private or public institution participate in each type of above-mentioned subproject.	Annual	Database of beneficiaries of PNIPA M&E system	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production
Direct project beneficiaries - Innovation agents: Professionals / technicians	Includes all professionals and technicians trained by PNIPA (component 1, 2 and 3). Moreover, it is assumed that every capacity building subproject will benefit	Annual	Database of beneficiaries of PNIPA M&E system	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture,

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
	10 technicians.			Ministry of Production
Direct project beneficiaries - Innovation agents: Female professionals / technicians	Assuming that 40% of total professionals and technicians are women	Annual	Database of beneficiaries of PNIPA M&E	PNIPA PIU Planning, Budget, and Monitoring Unit, Vice Ministry of Fisheries and Aquaculture, Ministry of Production

Annex 2: Detailed Project Description

PERU: National Program for Innovation in Fisheries and Aquaculture

Component 1. Promoting innovation in the fisheries subsector (US$30.8 million, including US$11.9 million from IBRD)

1. The capture fisheries subsector in Peru, especially the artisanal capture fisheries, is characterized by informality, resulting in a high incidence of unregulated and unreported fishing. As in many other countries, compliance with fishing regulations is very low, and a large constituency made up mainly of poor and marginalized fishermen has resisted government efforts to enforce restrictions on fishing effort or even establish an overarching national fisheries policy. Constrained by inadequate infrastructure and a lack of quality-enhancing services, many of these fishermen use antiquated and inefficient practices, and there is no strong tradition among fishermen and boat owners of sanitary practices, environmental awareness, and good business practices. Unlike in some other countries, fishermen in Peru face little pressure from consumers to modify their practices; while consumption of seafood continues to grow rapidly in the domestic market, there is little consumer awareness or demand for sustainable seafood.

2. The high incidence of informality within the capture fisheries subsector, combined with the low level of compliance with fishing regulations, makes it difficult to assess the health of fisheries resources. While landings data needed to determine stock status are scarce, it is likely that many stocks aside from anchoveta are overexploited or depleted. Empowering the fishing sector with the appropriate incentives to develop a long-term view of the resource, adopt better management practices, and employ more sustainable capture methods would greatly improve the chances of stock recovery and form the basis for generating shared prosperity in the sector.

3. Oceanographic changes, such as more severe and more frequent "El Niño" events resulting from climate change, can amplify the impacts of over-fishing, making it harder for fish stocks to recover, jeopardizing future catches, and threatening fishery-derived incomes. Healthy fish stocks are more resilient to climate impacts and can more easily sustain fishing economies.

4. Given the many threats to the natural capital that underpins the potential expansion of capture fisheries in Peru, as well as the constraints inherent in top-down approaches to the regulation of small-scale fisheries, the Government of Peru believes it appropriate to support innovation in the fisheries subsector. The Project, whose design has been informed by the strong record of success recorded under the INCAGRO I and II projects in promoting innovation in the agriculture sector, aims to improve competitiveness in the fisheries subsector by strengthening capacity to deliver innovations that will improve the governance of fisheries resources and encourage adoption of more sustainable fishing practices, leading to improved economic and social benefits.

5. With the goal of enhancing the economic viability and environmental sustainability of fisheries activities, especially in species other than anchoveta that have received relatively little attention up until now, Component 1 will strengthen capacity to deliver innovations in the capture fisheries subsector, specifically in the segment of the subsector that produces seafood destined for human consumption (in both marine and freshwater systems). Component 1 includes five subcomponents. The first four subcomponents consist of competitive grant facilities that will support: (a) upstream applied research to test new fisheries management systems, best practices, organizational arrangements and planning methods that contribute to the sustainability of the fishery; (b) downstream adaptive research to tailor management approaches, practices and technologies that have proved to be effective in other fisheries and value chains to fisheries in Peru; (c) extension advisory services to help scale up the use of effective tools and practices; and (d) capacity building to strengthen the community of fisheries applied research and extension service providers. The fifth subcomponent will provide support for the development of fisheries subproject proposals and the implementation of approved fisheries subprojects.

6. **Eligibility requirements for subproject grants supported under Component 1:** Subproject grants will be awarded to one or more productive agents that have partnered with one or more innovation agents to develop a collaborative proposal for applied research, adaptive research, extension, or capacity-building that offers a clear value proposition for improving the productivity, profitability, and/or sustainability of the fisheries subsector by improving the management and/or use of fisheries resources. Innovation agents will be required to ensure that proposals benefit both men and women. They will be encouraged to develop proposals targeting specifically women's needs and constraints in the fisheries subsector.

Subcomponent 1.1. Applied research on innovations in support of ecosystem-based fisheries management

7. Subcomponent 1.1 will support a competitive grants program focused on applied research on innovations in support of ecosystem-based fisheries management, with the goal of identifying and evaluating the institutional, biological, social, cultural and economic factors and variables associated with practices and technologies to better determine their potential to improve the profitability and sustainability of fisheries resources. It will support subprojects implemented by one or more productive agents (individual fishermen or formally established fishermen's associations) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on). The subprojects will be designed to identify and analyze the factors that influence the applicability and effectiveness of potential innovations. They will also be designed to identify and/or validate innovations that present a robust value proposition for improving the sustainability and financial viability of specific fisheries by improving performance at one or more stages of the value chain. Activities to be supported will include, among others, applied research on: institutional, biological, social, cultural and economic factors in a particular fishery or community; low-cost participatory methods to determine the status of a stock and calculate sustainable harvest rates; improved practices for sustainably and equitably managing access to fisheries resources (for example, conferring territorial user rights for near-shore fisheries, introducing marine spatial planning schemes); improved practices and technologies for licensing fishermen, registering vessels, monitoring fishing practices, and improving safety at sea; improved practices and technologies for ensuring traceability of seafood products; and collaborative models for gathering landings data and agreeing on and enforcing effort limits.

Subcomponent 1.2. Adaptive research in processes and technologies for good governance and improved competitiveness

8. Subcomponent 1.2 will support a competitive grants program focused on adaptive research designed to explore the transferability of innovative technologies and management practices that have been demonstrated to be effective in fisheries and value chains within or outside of Peru to other fishing communities in Peru. It will support subprojects implemented by one or more productive agents (individual fishermen or formally established fishermen's associations) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on). The subprojects will be designed to explore the transferability of innovative technologies and management practices that present a robust value proposition for improving the sustainability and financial viability of specific fisheries by improving performance at one or more stages of the value chain. Activities to be supported will include, among others, adaptive research on transferring knowledge about innovative fisheries management practices and technologies that can add value to existing fisheries or improve the sustainability of existing fisheries, assessing the effectiveness of such practices in new settings in Peru, and identifying modifications needed to improve their effectiveness and profitability under local conditions. Proposals to support innovations that are expected to generate greater productive value will be carefully screened to ensure that they do not

incentivize increased fishing effort, and preference will be given to subprojects that explicitly link value enhancements with more sustainable fishing practices.

Subcomponent 1.3. Fisheries extension and knowledge transfer

9. Subcomponent 1.3 will support a competitive grants program focused on supporting extension advisory services and other mechanisms for transferring knowledge in support of innovations that can help build sustainable and socially and economically viable fishing and related businesses along the fisheries value chain. Subprojects financed under Subcomponent 1.3 will respond to demand-driven extension needs expressed by one or more productive agents (individual fishermen or formally established fishermen's associations) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on), with the objective of solving a fisheries production, processing, marketing, or management problem. The subprojects will support the transfer of knowledge about established technologies and best practices, through the provision of advisory services in all aspects of fisheries, including improvements in fishing (for example, use of more selective gear to reduce by-catch, strengthening fishermen's associations), adoption of improved management practices (for example, participatory fisheries monitoring and enforcement of regulations, more systematic acquisition and reporting of catch data), and strengthening of value chains (for example, introducing enhancements in processing, distribution, marketing, traceability and market analysis).

Subcomponent 1.4. Capacity building for innovation

10. Subcomponent 1.4 will support a competitive grants program focused on building human and institutional capacity in support of fisheries innovation. It will support public and private innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on) whose activities can increase the sustainability and financial viability of specific fisheries and improve performance throughout the value chain. Emphasis will be placed on generating and transferring knowledge and skills relating to the fundamentals of good governance, as well as on building the analytical capacity needed to better understand the biological, social, economic, and environmental aspects of fisheries and fishing communities. These investments will contribute to the growth and strengthening of the fisheries innovation community, which is made up of skilled trainers and facilitators with expertise in the biological, social, economic, and environmental aspects of fisheries and seafood value chains. The subprojects supported under Subcomponent 1.4 will improve the design and strengthen the execution of the subprojects supported under Subcomponents 1.1, 1.2, and 1.3. Activities to be supported through competitive grants could also include educational workshops, training courses, learning exchanges, and the development of information and communications technology (ICT)-based platforms for facilitating learning and knowledge exchange.

Subcomponent 1.5. Support for subproject proposal development and implementation

11. Subcomponent 1.5 will finance a range of activities designed to support the effective design, development and implementation of innovation subprojects in the fisheries subsector. These activities will be coordinated by a small unit within the PIU that will liaise with productive agents and innovation agents in order to build fisheries innovation networks at national and regional level and ensure regular interaction and lesson-learning among the project participants. The role of this unit will be to publicize the opportunities that will be made available through the Project, help productive agents identify their innovation needs, match productive agents with innovation agents who are potential suppliers of the needed innovations, and help both partners develop viable subproject proposals that will be eligible for funding through one of the competitive grants funds. The unit will also generate contextual analysis of the fisheries subsector designed to inform and strengthen the priorities among stakeholders in specific fisheries and value chains as well as improve the design of proposals. Staff of this unit will convene more

than 100 awareness-raising and proposal development workshops across the country. Once an alliance of partners has been established, staff of the unit will be available to assist with proposal development as needed. They will also be available to provide advice to grantees on all aspects of subproject implementation, including in the areas of technical interventions, fiduciary management, M&E, and reporting of results.

12. All activities relating to the M&E of fisheries subprojects funded through competitive grants will be supported under Subcomponent 1.5.

Component 2. Promoting innovation in the aquaculture subsector (US$62.6 million, including US$24.1 million from IBRD)

13. Aquaculture in Peru is characterized by low species diversity, with less than 10 species being cultivated commercially. In the marine environment aquaculture production is concentrated in scallop and shrimp, and in freshwater systems it is concentrated in rainbow trout.

14. Recent diagnostic studies of Peru's aquaculture subsector have revealed the existence of knowledge gaps and capacity weaknesses in certain critical areas, such as genetics, breeding, and nutrition. A number of native marine and freshwater species have been identified as potential culture organisms, including pacific flounder, pacu (gamitana), mangrove cockle, oysters, Peruvian grunt, Peruvian seabass, and arapaima (paiche). Commercial cultivation of these species is prevented, however, by a lack of basic information about their biology in some cases and by technological gaps in other cases. Needed as well is a better understanding the socio-environmental context in which cultivation of these species might take place, as well as nature of the value chains that would be needed to link producers and consumers. Seaweeds have also been prioritized as culture species within the national aquaculture development plan, and research is needed to improve knowledge of the seaweed species that are naturally distributed along the Peruvian coast, as well as their potential to contribute to pharmaceutical, alimentary and cosmetic industries.

15. With the goal of enhancing the productivity and profitability of aquaculture activities, and identifying native species that might be suitable for aquaculture, Component 2 will strengthen capacity to deliver innovations in the aquaculture subsector. It will support adaptive and applied aquaculture research, piloting of promising aquaculture production technologies, scaling up of technologies whose effectiveness has been validated through pilots, knowledge generation and transfer, and capacity building. Component 2 includes five subcomponents. The first four subcomponents consist of competitive grant facilities that will support (a) upstream *applied research* to test aquaculture species, aquaculture production systems, and aquaculture production practices that are new to Peru; (b) downstream *adaptive research* to tailor aquaculture management approaches, practices and technologies that have proved to be effective in other countries and other value chains to the conditions of Peru; (c) *extension advisory services* to strengthen aquaculture producers' capacities and foster their self-sustainability; and (d) *capacity-building* to strengthen the community of applied aquaculture research and extension service providers. The fifth subcomponent will provide support for the development of aquaculture subproject proposals and the implementation of approved aquaculture subprojects.

16. **Eligibility requirements for subproject grants supported under Component 2.** Subproject grants will be awarded to one or more productive agents that have partnered with one or more innovation agents to develop a collaborative proposal for applied research, adaptive research, extension, or capacity-building that offers a clear value proposition for improving the productivity, profitability, and/or sustainability of the aquaculture subsector by improving the management and/or use of aquaculture resources. Innovation agents will be required to ensure that proposals benefit both men and women. They will be encouraged to develop proposals targeting specifically women's needs and constraints in the aquaculture subsector.

Subcomponent 2.1. Applied research to test and adapt aquaculture species and culture systems

17. Subcomponent 2.1 will support a competitive grants program focused on applied research on innovations in support of aquaculture, with the goal of identifying and evaluating practices and technologies that have the potential to improve the productivity and profitability of aquaculture production systems in Peru. It will support subprojects implemented by one or more productive agents (individual aquaculture producers or formally established aquaculture producers' associations) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on). The subprojects will be designed to identify and/or validate innovations that present a robust value proposition for improving the sustainability and financial viability of aquaculture production systems by improving performance at one or more stages of the value chain.

