

**Country-based Plans for
SPS Development**

**Peruvian Field Study
Cost Benefit Analysis**

Draft Report for the

World Trade Organization

Submitted by

Agra CEAS Consulting

Updated by the Government and Private Sector of Peru

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Tel.: +32 2 736 0088

Fax: +32 2 732 1361

E-mail: info@ceasc.com

www.ceasc.com

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1. Introduction

In October 2004, the World Trade Organization on behalf of the Standards and Trade Development Facility awarded Agra CEAS Consulting Ltd. (Bureau Européen de Recherches) a contract to carry out a technical assistance project entitled "Country-based Plans for SPS Development". The aim of the project according to the Terms of Reference is the following:

"...to facilitate sanitary and phytosanitary (SPS) capacity building in both the private and public sector. The goal will be achieved by making available a proven planning methodology which is responsive to economic objectives and which encourages a cooperative relationship between donors and private and public sector stakeholders in recipient countries".

The methodology developed to address this goal aims at supporting a national debate on the use of scarce resources for investments in SPS capacity. It is designed to help countries choose between alternative uses for these scarce resources.

A draft final report submitted to the WTO in April 2006 contains the results of the first field visit to Peru carried out under the second phase of the project – to apply the methodology to two pilot countries (Uganda and Peru). Fieldwork took place in Peru in late August/early September 2005 to survey SPS capacity, to identify SPS weaknesses and challenges and to identify products for further study.

As a result of the August/September fieldwork, asparagus (both fresh and chilled) and fish (molluscs) were selected for further study on the basis of their export growth to date, potential future growth and extent of SPS threat. In May/June 2006 a local consultant in Peru collected cost data for upgrading SPS capacity in these two sectors and this was combined with the "benefit" data from potential additional exports to estimate cost:benefit ratios. These cost:benefit ratios were presented to stakeholders at two workshops (one for asparagus and one for fish products) held in Lima in July 2006. At these workshops, there was some discussion about the cost data used for the calculations and a further consultation process has taken place in Peru to verify the indicators. This paper presents the results of this cost benefit research.

In October 2007, Peruvian public and private institutions concerned with sanitary and phytosanitary matters met to update the information in this report so as to ensure that it reflects the country's current needs.

2. Cost benefit analysis

The objective of this stage of the research is to compare the potential returns in terms of export revenue (to represent "economic benefits") with the costs involved in upgrading SPS capacity in order to sustain this growth. There are a number of caveats of which to be aware when appraising the methodology:

1. The comparison undertaken here between costs and benefits does not represent a typical "cost-benefit analysis" because only the costs (mostly public investment) of upgrading SPS capacity are considered. Costs incurred in production and export of the products are not taken into account. The result is more an indication of returns to public investment and assumes, in line with the outward oriented development strategy undertaken by Peru since the late 1990s, that export is an important indicator of policy success.

The results of this analysis therefore have two uses: firstly, as suggested in the generic methodology, they can be used to promote and prioritise between products. Secondly they could be used as a tool to strengthen the case for SPS capacity building investment given the high expected returns in terms of exports. This supports the case made by stakeholders and by exporters of agricultural, agro-industrial and fish products when approaching the domestic Ministry of Economy and Finance as well as international donors.

2. Given the complexity of the exercise in terms of defining potential export revenues and quantifying financial costs for strengthening SPS capacity, it was decided to narrow the time horizon to five years. This should increase the accuracy and reliability of the calculations but at the same time underestimate the potential benefits of the investments which would probably accrue over a longer time-period.
3. Costs and benefits have been assessed for two sectors: asparagus and fish¹. It is likely that much of the investment for these sectors would have spillover benefits for other sectors. These positive externalities are not quantified in the model, again potentially underestimating the returns to investment in SPS capacity. Neither are positive externalities in terms of improved food safety for consumers or from continued employment etc. in both sectors included. This has consequences when comparing the returns to investment in different products. It is possible that the returns to public investment in upgrading SPS

¹ For the purposes of this work, "fish" has been taken to include molluscs, prepared and frozen fish and crustaceans.

capacity for different export products may differ because of differences in the size of so-called "general costs".²

This report finds that the returns for asparagus are roughly 90% of those calculated for fish. However, for asparagus, "general costs" account for 42% of total costs while for fish these equate to only 18% of total costs. This suggests the potential positive spillover effects from upgrading asparagus are larger than those for upgrading export capacity for fish.

² "General costs" are costs that are expected to have wider impacts than solely on the sector for which they are specified in the model.

3. Asparagus

3.1. Calculation of potential benefits: projected exports

The export data for asparagus were provided by PROMPERU in Peru and a more detailed analysis of market potential is given in the Fieldwork Report. In Figure 3.1 and Figure 3.2, two possible scenarios are presented for fresh and canned asparagus. Projecting future export growth for agricultural products from Peru is a complex task as, in the main, these have experienced a marked surge in recent years.

For fresh asparagus, two scenarios are given: of 10% growth per annum and no growth from the 2008 export season i.e. stagnation. These are conservative scenarios and presuppose that the average growth of the 2000-2007 period of 22.5% slows over the next five years.

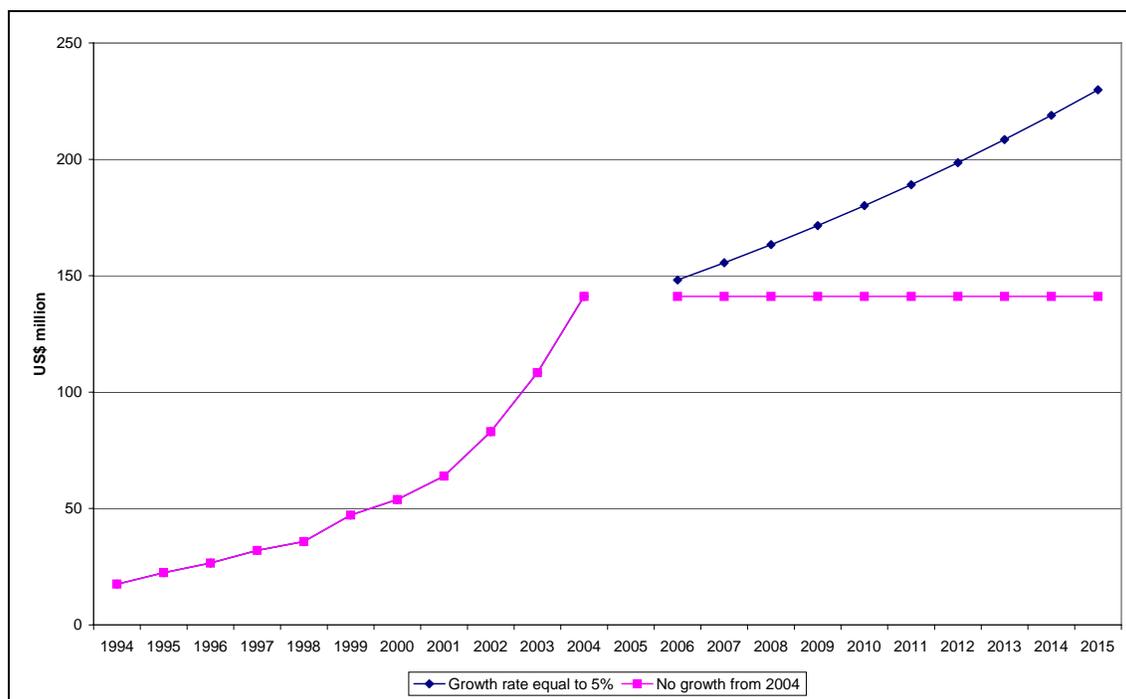


Figure 3.1: Expected benefits from projected exports of fresh asparagus

Source: PROMPERU data to 2007; projections based on fieldwork findings

In the light of the emergence of China as a competitor and fluctuations in world market prices for canned asparagus, two scenarios are given for this product: in the first, a rate of export return equivalent to 2007 performance and a growth rate of 4% per annum as of the 2008 export season; in the second, it is assumed that these

exports will stagnate (i.e. not increase). These may be considered "conservative" scenarios and are based on the average recorded increase in exports of 8.6% in the 1994-2007 period.