18. Activities to be supported under Subcomponent 2.1 will be designed to generate the knowledge needed to widen the spectrum of aquaculture production systems found in the country, including research designed to assess the performance of exotic species and non-traditional technologies. Additional activities to be supported under Subcomponent 2.1 include, among others, the identification and evaluation of improved practices and technologies for producing, harvesting, processing, transporting, storing, and/or distributing existing and new aquaculture products; the identification and evaluation of existing practices and technologies for sustainably managing the resource base on which aquaculture depends; the identification and evaluation of improved practices and technologies for ensuring safety and traceability of aquaculture products; the identification of approaches for preventing conflicts with other users of land and water resources used for aquaculture, such as marine spatial planning; the identification of practices and technologies for effluent pollution control; and the integration of aquaculture into agriculture and livestock production systems.

Subcomponent 2.2. Adaptive research to increase productivity and competitiveness in aquaculture value chains

19. Subcomponent 2.2 will support a competitive grants program focused on adaptive research designed to explore the transferability to Peruvian aquaculture production systems of innovative technologies and management practices that have been demonstrated to be effective elsewhere. It will support subprojects implemented by one or more productive agents (individual aquaculture producers or formally established associations of aquaculture producers) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on). The subprojects will be designed to explore the transferability of innovative technologies and management practices that present a robust value proposition for improving the productivity and profitability of aquaculture production systems by improving performance at one or more stages of the value chain.

20. Activities to be supported under Subcomponent 2.2 will include, among others, adaptive research on transferring knowledge about innovative aquaculture production practices and technologies that can add value to existing aquaculture production systems, assessing the effectiveness of such practices in new settings in Peru, and identifying modifications needed to improve their effectiveness and profitability under local conditions. Activities to be supported will include, among others: diagnosis of aquaculture performance gaps and identification of specific limiting factors; measurement of productivity and assessment of competitiveness of specific aquaculture production systems; development or refinement of practices and technologies that can increase productivity and/or profitability in an environmentally sustainable manner; identification of opportunities to narrow technological gaps in the cultivation of native species with some degree of advancement, such as pacific flounder, pacu, Peruvian grunt, and arapaima; development of more affordable aquaculture feeds; and identification of opportunities to achieve efficiencies in the postharvest stages of the aquaculture value chain (including the development of new products).

Subcomponent 2.3. Extension services to strengthen producers' capacities and foster their self-sustainability

21. Subcomponent 2.3 will support a competitive grants program focused on supporting extension advisory services and other mechanisms for transferring knowledge in support of innovations that can help build productive and profitable aquaculture productions systems in Peru. Subprojects financed under Subcomponent 2.3 will respond to demand-driven extension needs expressed by one or more productive agents (individual aquaculture producers or formally established associations of aquaculture producers) working in partnership with one or more innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on), with the objective of solving an aquaculture production, processing, marketing, or management problem. The subprojects will support the transfer of knowledge about established technologies and best practices, through the provision of advisory services in all aspects of aquaculture production, including improvements in production (for example, use of improved genetics, healthier fingerlings, improved feedstuffs), adoption of improved management practices (for example, methods for monitoring growth rates and feed conversion ratios, techniques to improve fish health and reduce mortality rates), and strengthening of postharvest stages of value chains (for example, introducing enhancements in processing, distribution, marketing, traceability and market analysis).

Subcomponent 2.4. Capacity building to strengthen the community of applied research and extension service providers

22. Subcomponent 2.4 will support a competitive grants program focused on building human and institutional capacity in support of aquaculture innovation. It will support public and private innovation agents (government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on) whose activities can increase the productivity and profitability of aquaculture productions systems and improve performance throughout the value chain. Emphasis will be placed on generating and transferring knowledge and skills relating to the fundamentals of production and marketing, as well as on building the analytical capacity needed to better understand the biological, social, economic, and environmental aspects of aquaculture productions systems and the communities that depend on them. These investments will contribute to the growth and strengthening of the aquaculture innovation community, which is made up of skilled trainers and facilitators with expertise in the biological, social, economic, institutional and environmental aspects of aquaculture value chains. The subprojects supported under Subcomponent 2.4 will improve the design and strengthen the execution of the subprojects supported under Subcomponents 2.1, 2.2, and 2.3.

Subcomponent 2.5. Support for proposal development and project implementation

23. Subcomponent 2.5 will finance a range of activities designed to support the effective design, development, and implementation of innovation subprojects in the aquaculture subsector. These activities will be coordinated by a small unit within the PIU that will liaise with productive agents and innovation agents in order to build an aquaculture innovation network and ensure regular interaction and lesson-learning among the project participants. The role of this unit will be to publicize the opportunities that will be made available through the Project, help productive agents identify their innovation needs, match productive agents with innovation agents who are potential suppliers of the needed innovations, and help both partners develop viable subproject proposals that will be eligible for funding through one of the competitive grants funds. The unit will also generate contextual analysis of the aquaculture subsector designed to inform and strengthen the priorities among stakeholders in specific aquaculture and value chains, as well as improve the design of proposals. Staff of this unit will convene more than 100 awareness-raising and proposal development workshops across the country. Once an alliance of partners has been established, staff of the unit will be available to assist with proposal development as needed.

They will also be available to provide advice to grantees on all aspects of subproject implementation, including in the areas of technical interventions, fiduciary management, M&E, and reporting of results.

24. All activities relating to the M&E of aquaculture subprojects funded through competitive grants will be supported under Subcomponent 2.5.

Component 3. Strengthening the SNIPA, institutions, and policies to improve governance of fisheries and aquaculture (US$16.5 million, including US$4.0 million from IBRD)

25. Component 3 will strengthen the capacity of the SNIPA to deliver innovations in the fisheries and aquaculture subsector. With the goal of increasing the productivity, enhancing the profitability, and ensuring the sustainability of fishing and aquaculture production activities, Component 3 will focus on (a) the strengthening of policies, regulatory frameworks, processes, and procedures, including those related to production, handling, transformation and consumption of fish and seafood products, and those related to productive and sustainable management of fisheries and aquaculture resources and (b) establishing a new organizational and institutional model for the fisheries and aquaculture sector. These activities will be undertaken in pursuit of the Government's vision of creating a decentralized, open, and dynamic system comprising both public and private actors to promote innovation in the sector and improve the knowledge needed to ensure efficient and sustainable management of the resource base on which fishing and aquaculture depend. These activities will be undertaken in pursuit of the Government's vision of creating a decentralized, open, and dynamic system comprising both public and private actors to promote innovation in the sector and improve the knowledge needed to ensure efficient and sustainable management of the resource base on which fishing and aquaculture depend.

Subcomponent 3.1. Strengthening policies and regulatory frameworks

26. Subcomponent 3.1 will support the strengthening of policy and regulatory frameworks to promote enhanced innovation in the fisheries and aquaculture sector. Subcomponent 3.1 will support the following activities, among others:

27. **Design of policies and regulatory frameworks.** Subcomponent 3.1 will support information collection activities and analytical works to inform the design of policies and regulatory frameworks for promoting innovation in the fisheries and aquaculture sector. Investments in monitoring systems and decision support tools, as well as in training the people needed to run them, will strengthen the capacity of PRODUCE and other agencies to monitor systemic changes in the fisheries and aquaculture sector; diagnose constraints and identify opportunities for improvement; contribute to the design of norms, standards, and legislation to support modernization; and build consensus among key actors around a shared vision for the future. An expected output is a National Policy for Fisheries and Aquaculture, based on the FAO Code of Conduct of Responsible Fisheries.

28. **Development and consolidation of innovation networks.** Innovation networks can be efficient instruments for facilitating exchanges of information, experiences, and knowledge. When properly implemented, they are able to link people sharing a common vision and stimulate collaboration and development of ideas to solve emerging challenges. Subcomponent 3.1 will support the establishment of fisheries and aquaculture innovation networks and thematic clusters at national and regional level, with the goal of encouraging informal discussion and open dialogue on issues related to modernizing and transforming the sector.

29. **Establishment of platforms to strengthen knowledge exchange.** Platforms will be organized to address needs identified through innovation networks. Workshops, learning events, trade fairs, and conferences with international attendance will be organized, to stimulate innovation, facilitate sharing of ideas, and generate recommendations. Prizes will be awarded to recognize achievements and stimulate the development of innovative ideas. New and relevant knowledge will be disseminated through printed publications, radio and television broadcasts, and diverse digital media.

30. **Ensuring the safety of fisheries and aquaculture products.** To ensure that Peru's fisheries and aquaculture products meet international health and safety standards, Subcomponent 3.1 will support activities designed to strengthen national standards for inspection. The standards will serve as a tool for orienting the work of public inspectors, but they will also be translated into simpler language to make them accessible to actors all along the value chain. Subcomponent 3.1 will also support the development of national standards for labeling of fisheries and aquaculture products to improve traceability. Ensuring the traceability of fisheries and aquaculture products is important to ensure that the products are safe for consumption and that fisheries resources are sustainably managed. Traceability is increasingly required to compete in global markets. Subcomponent 3.1 will support the collection, storage, and dissemination of information about the safety of fisheries and aquaculture products. Systems for certifying fish products and for issuing health and catch certificates will be strengthened. To ensure that the new health and safety standards are effectively implemented, Subcomponent 3.1 will support the training of fisheries and aquaculture inspectors.

Subcomponent 3.2. Establishing a new organizational and institutional model

31. Subcomponent 3.2 will support the establishment of new organizational and institutional model to support innovation the fisheries and aquaculture sector. It will support analytical, training, and advocacy activities, with the goal of improving the capacity of PRODUCE and other key agencies to provide effective governance of the sector. Subcomponent 3.2 will support the following activities, among others:

32. **Strengthening of governance services.** Subcomponent 3.2 will support M&E activities, diagnostic studies, impact assessments, and other analytical works designed to determine how policies, programs, and other instruments have impacted innovation in the fisheries and aquaculture sector. The products of these activities are expected contribute to the development of new policies, programs, and other instruments that can stimulate and enable further innovation. Subcomponent 3.2 will support training at national and regional level of staff working in the agencies charged with governing the fisheries and aquaculture sector. Consultations will be carried out with universities, research institutes, and other academic institutions to identify gaps in existing curricula, and new curricula will be developed to meet future demand and stimulate innovation in the fisheries and aquaculture sector. Funds will be provided for learning exchanges, internships, non-degree training, and degree training at national and international universities, research institutes, and other types of knowledge organizations. Funds will be provided to hire expertise at international level will be provided to ensure human capacity development needs are addressed.

33. **Development of systems for monitoring performance of the fisheries and aquaculture sector and identifying emerging technologies.** Subcomponent 3.2 will support the establishment of systems for monitoring performance throughout the fisheries and aquaculture sector. The systems will be used to track progress achieved with respect to the Government's long-term policy goals for the sector. The results of the monitoring exercise will be used to project future trends and identify emerging technology needs. Analytical works will be supported to assess the likely technical, economic, social, and environmental impacts of pipeline technologies, including impacts on groups within the population that are known to be disadvantaged (for example, indigenous people, women, youth). Key findings emerging from these analytical works will be disseminated through SNIPA innovation networks, with the goal of stimulating further innovation that addresses emerging priorities.

34. **Development of an M&E system for SNIPA.** Subcomponent 3.2 will support the establishment of a M&E system within PRODUCE to collect, analyze, and disseminate data about the performance of SNIPA. It will support institutional audits and evaluative studies designed to identify organizational and institutional constraints and opportunities affecting SNIPA, with the goal of providing the information needed to make adjustments to SNIPA to resolve bottlenecks and improve performance.

35. **Development of a fisheries and aquaculture knowledge management system.** Subcomponent 3.2 will support the establishment within PRODUCE of a knowledge management system for the fisheries and aquaculture sector. The purpose of the knowledge management system will be to make available to a broad audience information and analysis relating to the performance of the fisheries and aquaculture sector. A public website will be established to provide access to information, communicate news, and foster knowledge exchanges.

Component 4. Project management (US$11.0 million, including US$0.0 million from IBRD)

36. Component 4 will provide support to PRODUCE and other agencies to ensure successful implementation of project activities, including administration, financial management, procurement, M&E, and safeguards compliance.

37. To ensure effective implementation of Project-supported activities, PRODUCE will establish a PIU. Operating under the oversight of a broadly constituted Steering Committee, the PIU will include Executive Director; Operations Director; Fisheries Innovation Unit Director; Aquaculture Innovation Unit Director; Governance Unit Director; Head of Planning, Budget and Monitoring; Social Specialist; Environmental Specialist; and administrative staff (Head of Administration, Financial Specialist, Accounting Specialist, Treasurer, Procurement Specialist). The Directors of the three technical units will report to the Operations Director and will collaborate amongst themselves depending on their roles and responsibilities. The PIU, to be in place by Project effectiveness, will be responsible for planning and implementing annual work programs; ensuring compliance with all applicable World Bank procurement, financial management, and safeguards policies and procedures; managing human and physical resources; and carrying out M&E activities.

38. The Operational Manual describes the Project's institutional setup and provide details regarding its administrative, financial management, procurement, safeguards, and M&E procedures. Preparation of the Operational Manual and its approval by the World Bank is a condition of effectiveness. The PIU will be staffed with professionals and consultants to ensure adequate capacity for project implementation. The Operational Manual details the roles and responsibilities of PRODUCE (the implementing agency), as well as other institutions involved in carrying out the activities of the Project.