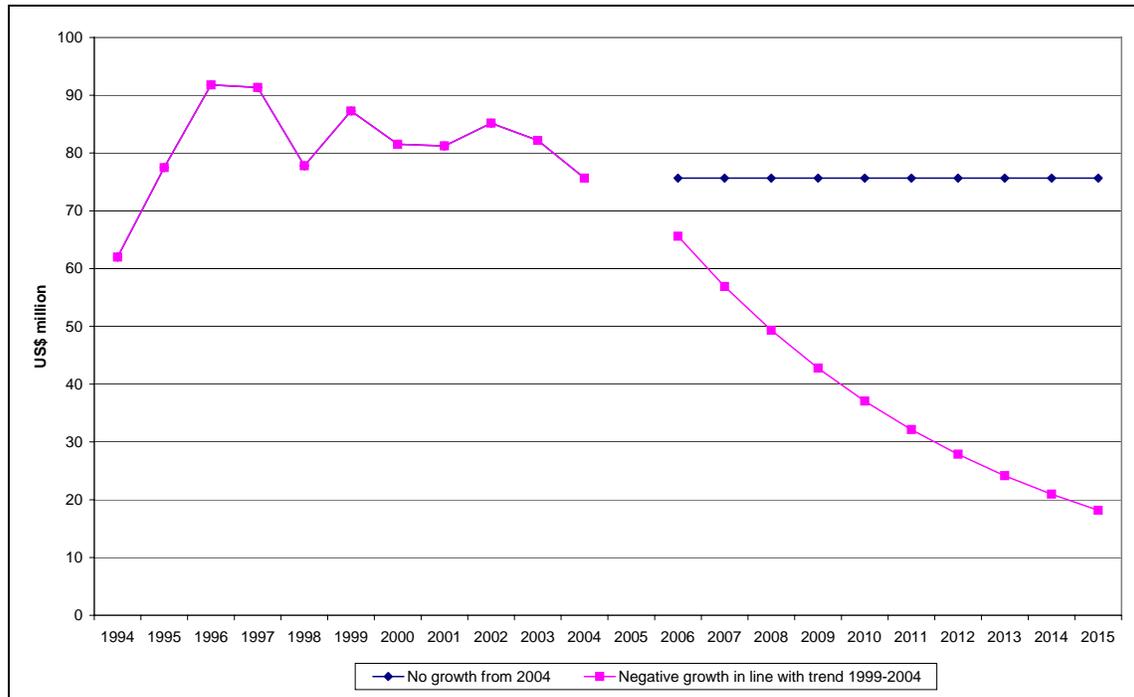


Figure 3.2: Expected benefits from projected exports of canned asparagus

Source: PROMPERU data to 2007; projections based on fieldwork findings

3.2. SPS issues identified in the asparagus sector

Main SPS concerns in the asparagus industry are as follows:

- The most important challenge for SPS is the current quarantine regulation imposed by the US which requires a 100% fumigation of all Peruvian fresh green asparagus entering the US market irrespective of the production area. This is mainly because of a risk of introduction of "Copitarsia decolora" which is present in the Southern (Lima and Ica) production regions and Prodiplosis longifolia from the Northern (La Libertad) regions of Peru.
- For fresh asparagus, the implementation of Good Agricultural Practices is benchmarked to Globalgap (formerly Eurepgap), preferentially for EU markets. For canned asparagus the challenges are more related to hygiene and food safety concerns and the lack of hygiene inspectors and HACCP certification.

- Further, insufficient surveillance capacity and SPS control is an industry wide concern.

3.3. Important findings impacting on the asparagus trade

- Also necessary to consider logistical challenges and new product presentation to extend shelf life of fresh asparagus and ensure access into the EU markets.
- Generate value added, since Chinese exports pose a serious threat to the growth of the canned white asparagus market.
- Focus on social responsibility and incorporating small scale farmers and consolidating associations to improve negotiation power for airspace and improved prices.

3.4. Horticulture in general

The main SPS challenges facing the industry are firstly related to availability, the registration of pesticides, and maximum residue limits (MRLs). This situation is mainly due to the current lack of national capacity in registering pesticides. SENASA is in the process of addressing this issue and establishing capacity for MRL tests in respect of pesticides for the main agro-export crops. This is of particular importance especially for the EU markets where there is a problem with a lack of harmonization between different countries in terms of MRL levels. An updated list of the pesticides permitted in the EU and in the other main agro-export destinations and their respective MRLs is also necessary and is a need that will have to be addressed through a central data bank. This should be coordinated by a national centralized system and information linked with the various production sectors.

3.5. Suggested upgrades to SPS capacity for the asparagus sector

It is important for sustained growth that international trade be secured and capacity built to address new or unexpected SPS measures that might in future negatively impact on the industry and disrupt trade flows. Several SPS related factors were identified in this study that may directly or indirectly impact on sustainability of trade or access into new markets. The indirect issues that may negatively impact on sustained growth are the following:

- The achievement of international recognition for the Peruvian accreditation body for the accreditation of product certification bodies, inspection bodies

and testing laboratories. This task falls to Indecopi which must achieve such recognition in order to promote exports.

- Lack of national auditor capacity for laboratory accreditation to ISO/IEC 17025: 2005, Good Laboratory Practices OECD (GLP), for conformity assessment bodies to ISO/IEC 65: 1996 (E) and ISO/IEC 17011: 2006 for product registration and registration of Environmental Management Systems and ISO/IEC 22003: 2006 for food safety management systems) and for inspection bodies (ISO/IEC 17020: 1998 (E)) and quality management systems (ISO/IEC 9001: 2000). There is also a lack of proficiency testing schemes for inter-laboratory comparisons and accredited bodies for the ISO/IEC Guide 43: 1997 (E).
- Lack of enough Indecopi-accredited laboratories for MRL and Mycotoxin work with adequate scope to address the needs of principal destination markets such as the EU.
- Lack of accreditation of the SENASA laboratory is the main short term concern.
- Lack of integration of water testing capacity (infrastructure and human capacity), legislation and a centralized "home" for all water aspects. This refers specifically to laboratory tests for the water used on farms for irrigation and pesticide application purposes and the wash water used in asparagus processing plants.
- Need for a strong national food safety vision. SENASA has now established a food safety department. A Commission is currently being set up to draft the proposed Framework Law on Food Safety, one of the objectives of which is to create the National Committee on Food Safety which will contribute to improving coordination between the competent authorities. This Committee will not duplicate the efforts of the National Committee on Sanitary and Phytosanitary Measures (National SPS Committee), which is also currently being established.

Agricultural research and technology transfer is crucial for any industry's future growth and to ensure that it remains competitive in international markets. This requires closer cooperation and integration of research activities at, for example, SENASA, the universities and INIA, and support from the production sector. This might

require collaborative funding incentives, strategic collaborative agreements and more effective technology transfer mechanisms through industry and INIA.

In addition, several directly related SPS issues have been identified and costed to support growth in the Peruvian horticultural sector. These include mainly:

- Building human capacity for SPS at various institutions
- Training of staff and workers in terms of SPS challenges at various institutions
- Building infrastructure to address SPS needs at various institutions
- Support for organizational/institution legislative frameworks to strengthen regulatory aspects and streamline and coordinate activities
- Establishing capacity to deal with international or regional agreements and providing a financial base for selected and trained negotiators and SPS technical experts to attend such meetings
- Capacity to manage all SPS related information, transfer it and make it accessible to the general public

3.6. Calculation of potential costs for investment in upgrading SPS capacities

The basis for the cost calculations was the analysis undertaken following fieldwork in Peru in August/September 2005. This allowed for identification of those areas of SPS which would require investment in order to secure future export markets for asparagus from Peru. Further fieldwork in Peru by a local consultant in May/June 2006 involving meetings with stakeholders provided a quantification of the identified cost categories. This data was presented at a workshop in Lima in July 2006 and, following this, local stakeholders provided comment on and substantial revisions to the cost data collected. This revised cost data is presented in Table 1 1 and described further in Appendix 1:

Both fixed and annual costs are presented (the former being spread over a five-year period) and have recently been updated for the 2008-2012 period. Four groups of costs are given: personnel, infrastructure, soft infrastructure and others (e.g. R & D, market access, etc.). Because of the complexities in quantifying such costs, as with the benefit data, some sensitivity analysis has been applied.

Table 1 1: Expected costs for upgrading SPS capacity (US\$)

	Total fixed costs	Variable costs per annum	Total variable costs (over 5 years)	Total cost (fixed plus variable) for 5 years	Total cost per year for 5 years	General costs over 5 years (fixed and variable)	Share of general costs over total costs
Personnel	3,850,000	608,760	3,043,800	6,893,800	1,378,760	1,957,000	28%
Infrastructure	9,715,200	477,890	2,389,450	12,104,650	2,420,930	2,893,450	24%
Organizational/ Institutional/Legislation (Soft Infrastructure)	42,983	367,110	1,835,550	1,878,533	375,707	1,738,533	93%
Others (R&D, MIP implementation, market access)	3,831,000	716,000	3,580,000	7,411,000	1,482,200	5,400,000	73%
Total Estimated Costs	17,439,183	2,169,760	10,848,800	28,287,983	5,657,597	11,988,983	42%
Sensitivity analysis							
-50%				14,143,992	2,828,798		
-30%				19,801,588	3,960,318		
-10%				25,459,185	5,091,837		
10%				56,575,967	11,315,193		
30%				36,774,378	7,354,876		
50%				42,431,975	8,486,395		

Source: Estimated during fieldwork interviews with various stakeholders in Peru

Costs are presented in the range +50% through to -50% to allow for misrepresentation in any of the cost categories. The result is that investments required to upgrade SPS capacity range between \$2.8 million and \$8.5 million per year with some frontloading as the fixed investment costs would, most likely, be incurred in the first years.

Calculations are based on the interviews with stakeholders conducted by the local consultant, the workshop in Peru and the follow-up consultation process. Therefore these figures reflect a reasonably accurate estimate of the real costs involved in upgrading SPS capacity and promoting asparagus exports.

3.7. Cost-benefit evaluation: Return to investment in SPS capacity

This section summarises the results from sections 3.1 and 3.6. The results of this summary are presented in Table 1.2 where the total expected costs of upgrading SPS capacity are compared with the total expected benefits in terms of future export revenues over 5 years (2007-2011). The total expected benefits includes benefits from both the fresh and canned asparagus sectors as the cost calculations allow for SPS upgrades to improve export potential in both of these sectors. Because of the sensitivity analysis, two numbers are presented at either extreme of the range.

The return that can be expected in terms of export revenue per dollar spent in upgrading SPS capacity varies between US\$46 and US\$174. That is, for every dollar invested in upgrading the SPS capacities of Peruvian institutions and private sector involved in supporting the asparagus sector, a return of between US\$46 and US\$174 could be expected³.

Table 1.2: Summary table for asparagus (US\$ million)

	Minimum	Maximum
Total expected costs for SPS upgrading	14.14	42.43
Total expected benefits from expected exports	1958.7	2461.9
Returns, in terms of export, for each \$ invested in SPS capacity upgrading	\$46	\$174

³ As already referred to, this is a conservative estimate of the total returns to such investments as positive externality effects on the export of other horticultural products are not included in the model. A measure of these externalities is given by the ratio "general costs" to overall costs. In the case of asparagus this ratio is equal to 0.42, i.e. 42% of the costs of upgrading SPS capacity for asparagus are also expected to impact positively on other export products.

4. Fish

4.1. Calculation of potential benefits: projected exports

Trade data for fish were provided by PROMPERU and a more detailed analysis of market potential is given in the Fieldwork Report. In Figure 4.1, two possible scenarios are presented for fish. For the purposes of this work, "fish" has been taken to include molluscs, prepared and frozen fish, crustaceans and other aquaculture products.

As with asparagus, projecting future export growth for fish from Peru is a complex task as, in the main, exports have experienced a marked surge in recent years. Hence two possible scenarios for future growth are presented. The first is a growth rate equal to 5% and the other represents exports constant at 2004 levels⁴.

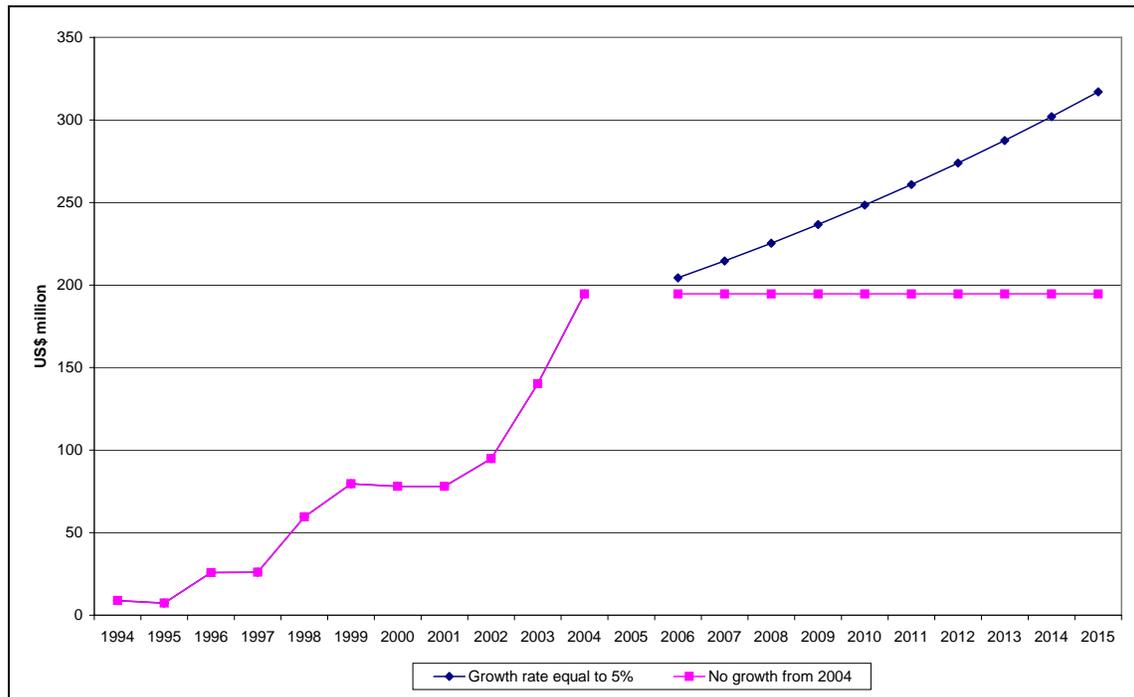


Figure 4.1: Expected benefits from projected exports of fishery and molluscs

Source: PROMPERU data to 2004; projections based on fieldwork findings

⁴ For detailed calculations see tables attached in Appendix 2:

4.2. Sanitary issues identified in the fisheries sector

Major sanitary challenges facing the fish sector include:

- The international challenges are related to the lack of harmonisation in terms of sampling and testing protocols for the different export markets.
- The need to strengthen inspection capacity.
- The most important challenges facing mollusc exports are EU requirements relating to the classification and authorization of areas and the undertaking of weekly inspections, which involve significant costs for the private sector.
- As a result of the shift towards decentralisation there is a need for capacity to conduct periodic inspections involving skilled human resources and tools (instruments and equipped laboratories). Notification of pests in WHAO in terms of ornamental fish trade, trout larvae exported to Norway, crustacean health, virus free certifications etc.
- For molluscs, risk of biotoxin contamination is of particular importance for access to the markets which in future will require modern testing capacity and equipment.
- For small artisanal producers, the risk of unhygienic handling constitutes a major sanitary challenge and requires on-going training for fishermen and industry workers, facilitated access to tools and the fitting out of premises.
- Pre-market periodic testing of sea water in authorized areas or areas that are to be authorized in order to determine the presence of toxic phytoplankton spp in areas where molluscs are farmed or extracted, should take the form of permanent monitoring; the relevant costs should be taken into account.

4.3. Suggested upgrades to sanitary capacity for the fisheries sector

Recommended sanitary actions:

Several sanitary capacity related factors have been identified that may directly or indirectly impact on sustainability of trade or access into new markets. The indirect issues that may negatively impact on sustained growth are the following:

- Building human capacity for SPS at various institutions.

- Training of staff and workers in terms of sanitary challenges at various institutions.
- Infrastructure improvements to address SPS needs at various institutions.
- Support for organizational/ institutional legislative frameworks to strengthen regulatory aspects and streamline and coordinate activities.
- Establishing capacity to deal with international or regional agreements, market access free trade agreements etc. and provide a financial base for selected and trained negotiators and SPS technical experts to attend such meetings.
- Capacity to manage all information relating to sanitary issues, transfer it and make it accessible to the general public.

General:

- Need for a strong national food safety vision. A Commission is currently being set up to draft the proposed Framework Law on Food Safety, one of the objectives of which is to create the National Committee on Food Safety which will contribute to improving coordination between the competent authorities. This Committee will not duplicate the efforts of the National Committee on Sanitary and Phytosanitary Measures (National SPS Committee), which is also currently being established.
- The achievement of international recognition for the Peruvian accreditation body for the accreditation of product certification bodies, inspection bodies and testing laboratories. This task falls to Indecopi which must achieve such recognition in order to promote exports.
- Lack of national auditor capacity for laboratory accreditation to ISO/IEC 17025: 2005, Good Laboratory Practices OECD (GLP), for conformity assessment bodies to ISO/IEC 65: 1996 (E) and ISO/IEC 17011: 2006 for product registration and registration of Environmental Management Systems and ISO/IEC 22003: 2006 for food safety management systems) and for inspection bodies (ISO/IEC 17020: 1998 (E)) and quality management systems (ISO/IEC 9001; 2000). There is also a lack of proficiency testing

schemes for inter-laboratory comparisons and accredited bodies for the ISO/IEC Guide 43: 1997 (E).

- Lack of enough accredited laboratories with chemical and microbiological test methods according to EU requirements. This aspect is in the process of being addressed by ITP.
- Lack of integration of water testing capacity (infrastructure and human capacity), legislation and a centralized "home" for all water aspects. Currently these activities falls partially under DIGESA which lacks human capacity and infrastructure and still needs to be accredited.

4.4. Calculation of potential costs for investment in upgrading SPS capacities

The basis for the cost calculations was the analysis undertaken following fieldwork in Peru in August/September 2005. This allowed for identification of those areas of SPS which would require investment in order to secure future export markets for fish from Peru. Further fieldwork in Peru by a local consultant in May/June 2006 involving meetings with stakeholders provided a quantification of the identified cost categories. This data was presented at a workshop in Lima in July 2006 and, following this, local stakeholders provided comment on and revisions to the cost data collected. This revised cost data is presented in Table 1 3 and described further in Appendix 2:

Both fixed and annual costs are presented (the former being spread over a five year period). Four groups of costs are given: personnel, infrastructure, soft infrastructure and others (e.g. R & D, market access, etc.). Because of the complexities in quantifying such costs, as with the benefit data, some sensitivity analysis has been applied. Costs are presented in the range +50% through to -50% to allow for misrepresentation in any of the cost categories. The result is that investments required to upgrade SPS capacity range between \$1.2 million and \$3.8 million per year with some frontloading as the fixed investment costs would, most likely, be incurred in the first years.

Calculations are based on interviews with key stakeholders undertaken by the local consultant, the workshop in Peru and the follow-up consultation process.

Table 1 3: Expected costs for upgrading SPS capacity for fish (US\$)

	Total fixed costs	Variable costs per annum	Total variable costs (over 5 years)	Total cost (fixed plus variable) for 5 years	Total cost per year for 5 years	General costs over 5 years (fixed and variable)	Share of general costs over total costs
Personnel	30,000	525,300	2,626,500	2,656,500	531,300	1,358,000	51%
Infrastructure	7,313,000	54,700	273,500	7,586,500	1,517,300	370,500	5%
Organizational/ institutional/ legislation (soft infrastructure)	0	492,300	2,461,500	2,461,500	492,300	571,500	23%
Others (R & D, MIP implementation, market access)	14,470	0	0	14,470	2,894	0	0%
Total estimated costs	7,357,470	1,072,300	5,361,500	12,718,970	2,543,794	2,300,000	18%
Sensitivity analysis							
-50%				6,359,485.0	1,271,897.0		
-30%				8,903,279.0	1,780,655.8		
-10%				11,447,073.0	2,289,414.6		
+10%				13,990,867.0	2,798,173.4		
+30%				16,534,661.0	3,306,932.2		
+50%				19,078,455.0	3,815,691.0		

4.5. Cost-benefit evaluation: Return to investment in SPS capacity

This section summarises the results from sections 4.1 and 4.4. The results of this summary are presented in Table 1.4 where the total expected costs of upgrading SPS capacity are compared with the total expected benefits in terms of future export revenues over 5 years (2007-2011). Because of the sensitivity analysis, two numbers are presented at either extreme of the range.