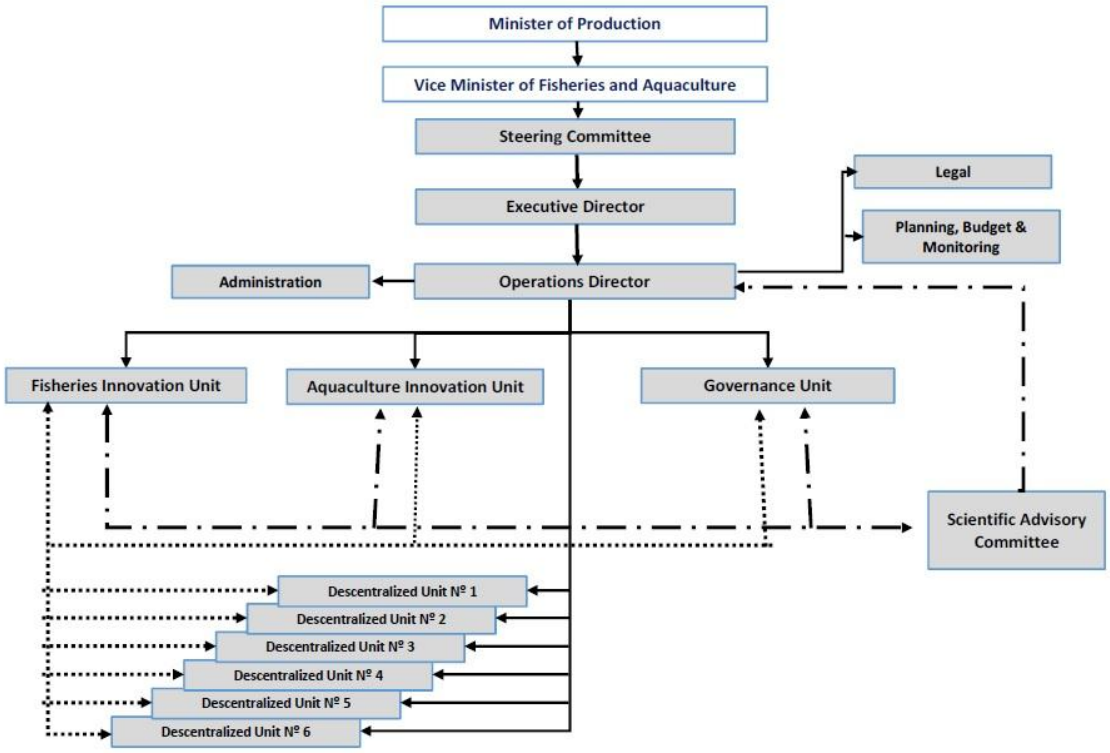
Annex 3: Implementation Arrangements

PERU: National Program for Innovation in Fisheries and Aquaculture

Project Institutional and Implementation Arrangements

1. **Borrower.** The Recipient of the Loan will be the Republic of Peru, through the MEF, which will transfer the loan proceeds to the PRODUCE. Serving as the Implementing Agency, PRODUCE will be responsible for the implementation of all Project activities, internal and external communications, financial management, procurement, and compliance with safeguards policies. Under PRODUCE, the Project will be managed by the Vice Ministry of Fisheries and Aquaculture, which holds the mandate in Peru to develop and manage the fisheries and aquaculture sector, including playing the key role of coordinating with regional and local governments to ensure that national fisheries and aquaculture policies are effectively implemented.

Figure 3.1. Project Institutional Arrangements



2. The institutional arrangements for the execution of the Project are shown in figure 3.1.

3. **Implementing agency.** PRODUCE will be responsible for overall project implementation, including all the financial and reporting transactions with the World Bank.

4. **PIU.** For the purpose of implementing the Project, PRODUCE will establish a PIU. The PIU will have the following main duties and responsibilities: (a) developing and approving budgets and annual operational plans; (b) ensuring the successful execution of subprojects; (c) ensuring the successful execution of other Project-supported activities; (d) performing the processes of procurement; (e)

approving contracts and agreements; (f) establishing financial management arrangements (budget, accounting systems, fund management, internal control, financial reporting and audit) to ensure proper management of resources and allocation of funds according to project objectives; (g) carrying out M&E activities; and
(h) ensuring compliance with the contractual conditions of the Project. The Project's Operational Manual provides details related to the Project's institutional setup, fiduciary arrangements, M&E procedures, safeguards compliance arrangements, and governance arrangements.

5. The PIU will consist of the following key staff. Executive Director; Operations Director; Fisheries Innovation Unit Director; Aquaculture Innovation Unit Director; Governance Unit Director; Head of Planning and Budget; Environmental Specialist; and administrative staff (Head of Administration, Financial Specialist, Accounting Specialist, Treasurer, Procurement Specialist). The PIU will be established by effectiveness of the Project, with all key staff hired except for the Accounting Specialist and Treasurer, who will be hired within six months of effectiveness of the Project. The Borrower, through PRODUCE, has also committed to hire a social specialist within the time frame referred to in the Operational Manual.

6. The Executive Director will provide overall leadership to the Project. The duties and responsibilities of the Executive Director will include, among others, (a) managing the PIU; (b) together with the Director of Operations, proposing to the Steering Committee programmatic strategies and operational plans; (c) representing PNIPA in its interactions with other actors in the fisheries and aquaculture sector, including partners and stakeholders (public agencies, private firms, universities and research institutes, civil society organizations, regional and local governments, local communities, and so on); (d) carrying out activities relevant to the strategic positioning of PNIPA; (e) assuming the role and tasks of Executive Secretary of the Steering Committee; (f) supporting the institutionalization of SNIPA; and (g) providing advice to the Vice Minister of Fisheries and Aquaculture on innovations issues.

7. The Operations Director will supervise day-to-day operations of the Project. The duties and responsibilities of the Operations Director will include, among others, (a) supporting the Executive Director in proposing to the Steering Committee programmatic strategies and operational plans; (b) supervising the directors of technical units; (c) preparing the annual operating plan and associated budget; (d) overseeing M&E activities, safeguards, and supervising the preparation of progress reports as requested by PRODUCE, MEF, and the World Bank; (e) carrying out administrative and budgetary controls (including arranging for audits and possibly other external controls); and (f) ensuring capacity building for Project staff.

8. Three management units within the PIU (Planning, Budget, and Monitoring; Administration; and Legal) will be responsible for planning, financial management, management of human and physical resources, and procurement of goods and services. These three units will operate under the supervision of the Operations Director. The management units will formulate rules and procedures, develop procurement and disbursement plans, prepare bi-annual and annual financial reports, and ensure compliance with all contracts in accordance with the procedures of PRODUCE and of the World Bank. The management units will also participate in the preparation and implementation of specialized software that will be used to track the financial management of the Project. The principal functions of these management units are described below:

9. **Planning, Budget, and Monitoring Unit.** The Planning, Budget, and Monitoring Unit will be responsible for planning the work program of the Project, developing associated budgets, and monitoring implementation paying attention to both technical and fiduciary aspects. Its principal duties will include: (a) proposing for review and approval by the Executive Director and/or Steering Committee institutional policy guidelines; (b) providing advice to the Operations Director in the areas of planning, budget, M&E; (c) proposing directives and/or strategic guidelines for improving the management related to the Planning, Monitoring, and Budget Unit; (d) coordinating the preparation of annual operating plans; (e) assessing

physical progress and financial performance of the Project; and (f) developing and proposing amendments to the Project.

10. **Administrative Unit.** The Administrative Unit will be responsible for carrying out administrative functions and coordinating the implementation of activities related to finance, treasury, accounting, human resources and procurement in accordance with World Bank standards and national standards. Its principal duties will include: (a) supervising jointly with the technical units the implementation of subprojects, including financial, administrative and procurement aspects; (b) monitoring all administrative, financial, and procurement aspects of contracts financed partly or wholly through external borrowing;
(c) coordinating with external auditors required under the terms of the Loan Agreement and providing any documentation that they may request; and (d) carrying out any other duties as requested by the Operations Director.

11. **Legal Unit.** The Legal Unit will be responsible for ensuring that the PIU and the Project more generally operate within the framework of current legislation. Its principal duties will include: (a) analyzing and following up on the legal aspects of all agreements and contracts; (b) informing the Operations Director and the heads of the different units about existing legal provisions having direct implications for the implementation of the Project and (c) providing training to PIU staff on legal issues relevant to the performance of their duties.

12. Three technical units within the PIU will operate under the supervision of the Executive Director and the Operations Director: (a) Fisheries Innovation Unit, (b) Aquaculture Innovation Unit, and (c) Governance Unit. The principal functions of each of these technical units are described below:

13. **Fisheries Innovation Unit.** The Fisheries Innovation Unit will be responsible for implementing the competitive grants program in support of fisheries innovation; provide advice, training, and technical assistance to ensure effective implementation of the fisheries innovation subprojects; support the successful implementation of the fisheries innovation subprojects; and monitor innovation in the subsector. Its principal duties will include: (a) designing the competitive grants program for fisheries innovation; (b) implementing the competitive grants program for fisheries innovation, including carrying out or coordinating all tasks related to publicity and awareness raising, issuing calls for proposals, and disbursement of grant funds; (c) providing advice, training, and technical assistance in implementing the subprojects; (d) monitoring the pattern and evolution of innovation in the fisheries subsector; (e) supporting the collection and distribution of information needed for the internal M&E of the Project; and (f) supporting knowledge management. In carrying out these duties, the central Fisheries Innovation Unit will coordinate the activities of the decentralized units and provide support to the decentralized units as needed. The Fisheries Innovation Unit will be staffed by a manager, a competitive grants specialist, a monitoring and evaluation and knowledge management specialist, and an administrative assistant.

14. **Aquaculture Innovation Unit.** The Aquaculture Innovation Unit will be responsible for implementing the competitive grants program in support of aquaculture innovation; provide advice, training, and technical assistance to ensure effective implementation of the aquaculture innovation subprojects; support the successful implementation of the aquaculture innovation subprojects; and monitor innovation in the subsector. Its principal duties will include: (a) designing the competitive grants program for aquaculture innovation; (b) implementing the competitive grants program for aquaculture innovation, including carrying out or coordinating all tasks related to publicity and awareness raising, issuing calls for proposals, and disbursement of grant funds; (c) providing advice, training, and technical assistance in implementing the subprojects; (d) monitoring the pattern and evolution of innovation in the aquaculture subsector; (e) supporting the collection and distribution of information needed for the internal M&E of the Project; and (f) supporting knowledge management. In carrying out these duties, the central Aquaculture Innovation Unit will coordinate the activities of the decentralized units and provide support to the decentralized units as needed. The Aquaculture Innovation Unit will be staffed by a manager, a

competitive grants specialist, a monitoring and evaluation and knowledge management specialist, and an administrative assistant.

15. **Governance Unit.** The Governance Unit will be responsible for building an appropriate enabling environment to promote effective governance of the national innovation system for fisheries and aquaculture in particular and of the sector more generally. Its principal duties will include: (a) facilitating knowledge exchange events, discussions and other activities to promote knowledge and dialogue for policy design and innovation standards in the fisheries and aquaculture subsectors; (b) promoting inter-institutional networks and partnerships aimed at innovation in the sector; (c) supporting the expansion and strengthening of the network coordinated by the National Service for Fisheries Health (*Organismo Nacional de Sanidad Pesquera,* SANIPES); (d) supporting the decentralized units in the development of strategies and activities to strengthen governance in fisheries and aquaculture at the local and subnational level;
(e) facilitating the construction of the National Innovation System in Fisheries and Aquaculture (SNIPA), including assuming on a provisional basis the role of technical secretariat; (f) advising, supporting, and carrying out executive tasks in the management of knowledge about the characteristics, trends and evolution of innovation in the fisheries and aquaculture subsector (including studies, systematization, exchange and dissemination activities, and so on); and (g) leading the M&E of the SNIPA developing procedures and tools oriented to measure and report the progress of the project considering the main indicators of PNIPA. The Governance Unit will be staffed by a manager, a fisheries/aquaculture policy specialist, a network governance and institutional coordination specialist, a knowledge, monitoring and evaluation specialist, and an administrative assistant.

16. Six regional offices will be established sequentially during the first two years of Project implementation, if not sooner, as further elaborated in the Operational Manual. These offices will be located in the six macro-regions of the country (see figure 3.2). Their principal functions will include: (a) identification of opportunities and demand for innovation and possible partnerships between actors at local and subnational (regional) levels; (b) communicating the mechanisms, including terms and conditions, through which PNIPA can provide support to stakeholders involved in fisheries and aquaculture activities who may be interested in participating in innovation initiatives; (c) training individuals and groups who may be interested in submitting proposals for competitive grants, and providing guidance on the preparation of proposals; (d) providing support (for example, counseling, training, technical assistance) to facilitate the implementation of innovation subprojects; (e) supporting the establishment and strengthening of systemic links between stakeholders at local and subnational levels (for example through networks and alliances) and better articulating stakeholders at local and subnational levels with initiatives being implemented at the national level to improve governance in the fisheries and aquaculture subsector; (f) advising, supporting, and if necessary, assuming responsibility for strengthening governance in fisheries and aquaculture at the local and sub-regional level, including by establishing relations with regional governments and local governments; (g) coordinating fiduciary and procurement activities with the Administrative Unit in Lima; and (h) assisting in the collection and dissemination of information regarding the implementation of innovation subprojects, as an input to the M&E system. Each regional office will be composed of one manager, two M&E specialists, one administrative/procurement specialist, and one driver.