The return that can be expected in terms of export revenue per dollar spent in upgrading SPS capacity varies between \$51 and \$186. That is, for every dollar invested in upgrading the SPS capacities of Peruvian institutions and private sector involved in supporting the fish sector, a return of between \$51 and \$186 could be expected⁵.

Table 1.4: Summary table for fish

	Minimum	Maximum
Total expected costs for SPS upgrading	6,359,485	19,078,455
Total expected benefits from expected exports	973,273,883	1,185,838,545
Returns, in terms of export, for each \$ invested in SPS capacity upgrading	\$51	\$186

⁵ As already referred to, this is a conservative estimate of the total returns to such investments as positive externalities are not included in the model. A measure of these externalities is given by the ratio "general costs" to overall costs. In the case of fish this ratio is equal to 0.18, i.e. 18% of the costs of upgrading SPS capacity for fish and molluscs are also expected to impact positively on other export products and the overall institutional and products capacities of the relevant stakeholders.

Appendix 1: Cost benefit calculations: asparagus

A1.1. Fresh asparagus

Table A1.1: Expected export benefits (current values in US\$ million)

	Growth rate equal to 10%	No growth from 2007
1994	17.45	17.45
1995	22.41	22.41
1996	26.53	26.53
1997	31.92	31.92
1998	35.74	35.74
1999	47.17	47.17
2000	53.80	53.80
2001	63.94	63.94
2002	82.98	82.98
2003	108.34	108.34
2004	141.53	141.53
2005	160.18	160.18
2006	187.35	187.35
2007	235.75	235.75
2008		
2009	259.32	235.75
2010	285.25	235.75
2011	313.78	235.75
2012	345.16	235.75
2013	379.67	235.75
2014	417.64	235.75
2015	459.40	235.75
2016	505.35	235.75
2017	555.88	235.75
2018	611.47	235.75
Annual growth rate	10%	0.00%
Projected exports 2009-2013	1,583.19	1,178.74

Source: Data to 2007 from PROMPERU, extrapolated to 2015 using stated growth rates.

Table A1.2: Expected costs for upgrading SPS capacities (current values in US\$)

	Fixed costs for 5 years	Annual variable costs	Total variable cost for 5 years	Total cost for 5 years	Annual total cost
Personnel	3,850,000	608,760	3,043,800	6,893,800	1,378,760
Infrastructure	9,715,200	477,890	2,389,450	12,104,650	2,420,930
Organizational/ Institutional/ Legislation (Soft Infrastructure)	42,983	367,110	1,835,550	1,878,533	375,707
Others (R&D, MIP implementation, market access)	3,831,000	716,000	3,580,000	7,411,000	1,482,200
Total Estimated Costs	17,439,183	2,169,760	10,848,800	28,287,983	5,657,597
Sensitivity analysis					
-50%				14,143,992	2,828,798
-30%				19,801,588	3,960,318
-10%				25,459,185	5,091,837
10%				56,575,967	11,315,193
30%				36,774,378	7,354,876
50%				42,431,975	8,486,395

Source: Estimated during fieldwork interviews with various stakeholders in Peru

Table A1. 3: Cost estimations for the asparagus sector from fieldwork

Project: Basic Plans for the Capabilities Development in MSF of the Countries									
Information on framed costs for the fresh and canned asparagus trade									
Date:	Cost Types	Description	Institutions	Comments	Total fixed costs	Variable costs per annum	Total variable costs (over 5 years)	Total cost (fixed plus variable) for 5 years	Total cost per year for 5 years
October - 2006	I. Personnel 1.1 Personnel Diagnosis Study to establish the personnel profile	The profiles of the personnel will be established on the basis of objectives. Profiles for: - Researchers on risk analysis - Inspectors in the application of GAP, GMP - Analysts of the laboratory of reference - Risk analysis managers - Regulating in the subjects - Researchers in quarantine treatments	SENASA, DIGESA	Accomplishment of 4 consultancies for the elaboration of 6 profiles. It is consider 1 month for the elaboration of each profile (2,500 US\$/month). The result of the consultancies will bring the number of inspectors needed in the institutions.	10,000	0	0	10,000	2,000

COUNTRY-BASED PLANS FOR SPS DEVELOPMENT:

PERUVIAN COST BENEFIT ANALYSIS

	Studies to set up training needs	Three levels diagnosis: analysis of the organization, personnel and duties at job.	SENASA, INIA, DIGESA, academic sector	Consulting services for the determination of training necessities. They will be determined once the profiles of the personnel have been determined. 3 months with an approximated cost of US\$2,500 per month for each one of the institutions are considered. It is consider SENASA, INIA, DIGESA and a diagnosis for 45 universities located in departments of the coast with food related faculties. The result of the consultancies will bring the Annual Training Plan.	30,000	0	0	30,000	6,000
	Strengthen INIA´s capacities in terms of technical personnel and researchers in order to bring support to Peruvian asparagus industries.	Increase the technical steady personnel who has to be upgraded permanently in order to improve capacity	INIA	No. of extra personnel to support the asparagus industry and its in 5 years growing. They are considered: <ul style="list-style-type: none"> - 1 Manager 2,000 US\$/month - 2 Responsibles 1,500 US\$/month - 2 Professionals 1,200 US\$/month 	0	127,200	636,000	636,000	127,200

	Strengthen the capacities of other public organizations involved with research, extension and certification	SENASA and DIGESA	<ul style="list-style-type: none"> - 3 Technics 800 US\$/month Strengthen SENASA and DIGESA through: <ul style="list-style-type: none"> - personnel with hours dedicated to research: 2 additional people for this activities (800 US\$/month) - Affiliation to magazines and research publications: 2,000 US\$/year 	0	40,400	202,000	202,000	40,400
Hiring of new personnel	New inspectors' recruiting or through third parties to complete the actions of surveillance.	SENASA, INIA	The costs of new inspectors recruiting are considered in the activities mentioned above.	0	0	0	0	0

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1.2	Training of the personnel of public organizations in order to ensure operative procedures on domestic and foreign trade issues	Brings more effective service and support to the industry. The coordination for the emission of the sanitary certificate is important since the food safety issues are competence of SENASA and DIGESA. Involvement of international experts who brings upgraded methodologies.	SENASA, DIGESA, INIA, MINCETUR, PROMPERU, RREE	Training at domestic and international level: SENASA: 5 trainings per year at US\$5,000. DIGESA: 4 trainings per year at US\$6,000. INIA: 5 trainings per year at US\$3,000. Courses on trade and manage of the product. MINCETUR: 2 trainings per year at US\$3,000. PROMPERU: 2 trainings per year at US\$3,000.	0	82,000	410,000	410,000	82,000
	Training in GAP, GPM, HACCP and quality seals and sanitary and phytosanitary measures	Train of trainers on GAP, GPM and HACCP, to bring support for the implementation of these systems. Also, it is required to have knowledge about quality seals due to the necessity of having a quality seal for fresh products.	SENASA, INIA, DIGESA	Participation on events of GAP, GPM, HACCP, quality seals and sanitary and phytosanitary measures. There is considered costs of participation, mobilization, allowances (on trips) of 3 representatives for institution in 4 events per year. It is considered US\$500 per institution.	0	6,000	30,000	30,000	6,000

	Strengthen the technical capacity on Heat Treatment for canned asparagus.	Course: Better Process Control School National courses. FDA regulations (USA) demands to the personnel of the canning industries to have a certificate on low acid and acidified food, as a way of proving their knowledge.	DIGESA, IPEH, private and academic sector	Organization of the following courses: - 2 basic courses for 100 person each (10,000 US\$) - 2 courses for technicians, for 100 people each (10,000 US\$) - 1 Better Process Control School Course for 50 people (40,000 US\$). Also, it is considered the evaluation of an international expert to assist demands (3,000 US\$)	0	60,000	300,000	300,000	60,000
1.3	Institutional Capacity Establishment of risk profiles in order to bring support to the industry according with the established priorities.	The risk profiles are the base of risk analyses, and will be elaborated with research information provided by all the sectors: public, private, accredited laboratories and universities. The information would be centralized through DIGESA.	DIGESA, SENASA and accredited laboratories	Consultancies of 6 months will be made each one for the determination of risk profiles of the greater vulnerability factors: - risk analysis of copitarsia –responsibility of SENASA - risk analysis of botulism - Climate change risk analysis Each one of the	150,000	0	0	150,000	30,000

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		The risk profiles will be focused to improve the presentation of the asparagus and its shelf life, avoiding the contamination of pathogens, in some of the stages of the food chain.		consultancies considers the following costs: determination of products to which its risk profile will be done, taking of samples at domestic level, samples analysis, evaluation of samples and specialists. A cost of 50,000 US\$/ consultancy is considered.					
	Strengthening of inspection to attend programs at port	Establish procedures for third bodies inspection services. It is required to coordinate with INDECOPI the necessity to have accredited inspection bodies in this field	SENASA, DIGESA	Hiring personnel for SENASA to attend shipment programs to USA. Is considered 6 inspectors with a salary of 530 US\$/month.	0	38,160	190,800	190,800	38,160
	Update of the Andean Technical Manual for the Registry and Control of Chemical Pesticides for Agricultural Use		SENASA	Participation in the Andean Technical Committee on Agricultural and Livestock Health meetings (COTASA)	0	5,000	25,000	25,000	5,000

	<p>Strengthening the system of food-borne illness surveillance for fresh products.</p>	<p>Costs of consultancy for the elaboration of a surveillance system for food-borne illness:</p> <ul style="list-style-type: none"> - Year 1: compilation of information of the sanitary authorities to know the information on which it is counted and the determination of necessities (to identify products and their risks). - Following Years: risk analysis of more used products in the market, compilation of information (taking samples) of these products, pathogens analysis transmitted by foods that will be translated and expressed as data of disease prevalence in 	<p>Ministry of Health, DIGESA, SENASA, ITP</p>	<p>It is considered an approx. cost 50,000 US\$/year</p>	<p>0</p>	<p>250,000</p>	<p>125,0000</p>	<p>125,0000</p>	<p>250,000</p>
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		annual revisions							
1.4	Implementation of food safety and quality management systems in industry Implementation of food safety and quality management systems (GAP, GMP, HACCP, ISO 22,000) in asparagus sector companies	It belongs to the private sector. The public organizations are in charge of the surveillance.	private sector	At least the certification of some Quality and Safety Management System in approx. 300 producers and exporters of fresh and canned asparagus (135 exporters). It is considered: - training: interpretation of the standard and internal audit: 4,000 US\$ - implementation of the system: buy materials, teams, etc. And time for the implementation: approx. 5,000 US\$ - certification audit: 2,500 US\$ - monitoring audit 700 US\$	3,660,000	0	0	3,660,000	732,000
II.	Infrastructure								

2.1	<p>(Equipment, inputs, materials)</p> <p>Facilities</p> <p>Creation of a laboratory system for pest identification.</p> <p>Implementation of fumigation chambers in order to reduce extra costs due to inspections and fumigations in American ports due to copitarsia problem.</p>	<p>Implementation of laboratories for pest identification at domestic level, to bring support to the main laboratory of SENASA.</p> <p>Located in the coast: Ica, Lima, La Libertad, Piura</p>	<p>SENASA</p> <p>Private sector</p>	<p>It is considered to implement 5 laboratories, where the following expenses are included:</p> <ul style="list-style-type: none"> - construction of facilities - equipment and materials for laboratories of research (box of temperature approx 50,000 US\$) - 5 people in charge. <p>An annual cost of \$10,000 is assumed.</p> <p>Implementation of 8 umigation chambers of methyl bromide.</p> <p>For the new fumigation chambers the following costs are considered:</p> <ul style="list-style-type: none"> - costs of fumigation chambers (200,000 US\$) - payment of the personnel who makes the fumigation (2 people 530 US\$/month) - payment of the personnel who makes 	250,000	12,650	63,250	313,250	62,650
					1,600,000	29,080	145,400	1,745,400	349,080

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				inspection (1 person 530 US\$/month) Initially 20% will be covered with the volume exported to the U.S.A. in high season. 300,000 US\$ approx are considered as expenses due to negotiation and payment of inspectors of APHIS in Lima.					
	Strengthening of SENASA's capacity for Diagnosis of pesticides residues in fresh food	It is important to implement the pesticide analysis in products, as well as do research on acceptable daily intake (ADI) based diets of the region. It is necessary to review the legislation in relation to the labelling of pesticides for agricultural use.	SENASA	Strengthen the laboratory of toxic residues with 6 more professionals (900 US\$/month)	0	64,800	324,000	324,000	64,800
	Strengthening the services of the laboratory of toxic residues in order to improve the capacities in water control and	The strengthening of the laboratory services for toxic residues will be carry out through those private laboratories accredited by	DIGESA, CENAN, SENASA and accredited laboratories	Strengthen the laboratories of CENAN, DIGESA and SENASA with: - laboratory equipment of high precision (chromatograph that brings ppt results)	100,000	38,160	190,800	290,800	58,160

	<p>guarantee food safety.</p>	<p>INDECOPI. The participant laboratories of reference will conform a Network of Services in the country. They will lend their services to DIGESA, the National Center for Food and Nutrition – CENAN, and SENASA, which has a Laboratory of Control of Agricultural supplies and Toxic Residues. These laboratories are participating in the international training organized by FAO and PAHO. The Network of Laboratories in the country is necessary not only to improve the quality service but because the intercalibration of methodologies of laboratorial control is</p>		<ul style="list-style-type: none"> - materials and reagents for new equipment - Personnel (530 US\$/month) 					
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		demanded by Codex, USA and EC.							
	Strengthen the laboratories of the experiment stations of INIA.	Improve laboratories, equipping them with equipment and reagents and in charge of trained personnel, considering the future growing of asparagus industry.	INIA	Improvement of the infrastructure of the laboratories of post-harvest in 4 zones of the coast: La Libertad, Ancash (Huarmey-Casma), Lima and Ica. 150,000 US\$ (it includes only improvement of laboratories in 4 zones of the coast of Peru). 45,000 US\$ (it includes maintenance and payment of personnel during the 5 years) and 120,000 US\$ for the improvement of the equipment of INIA.	315,000	0	0	315,000	63,000
	Strengthen quarantine inspection controls	Mainly the ones that are located in borders. Consider upgrading facilities and provide equipment and materials that allow	SENASA	Improvement of equipment use for the control at the entrance of imported products: 2 X-rays (100,000 US\$/each.), computers, GPS, offices, etc.	200,000	0	0	200,000	40,000