17. The regional offices will be located in the following cities (see map in Annex 6):

Macro-region I:	Piura
Macro-region II:	Chimbote
Macro-region III:	Huancayo
Macro-region IV:	Puno
Macro-region V:	Cusco
Macro-region VI:	Tarapoto

Governance and Oversight Arrangements

18. **Steering Committee:** By effectiveness, PRODUCE will establish a Steering Committee for the Project. The Steering Committee will be the highest governing body of the Project. It will provide general strategic guidance and ensure implementation oversight. The Steering Committee will be chaired by the Vice Minister of Fisheries and Aquaculture in PRODUCE or his representative and will be composed of eight members appointed by Ministerial Resolution and acceptable to the World Bank. These members will include one representative from MEF-DGIP, one representative from the General Directorate of Fish Production for Direct Human Consumption, one representative from General Directorate of Policies and Fisheries Development, one representative from the National Council of Science and Technology *(Consejo Nacional de Ciencia y Tecnología*, CONCYTEC), one representative elected by the main fishing unions, one representative elected by the main aquaculture unions, one representative of the faculties of fisheries of universities, and one representative from the Association of Engineers of Peru. The Steering Committee will meet regularly (at least four times per year) to review implementation progress, provide guidance on implementation issues, and coordinate actions needed to resolve problems that may be adversely affecting the performance of the Project. More specifically, the main functions of the Steering Committee is to: (a) provide guidance and approve PNIPA's programmatic strategies, (b) follow-up on the implementation of the activities and take any corrective action to achieve the goals of the Project, (c) approve the Annual Operating Plan and the Annual Budget, (d) approve annual reports, and other documents as needed, and (e) participate in the selection of the Executive Director and Operations Director. The operating procedures of the Steering Committee will be approved during its first session. The Executive Director of the Project will act as the Technical Secretary of the Steering Committee.

19. **Scientific Advisory Committee:** Within six months after effectiveness, PRODUCE will establish a Scientific Advisory Committee for the Project. The Scientific Advisory Committee will provide guidance to the Fisheries and Aquaculture Innovation Units on scientific and technical issues relating to the innovation agenda. The Scientific Advisory Committee will consist of six members, three with experience and specialization in fisheries and three with experience and specialization in aquaculture, all to be approved by the Steering Committee, and acceptable to the World Bank. The Scientific Committee will meet quarterly, chaired by the Executive Director. The Director of Operations of the Project will act as the Technical Secretary to the Committee. The functions of the Scientific Advisory Committee will include (a) providing information about global scientific advances in innovation, research in fisheries, aquaculture, biotechnology, genetic resources, and others; (b) identifying national, regional and international institutions and organizations engaged fisheries and aquaculture innovation with which the Project could develop partnerships; (c) identifying national, regional and international scientists who could participate in innovation activities being supported by the Project; and (d) assist the Executive Director in the annual assessment of innovation subprojects financed by the Project.

Other Stakeholders and Partners

20. Other stakeholders in the sector: In addition to PRODUCE, other public agencies hold important mandates in the fisheries and aquaculture sector.

Organization	Roles and Responsibilities
Marine Research Institute of Peru (*Instituto del Mar del Perú*)	Conducts scientific research on the relationship between fisheries resources, the environment and fisheries practices, which is key to the development of artisanal fisheries and sustainable aquaculture, and their contribution to the sustainability of industrial fisheries.
National Fund for Fisheries Development	Dedicated to promoting the development of small-scale

Organization	Roles and Responsibilities
(*Fondo Nacional de Desarrollo Pesquero*)	fishing and aquaculture. From its headquarters and four regional aquaculture centers, it provides training services, supports technology transfer, promotes innovation, and provides technical assistance for production.
Fisheries Technology Institute of Peru (*Instituto Tecnológico Pesquero del Perú*)	Dedicated to development of new fisheries products, including products with higher added value. It receives support from the National Service for Fisheries Health.
National Service for Fisheries Health (*SANIPES)*	Newly created specialized technical agency in charge of fish inspection. It is responsible for the regulation, supervision, and control of hygiene and quality standards for products originating from fisheries and aquaculture.
The National Council of Science, Technology and Innovation *(El Consejo Nacional de Ciencia, Tecnología e Innovación, CONCYTEC)*	Part of the National System of Science and Technology and Technological Innovation (SINACYT), has as its mission the promotion, coordination, and regulation of public initiatives in the fields of science, technology and technological innovation.
National Institute for the Defense of Competition and Intellectual Property *(Instituto Nacional de Defensa de la Competencia y de la Propiedad Intelectual)*	Responsible for ensuring that all forms of intellectual property are recognized and suitably protected within the national territory.
Universities and research institutes	A number of public and private institutions engage in research that can contribute to innovation in the fisheries and aquaculture sector and/or provide training to those engaged in such research.
Regional governments	Regional governments have a mandate to promote sustainable integrated regional development, encourage public and private investment in productive sectors, generate employment, and protect natural resources.
Local governments	Local governments have a mandate to promote concerted actions and build alliances for strategic research and technology transfer at the local level.
Organizations of fishermen and aquaculture producers, trade associations	Organizations of fishermen and aquaculture producers, as well as trade associations representing the fishing and aquaculture industries, represent their membership in interactions with government entities.

Implementation Arrangements: Competitive Grants Facility

21. Components 1 and 2 are designed to stimulate a dynamic marketplace for innovation, bringing together the productive agents who are in need of innovation (for example, fishermen and their organizations, aquaculture producers and their organizations, processors, wholesale and retail distributors, exporters, consumers) with the innovation agents who are able to supply innovations (for example, government agencies, academic institutions, research centers, private companies, technology firms, NGOs, and so on).

22. To help ensure that the innovation activities implemented under the Project respond to market demand, the subprojects to be supported under Components 1 and 2 will be financed through a Competitive Grants Facility. The Competitive Grants Facility will provide resources for innovation subprojects focusing on nationally or regionally prioritized topics in the areas of fisheries and aquaculture. Competitive grants will be awarded to individual organizations to partnerships, strategic alliances, and consortia involving two or more organizations.

23. Subprojects to be supported through the Competitive Grants Facility will, among others, (a) promote collaboration between productive agents and innovation agents, with the goal of stimulating the generation and exchange of technical knowledge, management practices, and market information; (b) support the development of value chains and industrial clusters to increase the competitiveness of Peru's fisheries and aquaculture products in domestic and international markets; (c) promote networks to increase flows of technical know-how and market information; (d) support the introduction of innovative management practices and production technologies that boost productivity and production while enhancing the environmental and social sustainability of fisheries and aquaculture resources; and (e) raise awareness about and promote consumption of healthy and nutritious foods produced in the fisheries and aquaculture sector.

24. Competitive grant recipients will be required to cover a specified minimum percentage of the total subproject costs, to be provided in cash or in kind. To encourage broad participation, the share of grant funding assigned to public agencies will be capped at a specified level.

25. The Fisheries Innovation Unit and the Aquaculture Innovation Unit will be responsible for day-to-day management activities of the competitive grants program. They will issue calls for proposals, establish and manage the work of the technical evaluation panels, coordinate the evaluation of proposals, supervise research and development subprojects under implementation, monitor progress, and evaluate the results of completed subprojects.

26. The Project will support the carrying out of awareness campaigns to publicize the availability of the funds available through the Competitive Grants Facility. The campaigns will target and provide additional capacity building as needed for disadvantaged groups (for example, indigenous people and women's organizations) to enable them to apply for subprojects. It will support also dissemination of information about the innovations produced through subprojects supported by the competitive grants facilities.

Data sheet: Component 1 Funds for Promoting Innovation in the Fisheries Subsector

	Fund 1 Applied Research	Fund 2 Adaptive Research	Fund 3 Extension Services	Fund 4 Capacity Building
Objective	Support applied research in governance models in support of ecosystem-based fisheries management.	Support adaptive research exploring the transferability of lessons, technology and management strategies.	Support extension services that build sustainable and socially and economically viable fishing, and related businesses along the entire value chain.	Support building capacity for applied and adaptive research as well as extension services to meet the demand in the fisheries subsector.
Lines of intervention	• New fisheries management models including territorial user rights and spatial management • Development of technologies for more sustainable fishing • Improving traceability	• New fisheries management models including territorial user rights and spatial management • Improving landing sights and processes • Improving traceability • Development of technologies for more sustainable fishing	• New fisheries management models including territorial user rights and spatial management • Market access • Development of technologies for more sustainable fishing • Improving landing sights and processes • Improving traceability	• New fisheries management models including territorial user rights and spatial management • Market access • Development of technologies for more sustainable fishing • Improving landing sights and processes • Improving traceability
Amount of grant	US$150,000	US$180,000	US$35,000	US$25,000
Matching contribution	20% (monetary)	30% (monetary)	20% (monetary)	20% (monetary)
Who can apply	Leader: Research centers, universities and institutions that perform scientific and technological activities. Partner: Processing companies, aquaculture companies, producer associations.	Leader: Processing companies, aquaculture businesses , producer association Partner: Research centers, universities and institutions that perform scientific and technological activities.	Leader: Research centers, universities and institutions that perform scientific and technological activities. Partner: Processing companies, aquaculture companies, producer associations.	Leader: Training centers (universities, institutes) Partner: Processing companies, aquaculture companies, producer associations.
Subproject duration	2 years	2 years	1 year	1 year
Calls for proposals	2	3	4	4
Budget structure	Human resources (30%) Equipment (20%) Inputs (30%) Overhead (20%)	Human resources (30%) Equipment (20%) Inputs (30%) Overhead (20%)	Human resources (40%) Equipment (20%) Inputs (20%) Overhead (20%)	Human resources (50%) Equipment (5%) Inputs (25%) Overhead (20%)

Data sheet: Component 2 funds for promoting innovation in the aquaculture subsector

	Fund 1 Applied Research	Fund 2 Adaptive Research	Fund 3 Extension Services	Fund 4 Capacity-building
Objective	Support applied research to benefit the aquaculture subsector, with the goal of identifying and evaluating innovations that have the potential to improve performance throughout the aquaculture value chain.	Support adaptive research exploring the transferability of lessons, technology and management strategies.	Support extension and knowledge transfer to pilot, validate, and/or scale up innovative management practices and productive technologies that have the potential to improve performance throughout the aquaculture value chain.	Support building capacity for applied and adaptive research as well as extension services to meet the demand in the aquaculture subsector.
Lines of Intervention	• Improved seed production • Waste management and sub-aquatic products • Development of food and diets • Genetic improvement • Reconversion and energy efficiency • Prevention and control of diseases • Management models	• Improved seed production • Waste management and sub-aquatic products • Development of food and diets • Genetic improvement • Reconversion and energy efficiency • Prevention and control of diseases • Management models	• Improved seed production • Waste management and sub-aquatic products • Development of food and diets • Genetic improvement • Reconversion and energy efficiency • Prevention and control of diseases • Management models	• Improved seed production • Development of food and diets • Reconversion and energy efficiency • Improvement in the prevention and control of diseases • Management models
Amount of grant	US$150,000	US$180,000	US$35,000	US$25,000
Matching contribution	20% (monetary)	30% (monetary)	20% (monetary)	20% (monetary)
Who can apply	Leader: Research centers, universities and institutions that perform scientific and technological activities. Partner: Processing companies, aquaculture companies, producer associations.	Leader: Processing companies, aquaculture businesses , producer association Partner: Research centers, universities and institutions that perform scientific and technological activities.	Leader: Research centers, universities and institutions that perform scientific and technological activities. Partner: Processing companies, aquaculture companies, producer associations.	Leader: Training centers (universities, institutes) Partner: Processing companies, aquaculture companies, producer associations.
Subproject duration	2 years	2 years	1 year	1 year
Call for proposals	2	3	4	4
Budget structure	Human resources (30%) Equipment (20%) Inputs (30%) Overhead (20%)	Human resources (30%) Equipment (20%) Inputs (30%) Overhead (20%)	Human resources (40%) Equipment (20%) Input (20%) Overhead (20%)	Human resources (70%) Equipment (10%) Inputs (10%) Overhead (10%)

Financial Management, Disbursements, and Procurement

Financial Management

27. A Financial Management Assessment was carried out to determine the adequacy of the financial management arrangements currently being used by PRODUCE. It is expected that the Vice Ministry of Fisheries and Aquaculture within PRODUCE will create a PIU to carry out the financial management functions of the Project. The main office of the PIU will be located in Lima. To provide close implementation support to the many subprojects that will be financed throughout the country, the PIU will create six regional offices in the six macro-regions of the country. The six regional offices will be supported by a similar number of decentralized sub-units located in areas where subprojects are concentrated. The financial management arrangements for the Project will be completed following the establishment of the PIU.

28. To comply with World Bank requirements, the following activities will need to be accomplished by Effectiveness:

(a) hire key fiduciary staff (Head of Administration, Financial Specialist and Procurement Specialist) to support the Administrative Unit and the Planning, Budget and Monitoring Unit within the PIU, with previous experience in implementing World Bank-funded projects; and

(b) secure No Objections from the World Bank on the Operational Manual including the Operational Manual for Subprojects.

29. Based on the assessment carried out, the Project's overall FM residual risk is rated Substantial. The FM arrangements, once fully implemented, will meet the World Bank's minimum fiduciary requirements.

Summary of Financial Management Arrangements

30. **Staffing and organizational arrangements.** Financial management functions for the Project will be carried out by a central Administration Unit established within the PIU and based in Lima. Led by a Head of Administration, the Administration Unit will include the following key positions: Accountant, Treasurer, Financial Management Specialist, Procurement Specialist, and Human Resources Specialist. The Accountant will monitor the budget execution of the Project, among other duties. The Lima-based staff will be complemented by additional staff working out of the six regional offices, who will provide support on technical and administrative aspects of Components 1 and 2 of the Project. Each regional office will host one or two staff charged with administrative tasks related to subproject implementation; these staff will be mapped to the Administration Unit and report directly to the Head of Administration.

31. **Programming and budget.** A Planning, Budget and Monitoring Unit will be established in the PIU for the purpose of planning and developing budgets, as well as monitoring implementation of fiduciary and technical activities, among other duties. The Planning, Budget and Monitoring Unit will be staffed with the following key positions: Head of the Planning, Budget and Monitoring Unit; Planning, Budgeting, and Monitoring Specialist; and Information Technology Specialist. Preparation of annual work programs and budgets will conform to the procedures established by the MEF through its General Office of Public-Sector Budget (*Dirección General de Presupuesto Público)*. These procedures will be complemented by specific procedures described in the Operational Manual for the Project and the operational manual for subprojects. To ensure an adequate budget control, the PIU will be responsible for: (1) timely provision of resources for each year established in the work plan and budget; (2) proper recording of the approved budget in the respective information systems following a classification by project component/subcomponent/ category/subproject; and (3) timely recording of commitments,

accruals, and payments, to allow an adequate budget monitoring and provide accurate information on project commitments for programming purposes.

32. **Accounting and information systems.** As required by Peruvian law, accounting transactions will be recorded in the Integrated System for Financial Administration *(Sistema Integrado de Administración Financiera*). The use of this integrated system will be complemented with a customized financial management information system (known as SIGPA) that will be used to issue the following reports: Statement of Sources and Uses of Funds, Statement of Cumulative Investments, Statement of Expenditures, and Subproject Reports.

33. **Internal controls.** To maintain adequate internal controls, the PIU will implement processes and procedures related to financial management. These processes and procedures will ensure a clear separation between the activities carried out in the central office and those carried out in the six decentralized offices, as well as between the activities carried out by technical staff and those carried out by fiduciary staff. The financial management processes and procedures will apply to all activities supported by the Project, including those related to the implementation of the subprojects to be financed under Components 1 and 2 using competitive grant funds. For each subproject, a separate subproject agreement will be signed between the PIU and beneficiaries. Disbursement of project funds to the subprojects will be contingent on verification by the PIU's technical staff of the progress achieved on the ground, as well as verification by the PIU's fiduciary staff of the supporting documentation.

34. **Financial reporting.** Interim Financial Reports (IFRs) will be issued from the Project's financial management information system in a format acceptable to the World Bank. The IFRs will include: (a) a statement of sources and uses of funds, including reconciling items, cash balances and bank reconciliations, with expenditures classified by project component/ subcomponent/category; (b) a statement of uses of funds; and (c) a subproject statement, detailing the amount disbursed, the amount documented, and outstanding balances. The IFRs will include updated information on the use of loan proceeds as well as counterpart funds. The IFRs will be prepared in US Dollars and will be submitted to the World Bank on a bi-annual basis no later than 45 days after the end of each period.

35. **Audit.** Financial Audits of the annual financial statements of the Project will be conducted in accordance with International Standards of Auditing (ISAs) issued by the International Federation of Accountants (IFAC). Audits will be performed by independent audit firms acceptable to the World Bank, under terms of reference approved by the World Bank. The selection of the audit firm will be performed through the General Audit Comptroller´s Office. Each audit of the financial statements will cover a period of one fiscal year of the Government of Peru (ending December 31) or another period agreed with the World Bank. The audited financial statements of the Project, including the associated management letters, will be submitted to the World Bank no later than six months after the end of each fiscal year. The cost of the audits are eligible expenditures (consulting services) that can be financed using loan proceeds. The scope of the audits will be defined in the TORs and will reflect project-specific requirements including at least the following: financial statements, internal controls, management letter, review of compliance with agreed processes and procedures, and review of subprojects. Documentation used in the preparation of financial statements will be maintained by the PIU and made available to World Bank supervision missions and to external auditors. Audit requirements to be reflected in the legal agreement are the following:

Deadline for Submission of Audits of Financial Statements

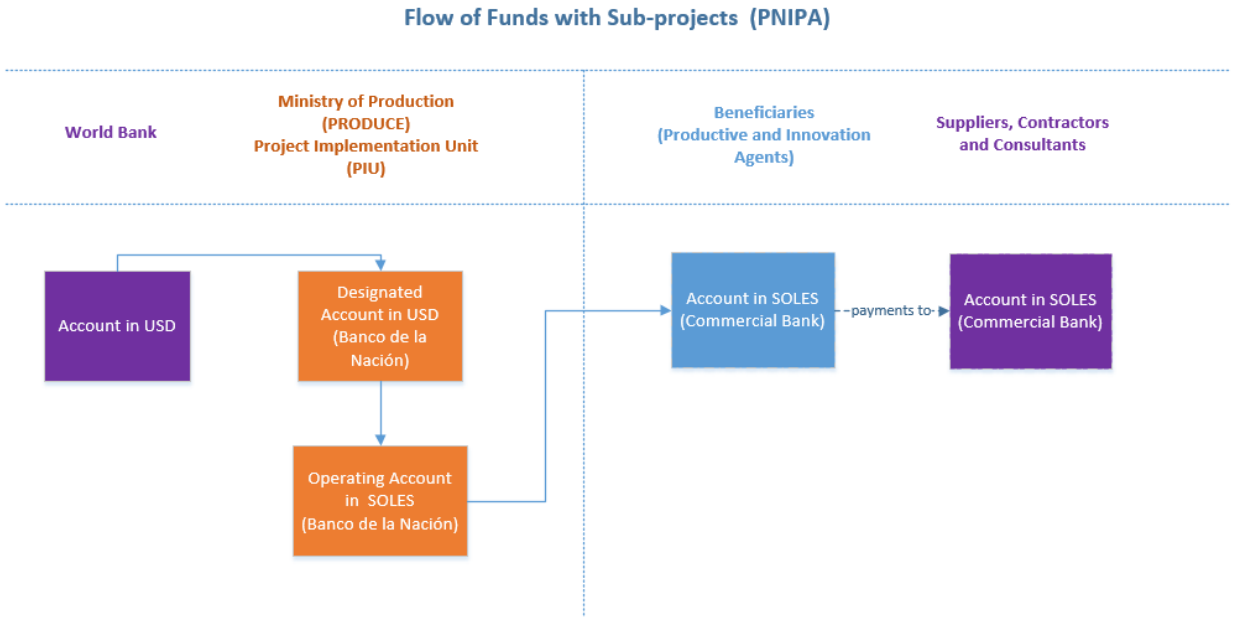
Audit Type	Due Date
Project financial statements	June 30 of each year

36. **World Bank supervision.** Financial management supervision will include on-site and off-site supervision. On-site supervision will be carried out at least twice a year. Off-site supervision will comprise desk review of interim financial reports and audited financial statements.

Disbursement

37. The PIU will open a designated bank account (DA) in U.S. dollars at *Banco de la Nación* that will be segregated, meaning the funds disbursed into the DA cannot be comingled with other funds. The DA ceiling, which establishes the maximum amount that can be disbursed into the account, will be based on a three-month forecast. The PIU will also open a local currency (Peruvian Soles) operating bank account at the same financial institution (this account will be known as the Operating Account). The PIU will use the operating account to make payments and disbursements to subprojects.

Figure 3.3. Flow of Funds



38. The following disbursement methods may be used to withdraw funds from the loan: (a) reimbursement, (b) advance, and (c) direct payment. Under the advance method, the PIU would have direct access to funds advanced by the World Bank to the Designated Account. Funds deposited into the Designated Account as advances will be subject to the World Bank's disbursement policies and procedures, to be described in the Legal Agreement and Disbursement Letter. PRODUCE will have responsibility over the funds deposited in the Designated Account and for the proper use of these funds for the purposes of the Project. The Decentralized Units will be responsible of monitoring the funds deposited to beneficiaries and for the review of supporting documentation sent by the beneficiaries. Finally, the beneficiaries will be responsible for the execution of subprojects according to procedures established in the subproject agreements signed with the PIU-PRODUCE.

39. **Disbursement arrangements under Components 1 and 2.** Under these components, the PIU will disburse Project proceeds for implementation of subprojects. Processes and procedures are reflected in the Operational Manuals for the Project and Subprojects. Following the initial disbursement (advance) to a given subproject, requests for additional disbursements to the same subproject should be supported

by documentation of expenses incurred based upon the disbursement schedule established in the legal agreements signed by the PIU-PRODUCE and the beneficiaries (subprojects). This documentation normally will be delivered to fiduciary staff based in the regional offices and decentralized sub-units. Amounts disbursed to subproject beneficiaries will be recorded by the fiduciary staff as expenditures and monitored through the tailor-made accounting information system named SIGPA in decentralized units and the main office. Amounts disbursed to subproject beneficiaries will be recorded as expenditures and monitored through the tailor-made accounting information system.

40. **Disbursements arrangements under Components 3 and 4.** Under these components, all payments will be processed by the PIU. Justification of expenditures will be submitted in accordance with the specific instructions established on the Disbursement Letter.

Allocation of Loan Proceeds

Category	Amount of the Loan Allocated (US$)	Percentage of Expenditures to Be Financed (inclusive of Taxes)
(1) Goods, non-consulting services, and consultants' services, training, and operating costs required under Subprojects of Parts 1 and 2 of the Project	35,957,000	100%
(2) Goods non-consulting services, consultants' services (including audits), training required under Part 3 of the Project	4,043,000	100%
Total Amount	40,000,000	

Procurement

41. Procurement for the Project will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services" dated January 2011 and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, revised July 2014, and the provisions stipulated in the Legal Agreement. The Borrower is preparing a detailed and comprehensive procurement plan that includes all contracts for which bid invitations and invitations for proposals are to be issued during the first 18 months of project implementation. For each contract to be financed by the loan, the Borrower and the World Bank have agreed on the allowable procurement methods or consultant selection methods, the need (or not) for prequalification, a cost estimate, prior review requirements, and the estimated time frame. This information is recorded in the Procurement Plan, which will be managed through the Systematic Tracking of Exchanges in Procurement (STEP). The Procurement Plan will be updated at least annually or as required by the Project's implementation needs.

42. **Procurement of Works.** No major civil works are expected to be financed under the Project. Small civil works procured under the Project might include refurbishment and/or habilitation of physical spaces. To the extent possible, contracts for civil works will be grouped in bidding packages. Contracts with estimated values of more than US$10,000,000 equivalent will be procured following International Competitive Bidding (ICB) procedures. Contracts with estimated values below US$10,000,000 equivalent may be procured using National Competitive Bidding (NCB) procedures. Contracts which cannot be grouped into larger bidding packages and estimated to cost less than US$250,000 per contract may be procured using national or international Shopping procedures. All procurement will be done using the World Bank's standard bidding documents, which are included in the Operational Manual.

43. **Procurement of goods.** Goods procured under the Project are expected to include hardware and software, peripheral equipment, Information technology (IT) systems, furniture, vehicles, and videoconference and/or communications equipment. To the extent possible, contracts for these goods will be grouped in bidding packages of more than US$2,000,000 equivalent and procured following ICB procedures. Contracts with estimated values below this threshold per contract may be procured using NCB procedures. Contracts for goods that cannot be grouped into larger bidding packages and estimated to cost less than US$50,000 per contract may be procured using national or international Shopping procedures. All procurement will be done using the World Bank's standard bidding documents, which are included in the Operational Manual.

44. **Procurement of Non-consulting services.** Procurement of non-consulting services is expected to consist of printing, materials reproduction, publication and dissemination, as included in the Procurement Plan. All procurement will be done using the World Bank's standard bidding documents, which are included in the Operational Manual.

45. **Selection of consultants.** Consultants procured under the Project are expected to include firms and individuals needed for evaluation of subproject proposals, supervision of subprojects, provision of technical assistance to subprojects, M&E of subprojects, studies and analytical works, impact evaluation, project management services, development of information systems, audits, and training, among others. Short lists of consultants for services estimated to cost less than US$350,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. Where firms are not required, individual consultants may be hired according to Section V of the Guidelines.

46. **Training.** The Project will finance all costs associated with training and workshops related to the implementation of the Project.

47. **Operational costs.** Operational costs under the Project will include incremental and reasonable expenditures that would not have been incurred by the Borrower without the Project, such as: office supplies, communications (including connectivity), travel expenses, per diems and equipment operations and maintenance.

48. **Subprojects.** Under Components 1 and 2, the Project will finance subprojects proposed by productive agents in partnership with innovation agents. Subproject proposals will be evaluated and selected in accordance with specific evaluation criteria described in the operational manual and in the subprojects manual. Subprojects may encompass consulting services, training expenses, goods, non-consulting services, and operating costs. Procurement of goods and non-consulting services financed under subprojects will be carried out using Shopping procedures, as described in the Operational Manual. Procurement of consultant services financed under subprojects will be carried out through comparison of curriculum vitae s, as described in the Operational Manual.

Assessment of PRODUCE's capacity to implement procurement

49. **Country.** The national procurement system of Peru has made significant progress in the last few years, particularly with regard to access to information and adoption of standard bidding documents. Areas of improvement are recognized in the National Procurement Strategy of Peru prepared by OSCE (available at http://www.osce.gob.pe/noticia.asp?idn=35).

50. **Agency.** In accordance with the implementation arrangements, a PIU with administrative and financial autonomy will be established within PRODUCE, and it will be responsible for the fiduciary management of the Project (that is, financial management and management of procurement and contracting). The PIU will be staffed with at least one Procurement Officer and one Procurement Assistant, who will coordinate the procurement planning of the Project, oversee procurement activities,

and provide assistance to the administrative staff that will be based in the six regional offices and that will support the procurement activities related to the subprojects.

51. A Procurement Assessment was carried out to assess PRODUCE's capacity to implement procurement actions for the Project. The assessment reviewed PRODUCE's: (a) organizational structure; (b) facilities and support capacity; (c) qualifications and experience requirements of the staff that will work in procurement; (d) record-keeping and filing systems; (e) procurement planning and monitoring/control systems used; and (f) capacity to meet the World Bank's procurement contract reporting requirements. It also reviewed the procurement arrangements proposed in the Procurement Plan. Based on the information available at the time of the procurement capacity assessment, the procurement team assessed the preliminary overall risk as **Substantial**. The key issues and risks identified as potentially affecting Project implementation include: (a) PRODUCE has no previous experience in implementing World Bank-financed projects, (b) the PIU is not yet established; and (c) PRODUCE lacks sufficient numbers of qualified and skilled staff to implement the Project's procurement functions using World Bank guidelines and procedures.