	Development of pilot facilities for heat treatment in post-harvest	to make a correct control of the imported agricultural merchandise. Strengthen the capacities of academic institutions.	academic sector	Implementation of plants facilities in 5 universities in Lima and 10 in the provinces. It includes: <ul style="list-style-type: none"> - cost of the facility construction (3,000 US\$) - purchase and installation of equipment of the facility (10,000 US\$) - technical staff salaries of the persons in charge of the facility (1,000 US\$/month) - inputs for the elaboration of canned products (500 US/month) 	195,000	270,000	1,350,000	1,545,000	309,000
	Construction of irradiation plants	Strengthen the capacities of academic institutions.	private and academic sector	The construction of 2 irradiation plants is considered necessary: <ul style="list-style-type: none"> - construction cost - purchase and installation of equipment of the facility - salary of the person in 	6,800,000	12,000	60,000	6,860,000	1,372,000

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				<ul style="list-style-type: none"> - charge of the facility - purchase of reagents - approval by APHIS 					
	Strengthen the laboratories of academic institutions	Laboratory of: <ul style="list-style-type: none"> - Phytopathology - Entomology - Science and seed technology - Soil science 	academic sector	Improve the facilities and conditions of the laboratories of universities, through: <ul style="list-style-type: none"> - consultancy to establish needs of improving or implementing new laboratories on universities placed close to asparagus production zones. - equipment and technical support - infrastructure of the laboratories <p>For the determination of these cost we have assumed to prioritised the improvement of 15 laboratories.</p> <p>Laboratory of phytopathology 730,000 US\$ (25%</p>	229,000	0	0	229,000	45,800

				asparagus). Laboratory of Entomology 650,000 US\$ (10% asparagus). Other laboratories 200,000 US\$ (20% asparagus)					
2.2	Platform systems Establish an information platform with information on MRLs for pesticides	Information of MRLs by country and product	SENASA, PROMPERU, private sector	It is considered: - construction of platform online: layout, design (1,000 US\$) - responsible to maintain updated the system (1,000 US\$/month)	1,000	12,000	60,000	61,000	12,200
	Implementation of a National System of Sanitary and Phytosanitary Alerts	MRLs for pesticides, microbiological contaminants, heavy metals, etc. Also, it will have to inform on the presence or increase of pest at domestic level.	public and private sector	A public or private organization will be in charge of the establishment of a platform of communication with the public institutions, associations in order to attend sanitary and phytosanitary alerts. Is considered the expenses	0	20,500	102,500	102,500	20,500

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	Establishment of an information system of SPS	The authorities have to inform through an accessible means of communication, about standards and regulations.	public and private sector	of logistic of communication (2,500 US\$/year) and salary (1,500 US\$/month) of a person in charge to maintain updated information collected from the sanitary authorities through their webpages or official communications Incorporate within publications of the public and private sector, information on new regulations, standards, etc. Also through the websites of private and public sector. Approx 200 US\$/month.	0	2,400	12,000	12,000	2,400
2.3	Accreditation of laboratories of reference Accreditation of laboratories of reference	Accreditation of laboratories of reference of DIGESA and SENASA. Although the reference laboratories must work with validated methods and apply	SENASA and DIGESA	For the accreditation of the laboratory of DIGESA and SENASA, it is considered: - Costs of implementation of ISO 17025 (elaboration of procedures, plans, records, etc.). Approx	23,200	0	0	23,200	4,640

		ISO 17025 is not a priority its accreditation, they are grouped in the RILA network of reference laboratories		US\$ 5,000 - Accreditation audit, cost 90% UIT (1 UIT = S/. 3,400). The accreditation lasts 3 years. The second and third year (previous to the renovation), a monitoring has to be make (70% of the UIT) and the renovation at the third year that has a cost of 90% of the UIT. Also the costs of the auditors that will make the audit (average cost per day 800 US\$)						
	Strengthen the laboratory of reference (national) for the required tests for surveillance effects, use the installed capacity in the country (accredited laboratories).		SENASA, DIGESA and accredited laboratories	Consider a budget for expenses related to the improvement of the services of analysis of the laboratories of reference of SENASA and DIGESA (5,000 US\$/year).	0	10,000	50,000	50,000	10,000	
2.4	International recognition of the accreditation body									
	International recognition of the accreditation body	Recognition from the International Accreditation Forum (IAF), in order that the	INDECOPI	The following costs are considered: - payment for the request to belong to IAF	2,000	6,300	31,500	33,500	6,700	

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III.	Organizational/Institutional/legislation (soft infrastructure)	certification bodies, accredited by INDECOPI, can bring an international recognized service to the exporters.		US\$2,000. - annual payment for the membership US\$6,300					
3.1	Coordination and articulation between public, private and academic sector Legally formalise the operation of the Consultative Committee on Quality, Health, Food Safety and Research	The Committee must: - Promote the elaboration of required sanitary and quality standards. - Its work must be tie with SPS problems - Must give monitoring, corrective measures and verify the correct fulfilment for the attention of sanitary alerts. The Secretary of the National Codex Committee must participate in this	public, private (associations), and academic sector	The following costs are included: - expenses of the participants to participate in the meetings of the Committee (travel costs). Average cost 150 US\$/month	0	1,800	9,000	9,000	1,800

		Committee							
	Support the execution of bilateral meetings of negotiation between sanitary authorities for the open market. Also the multilaterals	Reinforce the presence in the meetings of the reference bodies. For bilateral meetings the private sector contributes with resources (in some cases), reason why greater resources are needed (budget) for bilateral meetings for opening markets.	SENASA, DIGESA, MINCETUR, RREE	Participate in meetings with delegation conformed by representatives of SENASA (2), DIGESA (2), MINCETUR (1) and RREE (1). The expenses of air ticket and travel allowance of 6 representatives are considered. 6 trips per year, average cost of US\$2,500 by person	0	90,000	450,000	450,000	90,000
	Strengthen the national participation, public and private, on international meetings, discussion forums, technical panels, forums of experts and workshops.	Participation in Codex Alimentarius meetings and SPS meetings. Globalgap (formerly Eurepgap) meetings are also considered. Allocation of resources for participation of DIGESA, SENASA and ITP	public and private sector	Participation of delegation of minimum 5 representatives of institutions of the public and private sector in the following international events: - Meetings of the Codex Alimentarius: Committee of Hygiene, Committee of Fruits and Fresh Vegetables,	0	112,500	562,500	562,500	112,500