52. The following corrective mitigating measures are proposed:

Mitigating Measures	Stage
Finalize the Procurement Plan for the first 18 months of implementation	By negotiations (accomplished)
Finalize the Operational Manual, and prepare an Operational Manual for Subprojects, both acceptable to the World Bank	By effectiveness
Hire a Procurement Specialist under TORs and qualifications acceptable to the World Bank	By effectiveness
Provide procurement training for PIU staff (to be done by the World Bank Procurement Specialist)	Project Launch
Conduct regular procurement reviews (to be done by independent reviewers and/or World Bank staff)	During implementation

Procurement Plan

World Bank approval date of the Procurement Plan: November 3, 2016
Date of General Procurement Notice: Q3 2017
Period covered by this Procurement Plan: January 1, 2017 to June 30, 2018

Thresholds for Procurement Methods and Prior Review

53. Thresholds recommended for the use of the procurement methods specified in the Project's procurement plan are identified in the tables below, which also establish thresholds for prior review.

Goods and Non-consulting Services

54. **Prior Review Threshold:** Procurement decisions subject to prior review by the World Bank as stated in Appendix 1 to the Guidelines for Procurement:

Thresholds for Procurement Methods and Prior Review (US$, thousands)

Expenditure Category	Contract Value (Thresholds) US$, thousands	Procurement Method	Contracts Subject to Prior Review
1. Works	>10,000	ICB	All
	250 – 10,000	NCB	According to Procurement Plan
	<250	Shopping	
	Regardless the value	DC	
2. Goods and Non-Consulting Services	>2,000	ICB	All
	50 – 2,000	NCB	According to Procurement Plan
	<50	Shopping	
	Regardless of the value	DC	

Note: DC = Direct Contracting

55. **Operational Manual.** The Borrower, as part of Project preparation, has prepared an Operational Manual which provides detailed procurement information for the implementation of the Project, including (a) the particular methods for the procurement of goods, non-consulting services and consultants; (b) a clear definition of responsibilities that will apply to each kind of procurement; (c) filing procedures; (d) management of the Procurement Plan; and (e) templates for each procurement method.

Selection of Consultants

56. **Prior Review Threshold:** Selection decisions subject to prior review by the World Bank as stated in Appendix 1 to the Guidelines Selection and Employment of Consultants:

Thresholds for Methods and Prior Review (US$, thousands)

Consulting Services	Contract Value (Thresholds) US$, thousands	Procurement Method	Contracts Subject to Prior Review
3.a Firms	>100	QCBS, QBS, FBS, LCS	According to Procurement Plan
	<100	QCBS, QBS, FBS, LCS, CQS	
	Regardless of the value	SSS	
3.b Individuals		Comparison of 3 CVs in accordance with Chapter V of the Guidelines	According to Procurement Plan
	Regardless of the value	SSS	

Note: QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection; FBS = Fixed Budget Selection; LCS = Least-Cost Selection; CQS = Selection Based on Consultants' Qualifications; SSS = Single Source Selection; CV = Curriculum vitae.

57. **Short list comprising entirely of national consultants.** Short lists of consultants for services estimated to cost less than US$350,000 equivalent per contract may be comprised entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

58. **Frequency of procurement supervision.** In addition to the prior review functions to be carried out from World Bank offices, the Procurement Capacity Assessment of PRODUCE (the Implementing Agency) has recommended annual supervision missions to the field to carry out post review of procurement actions. The size of the sample for post-review will be not less than 1 in 10 contracts.

Environmental and Social (including Safeguards)

59. **Environmental Assessment OP/BP 4.01.** The policy is triggered, due to potential adverse environmental impacts of Project-supported fisheries and aquaculture production activities on environmentally sensitive areas, as well as adverse occupational health and safety impacts. Under OP/BP 4.01, the Project is classified as Category B. Environmental management of Project-supported activities is required due to the potential adverse environmental impacts. These impacts could include (a) degradation of the lake bed and release of nutrients into the water column (these benthic impacts are relevant only in the case of cage farming in lakes, given the potential of this method to result in the deposit of large quantities of fecal and waste feed material); (b) release of nutrient-rich materials (for example, feed, fecal and excretory products) from cage farming, water flow out of ponds and flow-through hatchery and ponds to receiving water bodies such as rivers, irrigation channels and lakes, potentially affecting water quality; (c) damage to species or habitats of conservation importance, including sensitive sites; (d) restricted access by other users of the water sources and/or land base; (e) negative visual impact; (f) excessive noise from generators or machinery, when these are used during construction, operation, or deconstruction of sites where project-supported activities are carried out; (g) waste generation; (h) curtailed recreational use; and (i) increased traffic and transport.

60. Since the exact location and/or nature of subprojects to be financed under the Project have not yet been determined, PRODUCE has prepared an ESMF to conform to the environmental safeguard policies triggered by the Project and the applicable national regulations. The ESMF provides (a) a basic environmental characterization of the Project intervention areas; (b) a diagnosis of the legal framework related to the environment theme in the different sectors that the Project will support, and the institutional framework that will be involved; (c) an assessment of potential adverse environmental issues or impacts commonly associated with the potential types of fisheries and aquaculture subprojects and the ways to avoid, minimize or mitigate them; (d) specification of procedures and methodologies for environmental planning, review, approval and implementation of subprojects to be financed under the Project; and (e) specification of roles and responsibilities and the necessary reporting procedures for managing and monitoring environmental concerns arising from the subprojects. The ESMF also provides basic guidance on best practices for fisheries and aquaculture production activities. The ESMF explicitly forbids any support for activities proposing introduction of non-native species in critical natural habitats in the coastal, Andean and Amazon regions. For any other potential harmful impact, the ESMF lays out guidelines, procedures, and principles to be followed by the groups implementing subprojects to prevent or minimize adverse environmental impacts.

61. The ESMF underwent two rounds of consultations with Project stakeholders in January-August 2016 and October 2016. The ESMF has been published through the World Bank external website and made publicly available through the PRODUCE external website.

62. **Natural Habitats OP/BP 4.04.** The policy is triggered, given the potential of the Project to impact terrestrial, freshwater and marine ecosystems through the expansion of fisheries and aquaculture production activities. The ESMF explicitly forbids any support for activities in areas supporting critical natural habitats or inducing conversion or degradation of critical natural habitats. The ESMF includes

guidance on avoiding negative impacts of cultivation of exotic species. Impact monitoring and evaluation will be defined for any harvesting activities during subproject preparation.

63. **Forests OP/BP 4.36.** The policy is triggered due to the presence of forest ecosystems (for example, mangroves and tropical rainforests) at locations where Project activities could potentially take place. The Project will not finance activities that will cause the destruction and conversion of forests and forest ecosystems. Similar to the case of natural habitats, the ESMF explicitly forbids any Project activities likely to support destruction or conversion of forests and forest ecosystems. Furthermore, the ESMF lays out guidelines, procedures, and principles to be followed by the groups implementing subprojects to prevent or minimize adverse environmental impacts. Subproject proposals will have to include information on potential environmental and social impacts of proposed activities, as well as prevention/mitigation measures.

64. **Pest Management OP/BP 4.09.** The policy is triggered because some applied research and development activities, and some extension and knowledge transfer activities, could involve the use of disinfectants, antibiotics, anti-fouling, and other pest management chemicals that are typically used in commercial aquaculture. Tanks and pond cleaning may require disinfectants, as well as antibiotics to prevent fish mortality due to diseases and parasites. Also, in some cases chemical substances may need to be used to control aquatic weeds. Use of these substances is common practice in aquaculture, so it is possible that some subprojects will be required to prepare a Pest Management Plan (PMP) for the control of parasites and/or weeds. The need for developing a PMP for a given subproject will be identified during the subproject screening and evaluation process.

65. **Physical Cultural Resources OP/BP 4.11.** The policy is triggered, because Peru is home to thousands of pre-Columbian archeological sites, and the Project could finance research and extension subprojects in locations in which chance finds might occur. Peru has established regulations for the management of sites containing chance finds. If physical cultural resources are encountered during Project implementation, the Ministry of Culture will be notified immediately, and as the competent authority it will take a decision as to how any chance finds will be managed. The ESMF explicitly forbids funding of activities that would negatively impact any site known to contain physical cultural resources.

66. **Indigenous Peoples OP/BP 4.10.** The policy is triggered, due to the potential presence of indigenous peoples in the Project area (which includes all rural areas throughout the country). Since the specific locations in which the Project will operate will not be identified prior to appraisal and will become known only at the time when subprojects are identified, PRODUCE has prepared an IPPF that complies with OP/BP 4.10, is acceptable to the World Bank, and has been cleared by the Regional Safeguards Advisor. The IPPF was consulted with several Indigenous Peoples organizations in February 2016 (details of the consultation are documented in Annex 1 of the IPPF). The IPPF has been published through the World Bank's external website and has been disclosed in Peru through the PRODUCE external website.

67. The Project has the potential to benefit the rural population of Peru, including indigenous communities in the Andean highlands as well as in the Upper and Lowland Amazon basins. The demand-driven Project will be national in scope and will give priority to areas in which fishing and aquaculture production activities are already established. The Project aims at improving competitiveness in the sector through research and technological innovation. Rural communities, including indigenous peoples' communities, could benefit directly or indirectly from the Project. In the former case, whenever these communities submit a subproject through organized producers associations or small enterprises that have fulfilled the Project requirements; in the latter case if private sector entrepreneurs partner with local organizations, or share benefits with them through agreements

68. The IPPF includes sections on the traditional fishery practices of the indigenous peoples of Peru as well as on their technologies and adaptation to the various ecosystems of the country. The IPPF provides guidelines for the preparation of Indigenous Peoples Plans (IPPs), protocols for consultation

processes, mechanisms aimed at encouraging the participation of indigenous peoples in Project-supported subprojects, behavioral codes for workers, and so on. It also provides a set of recommendations for reaching out to indigenous peoples, as well as suggestions to support capacity building that benefits indigenous peoples.

69. The IPPF identifies two potential adverse impacts: use of Indigenous Lands by private producers and concentration of employment, and provides the mitigating measures to ensure adequate implementation and turning these potentially adverse effects into positive ones. If fisheries and aquaculture subprojects are carried out by private agents in partnership with indigenous people within their territories, the IPPF stipulates that written agreements will be required showing that community consultations have taken place and that the partnerships have the support of the community. To ensure that employment generated by Project-financed investments benefits a broad spectrum of people within participating indigenous communities, a rotational local hiring policy will be implemented.

70. PRODUCE is committed to make efforts that are plausible and relevant to reach out to indigenous peoples when promoting the program, such as using local media so that indigenous peoples can learn about the Project and may become interested in participating.

71. **Involuntary Resettlement OP/BP 4.12.** The Project does not trigger OP/BP 4.12. The scope and scale of investments made through subprojects supported under Components 1 and 2 will be extremely limited; most subproject grants (which will benefit groups expected to range from several dozen to several hundred members) will range from US$25,000 to US$30,000 on average and will involve little or no investment in infrastructure, apart from upgrading of existing facilities. All subprojects supported under the Project will be implemented within the property of the beneficiaries (for example, producers, producer associations, community groups, firms). No involuntary taking of land will be needed. In addition, there will be no involuntary restrictions in access to land. Furthermore, due to the small footprint of these investments, beneficiaries usually will have ample choices for siting new facilities to avoid areas that are already being used, so no involuntary taking of land will be needed. In rare cases where displacement of existing users would be unavoidable, Project funding will not be provided.

72. Restrictions in access to fishery resources could be introduced through subprojects financed under Components 1 and 2, but any such restrictions would be introduced only for the purposes of ensuring environmentally sound and sustainable management of the resource, which is allowable under OP 4.12. Furthermore, any restrictions in access to fisheries resources introduced under the Project will not occur in NPAs, as this would trigger OP 4.12. Activities in NPAs are explicitly excluded from project support. Some fisheries management schemes piloted under the Project would be expected to limit access to fisheries resources to enhance the productivity of these resources and ensure their sustainability. In these cases, the Project will support only subprojects conducted in a community-based context, and any restrictions will have been discussed and agreed through an adequate participatory decision-making process, as allowed under Footnote 6 of OP 4.12.

73. Activities financed under Component 3 will include the development of policy and regulatory frameworks, which may have safeguards implications, including temporal or spatial limitations on access to fisheries to enhance their productivity and ensure their sustainability as allowed under Footnote 8 of OP 4.12. Safeguards implications of policy and regulatory frameworks developed under the Project will be assessed and addressed when appropriate. Environmental and social dimensions will be considered when these are relevant, including in study design and policy analysis, and consultations with civil society and potentially affected people will be carried out when appropriate.

74. **Projects on International Waterways OP/BP 7.50.** The policy is triggered, because some aquaculture subprojects could rely on water from Lake Titicaca (shared between Peru and Bolivia) or from rivers that are shared with Bolivia, Brazil, Colombia, and Ecuador. On January 20, 2016, the World Bank, on behalf of the Government of Peru, notified the Governments of Bolivia, Brazil, Colombia, and Ecuador regarding the Project. Responses were received after the original deadline to respond from

Bolivia (which had requested an extension of the deadline) and Brazil. No responses were received from Colombia and Ecuador. Bolivia and Brazil requested to be notified about the nature and location of Project-supported interventions, once these are known. In this regard, the World Bank will coordinate with Project management to ensure that the relevant agencies in the Governments of Brazil and Bolivia are bi-annually provided with a list of the approved subprojects including information concerning the location and nature of activities to be supported by the approved subprojects, as well as the fisheries or aquaculture species involved. An appropriate covenant to this effect is included in Section I.E.5 of Schedule 2 of the Loan Agreement. The Operational Manual describes the process to be followed in the unlikely event that a downstream riparian objects to any subproject. The information to be provided to Brazil and Bolivia will also be made publicly available through the PRODUCE external website. The World Bank is satisfied that the Project will not cause appreciable harm to the other riparians or be appreciably harmed by other riparians' possible water use since (a) the Project activities are not expected to have adverse effects on water quantity or quality of the transboundary waters and (b) the risk of accidental introduction of exotic species into international waterways will be mitigated by the application of the Project's ESMF.

Monitoring and Evaluation

75. The Planning, Budget, and Monitoring Unit will be responsible for carrying out M&E functions for the Project. For this purpose, a computer-based M&E system will be developed and made accessible via the internet to staff of the PIU working in the national office, the regional offices, and the sub-regional units. It is expected that the M&E system will include at least three modules with the following functions: (a) reporting on performance indicators appearing in the results framework, (b) management of subprojects financed by the Project, and (c) reporting on the implementation status of the Project's annual operating plan and budget. The information generated through of the integrated management information system will be systematized and will be reported to PRODUCE, the MEF, the World Bank, and other institutions in accordance with the required procedures.

76. Implementation support missions will be carried out by the World Bank twice per year on average. These missions will review the implementation status of the Project, assess progress achieved with respect to the development objective, and identify issues requiring attention (administrative, fiduciary, institutional), for the purpose of offering specific recommendations to the PIU to help ensure the successful accomplishment of the PDO.

77. A mid-term review will be carried out during the first semester of the third year of implementation to evaluate the progress achieved by the Project at that time. A final evaluation will be conducted during the last year of implementation to evaluate the overall accomplishments of the Project. These evaluations will be focused on the analysis of the indicators set out in the results framework, and they will assess the relevance, efficiency, efficacy and sustainability of the Project. The recommendations emerging from the mid-term review will be used to make adjustments to the implementation arrangements of the Project, should adjustments be needed. By agreement with the Government of Peru, an impact evaluation will be conducted to measure the high-level indicators proposed in the logical framework of the feasibility document. This study will be carried out at Project closing.

78. To facilitate M&E, a baseline study will be conducted during the first year of implementation. The baseline study will generate an initial set of information about the without-Project performance of the actors that make up the SNIPA, as well as the activities of the productive agents and innovation agents that are expected to benefit from Project-supported activities.

Annex 4: Implementation Support Plan

PERU: National Program for Innovation in Fisheries and Aquaculture

Strategy and Approach for Implementation Support

1. The Project will be the first World Bank-financed project implemented by PRODUCE.

2. Implementation support for the Project will focus on the functions and activities typically monitored by World Bank task teams during supervision, including monitoring of technical activities, management functions (administration, financial management, procurement), and compliance with safeguards policies. In addition, special attention will be directed to ensuring the timely implementation of the risk mitigation measures identified in the SORT matrix. The implementation support strategy is flexible and is likely to be amended during implementation in response to the evolving needs of the Project, including changes in the institutional context.

3. The Implementation Support Strategy includes the following main elements:

- World Bank implementation support will begin immediately after Board Approval, to help the Borrower achieve effectiveness in a timely manner (this will involve formally establishing the PIU and recruiting key staff). The frequency of supervision missions may be higher at the beginning of implementation (possibly up to three per year) to monitor closely the launch of the Program, and decrease to the usual two missions per year after the Project reaches a good implementation pace.

- Given PRODUCE's limited experience with World Bank operations, fiduciary and safeguards trainings will be provided early on to staff in the PIU. In addition to carrying out their usual implementation support functions, World Bank fiduciary and safeguards specialists will be available to provide close support and detailed, hands-on guidance to their counterparts during the initial months following effectiveness.

- The Implementation Support Strategy will be revisited regularly, taking into account implementation progress and continuous risk assessment.

4. **Technical support.** The Project will support a wide range of activities designed to strengthen the capacity of the national innovation system to deliver innovations in the fisheries and aquaculture sector. The World Bank task team will include technical specialists with expertise in a range of areas, drawn from within the institution and from FAO. Technical specialists with expertise in other areas may be recruited externally, as necessary. Field visits will focus on verifying compliance with the policies and procedures spelled out in the Operational Manual, identifying bottlenecks that may be impeding implementation progress, and offering recommendations designed to overcome those bottlenecks.

5. **Capacity.** Because PRODUCE has no previous experience with World Bank-funded projects, it is likely that many of those involved in implementing the Project will be unfamiliar with World Bank policies and procedures. Strong implementation support will likely be needed while staff of the PIU climb the learning curve. For this reason, the World Bank task team is prepared to schedule additional implementation support missions as needed during the first year of implementation.

6. **Fiduciary aspects.** World Bank fiduciary specialists will provide early procurement support to the PIU. The World Bank Procurement Specialist and World Bank Financial Management Specialist assigned to the Project are both based in Peru, so in addition to joining regular implementation support missions, they will be available to meet with counterparts in the PIU to provide hands-on support to the

PIU to avoid initial delays in submitting withdrawal applications, performing financial management activities, processing procurement requests, and so on.

7. **Safeguard compliance.** Consultants knowledgeable with Bank procedures and safeguards will be hired to support implementation. These consultants will work with the Environmental Specialist and the Social Specialist working in the PIU. Environmental and Social Safeguards Reviews will be carried out as part of every implementation support mission, that is, twice per year on average. The World Bank Environmental and Social Safeguards Specialists will backstop the consultants by reviewing the documents produced and providing additional on-the-job capacity building to the staff of the PIU.

8. **M&E.** The dedicated M&E team within the PNIPA Governance Unit in the PIU will be responsible for developing, putting in place, and maintaining the Project's decentralized M&E system, which will systematically collect information needed to track progress achieved against the PDO, generate financial information, and document compliance with safeguards policies. Information generated by the M&E systems, complemented by information emerging at the time of the mid-term review, will be used to adjust operational procedures and make any necessary mid-course corrections to the Project implementation modalities. FAO has provided strong technical support in the area of M&E during project preparation, and this support is expected to continue during implementation.

Implementation Support Plan

9. The main focal areas of projected implementation support activities are summarized in table 5.1. The required skills for the implementation support effort appear in table 5.2. Implementation support is expected to be particularly intense during the first 12 months of implementation. Implementation support missions will be reduced from three to two in the years following the first year, although support provided by country office-based members of the task team will remain continuous. table 5.3 recognizes the partners that will support the implementation support effort.

Table 5.1. Main Focal Areas of Implementation Support Activities

Time	Focus	Skills Needed	Resource Estimate	Partner Role
Months 1-12	• Program establishment • Fiduciary Processes	• Innovation Management • Fiduciary Management	• 3 implementation support missions • intense support from the country office	Technical FAO experts will participate in missions, as needed.
Months 13-48	• Program implementation • Communication activities • Monitoring • Reporting	• Innovation Management • Communication • M&E • Auditing and accounting	• 2 implementation support missions • -intense support from the country office	Technical FAO experts will participate in missions, as needed.

Table 5.2. Required Skills

Skills Needed	Number of Staff Weeks	Number of Trips
Task Team Leaders	• 2 x 7.5 weeks per year (Year 1) • 2 x 6 weeks per year (Year 2 to 4)	• 3 in Year 1 • 2 in Years 2 to 4
Fisheries Specialist	• 12 weeks per year	• 3 in Year 1 • 2 in Years 2 to 4
Agriculture Specialist	• 12 weeks per year	• In country office
Technical Specialists	• 2 x 6 weeks per year	• 3 trips in Year 1 • 2 trips in Years 2 to 4
Procurement Specialist	• 6 weeks per year	• In country office
Financial Management Specialist	• 6 weeks per year	• In country office
Environmental Specialist	• 6 weeks per year	• In country office
Social Specialist	• 6 weeks per year	• 3 trips in Year 1 • 2 trips in Years 2 to 4

Table 5.3. Partners

Name	Institution/Country	Role
FAO expertise as needed	FAO	M&E, and other areas, as needed.

Annex 5: Economic and Financial Analysis

PERU: National Program for Innovation in Fisheries and Aquaculture

Introduction

1. Ex-ante economic and financial analysis was carried out to provide reassurance that investments made under the Project will generate attractive rates of return compared to alternative investment opportunities that may be available in Peru.

2. Activities financed through the Project are expected to generate four main benefit streams:

   (a) Increased value of production in the fisheries subsector

   (b) Increased value of production in the aquaculture subsector

   (c) Nutritional and health benefits from a strengthened health and safety

   (d) Increased value of improved governance capacity

3. Some of these benefit streams lend themselves more readily to evaluation than others. The economic and financial analysis focuses on the first, second, and third benefit streams, which are somewhat easier to measure and value. The economic and financial analysis did not consider the fourth stream, which is much more difficult to measure and value.

4. Component 1 and Component 2 being demand driven, subprojects to be supported under the Project will be competitively selected, so the precise nature, mix, and scope of the investments to be financed cannot be known with certainty in advance. Consequently, any attempt to assess the economic viability of the project on an ex-ante basis is necessarily uncertain. Nonetheless, to provide a sense of the likely economic and financial feasibility of project-supported investments, cost/benefit analysis was carried out on a set of subprojects of the type that are likely to be financed.

Justification for Public Funding

5. In addition to calling for quantitative assessment of project-supported investments, the World Bank's economic analysis guidelines require an assessment of the public funding justification for all World Bank lending operations.

6. Public funding is justified when an important market failure is present, or when additional investment is needed to remedy a policy/government failure. In both cases, the intervention to be supported with public funding must address the relevant failure(s) in some convincing way.

7. Market failures clearly are present in each of the three main areas in which the Project will operate:

   (a) **Marine capture fisheries other than anchoveta.** Wild fish stocks have the characteristics of common goods (rival and non-excludable). Because individual fishermen, processors, and distributors have little incentive to safeguard the resource for the common good, use of public resources is justified to promote data collection and management, provide regulatory oversight, and ensure enforcement and compliance with regulations to prevent over-exploitation.

   (b) **Aquaculture.** The subsector suffers from a series of market failures stemming from lack of coordination among productive agents, information bottlenecks, non-availability of credit,

and negative environmental externalities. Because individual aquaculture producers, processors, and distributors have little incentive to invest in activities from which they themselves derive minimal benefit, use of public resources is justified to establish and enforce health and quality standards, collect and disseminate market intelligence, increase the availability of credit, and suppress practices that contribute to negative environmental externalities.

(c) **Governance.** Strengthening the capacity of the government institutions responsible for the governance of the fisheries and aquaculture sector is clearly a public function. Given the potentially enormous payoffs to improved governance, the justification for public funding is clear. This is an area in which the World Bank could play a catalytic role.

8. Use of public funding to address these market failures is justified from an efficiency standpoint, as long as the activities to be supported are well designed and cost-effective.

Analytical Approach Used to Measure Increased Benefits

9. For the first two benefit streams, profitability measures were calculated at the level of individual subprojects and then aggregated up to the Project level. For the third benefit stream, economic and financial analysis was carried out at the Project level. The results for all three components were then combined to derive overall measures of project worth.

Components 1 and 2

10. Components 1 and 2 will finance subprojects in four areas: (a) applied research, (b) adaptive research, (c) diffusion/extension of innovations, and (d) capacity building. Although the number and type of subprojects cannot be known in advance, it is anticipated that the activities to be financed under the subprojects will generate a range of benefits, some of which lend themselves more easily to measurement and valuation than others. Benefits that are easier to measure and valuate include those directly related to the productivity and profitability of fisheries and aquaculture activities, for example: improvements in productivity, increases in production, reductions in costs, and improvements in prices received for fisheries and aquaculture products. Benefits that are less easy to measure and valuate include those related to social, institutional, and environmental impacts, for example: improvements in the capacity of fishermen and aquaculture producers to manage their productive activities, improvements in the health and nutritional status of consumers of fisheries and aquaculture products, strengthened capacity of the national innovation system to deliver innovations, and reductions in negative environmental externalities caused by fishing and aquaculture production activities.

11. Given the uncertainty about the type of subprojects to be financed, as well as the scarcity of relevant data, financial and economic benefits were estimated using a conservative approach that focuses on expected reductions in unit production costs of fisheries and aquaculture products. The analysis involved three steps:

- First, budgets were developed for a set of representative fisheries and aquaculture subprojects of the type that are expected to be financed under the Project. Representative subproject budgets were developed based on secondary data, complemented by information taken from the Government's feasibility studies. Several recent studies have concluded that Peru's small-scale fisheries and aquaculture subsectors are inefficient, due to a lack formality, use of outdated technology, information bottlenecks, inability to capture

economies of scale, and other factors.[5] Based on this evidence, the analysis assumes that innovations introduced through the Project will lead to a 7 percent reduction in unit production costs for fisheries and aquaculture products. Fisheries and aquaculture specialists consulted during project preparation suggested that reductions in unit production costs on the order of 10 percent or more are readily achievable, so the assumed 7 percent reduction can be considered conservative.

- Second, the results obtained at the level of individual subprojects were scaled up to reflect the total number of subprojects that are expected to be financed under the Project.

- Third, sensitivity analysis was conducted to test the robustness of the results in the face of potential changes in key parameters, including input costs, output prices, productivity measures, and portfolio composition.

Step 1. Estimating Benefits at the Subproject Level

Fisheries Subsector

12. For Component 1, representative budgets were developed for subprojects involving two species: (a) Humboldt squid, or *pota* (*Dosidicus gigas*), and (b) Chilean jack mackerel/chub mackerel or *jurel/caballa* (*Trachurus picturatus murphyi*/*Scomber japonicus peruanus*). These species were selected for two main reasons. First, they are caught in large quantities by many of the small-scale artisanal fishermen being targeted by the Project.[6,7] Second, data needed to carry out the economic analysis are available from a number of sources.

13. In the case of pota, parameters used for the economic analysis are drawn from Paredes and De la Puente (2014).[8] Currently, operational costs comprise approximately 75 percent of total costs, hence revenues are limited due to inefficiencies and low storage capacity. Pota is considered underexploited, and there is huge potential and increasing demand, even though current capture technology is old and vessels have limited capacity (Paredes and De la Puente).[9]

14. In the case of jurel/caballa, both species are overexploited, and current catch levels can be considered maximal. The analysis therefore assumes no further growth in catch levels. According to Paredes (2013), 16 percent of the jurel/caballa total catch can be attributed to artisanal and small-scale fishermen. Data on input use and production cost are taken from the sector-wide parameters reported by Paredes (2013).[10] Since the Project will focus on small- and medium-scale fishermen, it is assumed that extraction costs for subproject beneficiaries are 50 percent higher than the sector-wide values, due to the

[5] For example, see Paredes (2013), "Atrapados en la red: La reforma y el futuro de la pesca en el Perú." Fondo Editorial USMP.

[6] The Census of Artisanal Fisheries reports that nearly 25 percent of small-scale fishermen in Peru catch pota, making it the most important resource along the Peruvian coast.

[7] The Census of Artisanal Fisheries reports that approximately 20 percent of small-scale fishermen in Peru catch jurel/caballa. Most of the catch is destined for human consumption.

[8] Paredes and De la Puente (2014), "Situación actual de la pesquería de la pota en el Perú y recomendaciones para su mejora". The Economic and Social Research Consortium (CIES).

[9] From 2000 to 2013, pota exports to Asia grew at an annual rate of 19.2 percent. Asia is the biggest destination market (nearly 50 percent of pota exports goes to this market). The analysis assumes market growth rate of 10 percent per year, well below the historical growth rate. The results are not very sensitive to modest changes in this parameter.

[10] Paredes (2013), "Atrapados en la red: La reforma y el futuro de la pesca en el Perú". Fondo Editorial USMP.

greater inefficiencies exhibited by small- and medium-scale fisherman and their inability to capture economies of scale.

Table 4.1. Key parameters for pota and jurel/caballa subprojects

Key Parameters	Pota	Jurel/Caballa
Monthly Catches (MT)	60	80
Average Price (US$/kg)	0.56	1.34
Average Cost (US$/MT)	52	306
Annual Growth Rate (%)	10	0
Cost Reductions due to Project (%)	7	7
Annual Gross Revenue (US$)	405,600	1,296,410
Annual Costs (US$)	37,320	295,062
Annual Net revenue (US$)	368,280	1,001,349

Source: Paredes and De la Puente (2014), and Paredes (2013).

Aquaculture Subsector

15. For Component 2, representative budgets were developed for subprojectrs involving three species: (a) Peruvian scallop (*Argopecten Purpuratus*), (b) rainbow trout (*Oncorhynchus mykiss*), and (c) tambaqui or gamitana (*Colossoma macropomum*). Similar to the case of fisheries, these species were selected for two main reasons. First, they are produced in large quantities by many of the small-scale aquaculture producers being targeted by the Project.[11,12,13] Second, data needed to carry out the economic analysis are readily available.

16. For scallops, parameters used for the economic analysis are taken from Sanchez, Gomez, Ysla, and Kluger (2014).[14] These authors report data for northern Peru (that is, Sechura and Piura), which accounts for nearly 70 percent of national production. Inputs and planting costs comprise nearly 30 percent of total costs. Even though most of production goes to the international market, the analysis considers only the local price, under the assumption that small-scale producers currently do not have the capacity to export. This substantially impacts their profits.

[11] Trout is the third most important species produced in Peru (Baltazar and Palacios, 2015).

[12] Peruvian scallop is the most important product in terms of production (Baltazar and Palacios, 2015).

[13] Gamitana is native to the Peruvian Amazon and is locally important. According to IIAP (2009), two-thirds of the aquaculture producers in the Selva Region farm gamitana.

[14] Sanchez, Gomez, Ysla, and Kluger (2014), "Análisis sectorial de la cadena de valor de la concha de abanico en la Bahia de Sechura, Piura." Universidad Nacional Agraria La Molina.

17. For trout, parameters used for the economic analysis are taken from Arroyo and Kleeberg (2013),[15] who report costs for trout production in Lake Titicaca. Inputs, especially feed, account for about 76 percent of total production costs.

18. For gamitana, the analysis is based on data from the Peruvian Amazon Research Institute (2009).[16] Inputs also represents the most important cost item, accounting for nearly 80 percent of total costs.

Table 4.2. Key Parameters for Trout, Scallops, and Gamitana Subprojects

Key Parameters	Trout	Scallops	Gamitana
Annual Production (MT)	372	75	71
Average Price (US$/kg)	4.25	6.50	2.50
Input costs (US$/MT)	2,787	1,428	1,466
Variable Cost (US$/MT)	609	3,672	136
Annual Growth Rate (%)	5	5	5
Cost Reductions due to Project (%)	7	7	7
Annual Gross Revenue (US$)	1,581,638	487,500	178,500
Annual Costs (US$)	1,263,978	382,500	114,400
Annual Net Revenue (US$)	317,660	105,000	64,100

Source: Sanchez, Gomez, Ysla, and Kluger (2014), Arroyo and Kleeberg (2013), Peruvian Amazon Research Institute (2009).

Step 2. Scaling Up the Subproject Analysis at the Project Level

19. Results from the subproject-level analysis were scaled up to the project level, based on the amount of subproject financing allocated under Components 1 and 2. Based on expected demand (subjectively determined on the basis of current activity within the two subsectors plus projected future growth in demand for different fisheries and aquaculture products), the available resource envelope was allocated to the different types of subprojects in the following proportions: within Component 1, 70 percent of the resources were allocated to pota subprojects and 30 percent of the resources were allocated to jurel/caballa subprojects, and within Component 2, 40 percent of the resources were allocated to scallop subprojects, 40 percent of the resources were allocated to trout subprojects, and 20 percent of the resources were allocated to gamitana subprojects. Implicit in this approach is the assumption that the benefits generated by this simple, subjectively constructed portfolio of subprojects are similar to the benefits that will be generated by the much more diverse portfolio of subprojects that will eventually be funded through the Project.

[15] Arroyo and Kleeberg (2013), "Inversión y rentabilidad de proyectos acuícolas en el Perú", Ingeniería Industrial 31, Enero-Diciembre, 2013, pp. 63-89. Universidad de Lima

[16] IIAP (2009), "Evaluación económica de la piscicultura en Loreto. Estudios de casos: piscigranjas Eje Carretera Iquitos- Nauta." Instituto de Investigación de la Amazonia Peruana (IIAP).

Component 3

20. For the third benefit stream, benefits were estimated assuming that the strengthening of SANIPES, the newly created National Service for Fisheries Health which is responsible for the regulation, supervision, and control of hygiene and quality standards for products originating from fisheries and aquaculture at the national level, will lead to improvements in sanitary standards, increasing the competitiveness of Peruvian seafood exports.

21. Benefits were evaluated for the entire fisheries and aquaculture sector. The analysis focuses on the export market only. Benefits realized in domestic markets are not considered, but these could be significant. The approach used therefore may be considered conservative.

22. Anders and Caswell (2006)[17] suggest that during the period 1998-2004, implementation of stricter seafood safety standards in USA caused a reduction in seafood imports from Peru of approximately US$44.76 million. During the same period, the total value of Peruvian seafood exports came to US$300.2 million, so the foregone exports to USA represented 15 percent of Peru's total seafood exports. The Anders and Caswell study is relevant for two reasons: (a) Peru was included in the analysis, so the impact of the implementation of the safety standards in USA was calculated specifically for Peru, and (b) USA represents the main market for Peruvian seafood exports destined for human consumption (approximately 20 percent of this category of exports[18]). The third benefit stream was calculated assuming (a) in the absence of the Project, seafood exports from Peru would continue to be depressed by 15 percent and (b) if and when the Project is implemented, investments to be made under Component 3 to strengthen the national regulatory system would allow one-fifth of the foregone exports to be avoided, that is, 3 percent of the foregone exports would be regained.

Combined Analysis for All Three Components[19]

23. For the project-level analysis, project management costs to be financed under Component 4 were allocated to each component on a pro-rated basis.

24. Using the approach described above, it is estimated that the US$120.9 million to be invested in the Project will generate efficiency benefits with an NPV of US$62 million (using a discount factor of 11 percent[20]) or US$82 million (using a discount factor of 6 percent[21]) (see table 3.3). The internal rate of return (IRR) to this investment is estimated at 55 percent.

[17] Anders and Caswell (2009), "Standards as barriers versus Standards as catalysts: Assessing the Impact of HACCP implementation on U.S. seafood imports", American Journal of Agricultural Economics 91(2): 310-321.

[18] In 2013, total Peruvian seafood exports for human consumption were approximately US$1 billion.

[19] For the project-level analysis, project management costs to be financed under Component 4 were allocated to each component on a pro-rated basis.

[20] Discount factor used by the Government of Peru to assess public investment programs.

[21] Discount the value recently adopted by the World Bank for project evaluation

Table 4.3. Measures of Project Worth – Net Benefits, NPV, and IRR

	Year 1	Year 2	Year 3	Year 4	Year 5
Component 1: Fisheries					
1.1. Pota	830,221	913,243	1,004,567	1,105,024	1,215,526
1.2 Jurel/Caballa	2,813,117	2,813,117	2,813,117	2,813,117	2,813,117
Component 2: Aquaculture					
2.1 Trout	25,267,118	25,267,118	25,267,118	25,267,118	25,267,118
2.2. Scallops	9,317,700	9,317,700	9,317,700	9,317,700	9,317,700
2.3. Gamitana	1,275,124	1,275,124	1,275,124	1,275,124	1,275,124
Component 3: Strengthening Institutions and Policies					
3.1. Sanitary Standards	7,701,046	7,701,046	7,701,046	7,701,046	7,701,046
Total Benefits	47,204,326	47,287,348	47,378,672	47,479,129	47,589,631
NPV (US$, millions), Discount factor 11%					US$62.0
NPV (US$, millions), Discount factor 6%					US$82.3
IRR					55%

Step 3. Sensitivity Analysis

25. Sensitivity analysis was carried out to test the robustness of these results to changes in the values of the following key parameters: (a) output prices, (b) productivity parameters, and (c) discount factors. The sensitivity analysis revealed that the measures of project worth are quite robust to adverse changes in the values of key parameters (see table 3.4).

Table 4.4. Sensitivity Analysis – NPV and IRR

	NPV (US$, millions)		IRR
	@ 11%	@ 6%	
Baseline Scenario	62.0	82.3	55%
Changes on efficiency parameter (baseline = 7% due to project)			
- Low scenario = 4%	5.4	14.7	15%
- High scenario = 9%	99.7	127.4	83%
Changes in prices			
- Low scenario = -4%	26.0	39.3	30%
- High scenario = +4%	134.0	168.4	108%
Changes in discount factor			
@ 3 %	97.7		
@ 15 %	49.4		
@ 20 %	36.9		

26. Sensitivity analysis was also carried out to test the robustness of these results in the face of changes in the portfolio of subprojects (see table 5).

Table 4.5. Sensitivity Analysis – NPV and IRR

	(1)	(2)	(3)
Component 1: Fisheries			
1.1. Pota	70%	50%	20%
1.2 Jurel/Caballa	30%	50%	80%
Component 2: Aquaculture			
2.1 Trout	40%	33%	25%
2.2. Scallops	40%	33%	25%
2.3. Gamitana	20%	33%	50%
NPV @ 11% (US$, millions)	62.0	50.9	38.4
NPV @ 6% (US$, millions)	82.3	69.1	54.2
IRR (%)	55%	47%	38%

Conclusions

27. The ex-ante economic and financial analysis suggests that Project-supported investments will generate substantial benefits for beneficiaries in areas served by the Project, as well as substantial benefits for Peruvian society as a whole. Overall, the NPV is projected to reach US$62 million (11 percent discount rate) / US$82 million (6 percent discount rate). The investments evaluated for the economic and financial analysis will generate an internal rate of return of 55 percent. The economic and financial analysis thus shows that if Project implementation is effective and efficient, Project-supported investments will bring substantial financial and economic benefits to fishermen and aquaculture producers in the Project area and to Peruvian society in general.

Limitations of the Analysis

28. The economic and financial analysis has focused on efficiency benefits that are expected to be generated through the subproject investments to be supported under Components 1 and 2, as well as the investments to strengthen governance of the fisheries and aquaculture sector to be made under Component 3. Although many of the benefits generated by the Project lend themselves to measurement and valuation and therefore have been included in the analysis, some qualitative benefits defy easy measurement and have not been taken into account. These qualitative benefits include, among others, improvements in the capacity of fishermen and aquaculture producers to manage their productive activities, improvements in the health and nutritional status of consumers of fisheries and aquaculture products, strengthened capacity of the national innovation system to deliver innovations, and reductions in negative environmental externalities caused by fishing and aquaculture production activities.

29. In addition, and as mentioned previously, benefits were not calculated for one benefit streams that will be generated through investments made under Component 3, that is, increased value of improved governance capacity. While difficult to measure and value, these benefits are expected to be substantial, suggesting that the overall benefits of the Project will far exceed those reflected in the measures of project worth reported above.

Annex 6: Map

PERU: National Program for Innovation in Fisheries and Aquaculture