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				<p>Committee of Fruits and Elaborated Vegetables, Committee of Pesticides and meeting of the Codex Commission</p> <ul style="list-style-type: none"> - Meetings of the Committee of Sanitary and Phytosanitary Measures (3 meetings per year). - Meeting of Globalgap (formerly Eurepgap). 					
	Strengthening of associations		private sector	<p>For all cases, expenses for flight ticket and travel costs are considered.</p> <p>Strengthen the producers and exporters association of asparagus. At the moment IPEH represents 80% of the asparagus exports of Peru. Expenses of promotion and diffusion of associao-activity are considered (1,000 US\$/month).</p>	0	12,000	60,000	60,000	12,000
3.2	<p>Transparency/ Information</p> <p>Establish and support public centres of information and</p>	This will allow to improve the market access for products	SENASA, DIGESA, PROMPERU, MINCETUR,	Coordinate with education centres, public and private, in the country	0	18,000	90,000	90,000	18,000

	education in sanitary and phytosanitary matters.	will real export potential.	INDECOPI, private sector	in order to spread good practices and sanitary and phytosanitary measures, through awareness events and the elaboration of diffusion material (1000 US\$/month). Cost of participation in events at national level: 500 US\$/month.					
3.3	Legislation and Standardization								
	Development of good agricultural practices guides, asparagus manuals to promote its implementation	Develop and spread	SENASA, PROMPERU, INDECOPI, Technical Standardization Committees	Elaboration of good agricultural practices guides, manufacture, guides for heat treatment of canned asparagus, etc. The documents will be spread at domestic level, including universities, private sector and manufacturers.	0	10,000	50,000	50,000	10,000
	Development of domestic standards	Revise and update standards on requirements, methods and good practices, so that they are harmonized in such as way as to ensure consistency	INDECOPI, public and private sectors	Includes the costs of the Technical Standardization Committees, the development of standards, the participation of members in Committee meetings, logistical aspects of the	0	42,000	210,000	210,000	42,000

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		with Codex Alimentarius standards for fresh and canned asparagus.		development of standards, remuneration of the Technical Secretary, and the printing of the texts of standards.					
Strengthen the implementation of labour and environmental standards	Through awareness campaigns.		public and private sector	Promote the implementation of standards through awareness campaigns.	0	6,000	30,000	30,000	6,000
Elaboration and spreading of an internationally recognized national seal.	A quality seal recognizing Peru as a secure supplier of fruits and vegetables. Good agricultural practices will be used as a benchmark: Chilegap, Mexico Supreme Quality.	AGAP, INDECOPI		The following costs are included: <ul style="list-style-type: none"> - Elaboration of verification list: payment of Technical Secretary 1500 US\$ for 6 months and 10 trips with costs of travel allowances of 250US\$/trip are considered. - Organization of the infrastructure for the surveillance of the quality seal: the salary of 3 person of 1,500 US\$/month and 	42,983	74,810	374,050	417,033	83,407

IV. 4.1	Others Research and Development			<p>purchase of equipment for the office 20,000 US\$.</p> <ul style="list-style-type: none"> - Awareness, training and spread of the quality seal: spreading of the seal in 3 international fairs per year (Europe, Asia, USA), elaboration of material for the spreading (brochures, DVDs, souvenirs, etc.), spreading in 6 events per year at domestic level. - Globalgap (formerly Eurepgap) approval: included are the revision of the Peruvian Technical Standard (3,850 €), external audit of benchmarking, (1,400 €), extra days (1,520 €), payments of flight ticket and travel allowance of consultants (2,750 €). 					
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	<p>Information and research on withholding periods (MRLs)</p>	<p>The withholding periods indicated on product labels at the time of harvesting are not necessarily the same as those established by countries where the product will be exported.</p>	<p>INIA, SENASA, AGAP</p>	<p>Consultancy on MRLs research for asparagus. It is considered 4 visits of 10 days each one. It is considered the following expenses: air ticket (1,500 US\$), allowances (250 US\$/day) and salary (250 US\$/day).</p>	<p>26,000</p>	<p>0</p>	<p>0</p>	<p>26,000</p>	<p>5,200</p>
	<p>Promote research on the identification of significant risks in the whole production chain</p>	<p>The use of the methodology of risk analysis has to be intensify. The Sanitary Authority do the risks evaluation that is part of the risk analysis. The private sector do the risks evaluation through the implementation of HACCP System. The use of the methodology for the risk analysis in the public and private sector has to be promoted (autocontrol). Is considered research applying the</p>	<p>DIGESA and private sector</p>	<p>The costs for the accomplishment of researches applying risk evaluation are considered. The methodology consists of:</p> <ul style="list-style-type: none"> - determination of hazard - analysis of hazard - evaluation of the exhibition - risk characterisation <p>According with the indicated above, it is considered costs of reagents, evaluation analyses and personnel.</p>	<p>0</p>	<p>10,000</p>	<p>50,000</p>	<p>50,000</p>	<p>10,000</p>

	Develop or identify research projects on ICM (Integrated Crop Management)	risk evaluation for asparagus Will be done by INIA in coordination with SENASA	INIA, SENASA	It is considered a test per year. Estimated cost 10,000 US\$/year and it includes the payment for the personnel, equipment and presentation of final report.	0	10,000	50,000	50,000	10,000
	Develop a research project for breeding and selecting more suitable asparagus varieties for different agroecological zones of Peru	This research project will be done in coordination with California University and UNALM, with the participation of the private sector for 4 years.	INIA, academic and private sector	700,000 US\$ for 4 years	700,000	0	0	700,000	140,000
	Establishment of a program for the development of the asparagus crop	Practical asparagus research programme in respect of aspects relating to the use of fertilizers, water for irrigation, quality standards, pests, etc.	INIA	\$55,000 for the installation and maintenance of 10 ha. 1 st year (cost per hectare \$5,500 that it is \$3,500 installation and \$2,000 maintenance). \$80,000 for the maintenance of 10 has. (\$20,000 for 10 has. in 4 years)	55,000	16,000	80,000	135,000	27,000
	Strengthen the National Program on Fruits and vegetables research of INIA	The National Program on Fruits and Vegetables research of INIA has already	INIA, private and academic sector	It was considered: - increase the asparagus hectares for research - evaluation of the crop	0	5,000	25,000	25,000	5,000

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	<p>(Program of varieties oriented to improve characteristics that have an SPS impact)</p>	<p>carried out the evaluation of different crops i.e. asparagus for the United States as well as for Spain, but because of the budget they had to eliminate one hectare of asparagus crops.</p>		<p>- remuneration of the specialized staff</p>					
	<p>Develop the research project "Differential Expression to find the components of adhesion of the egg of Copitarsia decolora on green fresh asparagus (UPCH - IPEH - APTCH) and research of substances that hydrolyse sticky substance of the egg of Copitarsia decolora</p>		<p>INIA, private and academic sector</p>	<p>It was considered: - sampling - analysis (new equipment, etc) - travels of the researchers to asparagus fields - remuneration of the specialized staff</p>	<p>150,000</p>	<p>0</p>	<p>0</p>	<p>150,000</p>	<p>30,000</p>
	<p>Implementation or irradiation facilities to eliminate pests (copitarsia in asparagus, fruit flies, etc.), to extend product shelf life.</p>		<p>SENASA, IPEH, academic sector, IPEN</p>	<p>The estimated budget is 3,400,000 US\$ the one that could be carried out if the following three factors i) consumer's acceptance, ii) asparagus shelf life, iii) approval of APHIS, results are favourable. This plant could also be used for other products like mango.</p>	<p>2,900,000</p>	<p>500,000</p>	<p>2,500,000</p>	<p>5,400,000</p>	<p>1,080,000</p>

4.2	Implementation of ICM Implementation of ICM at domestic level	Training, spreading and information systems in relation with the pest incidents.	associations, producers, SENASA	Implement ICM in Ica, Lima, Ancash and La Libertad. An estimated cost for the implementation of 700,000 with a 4 year project.	0	175,000	875,000	875,000	175,000
				TOTAL	17,439,183	2,169,760	10,848,800	28,287,983	5,657,597

A1.2. Frozen asparagus

Table A1.4: Expected export benefits (current values in US\$ million)

	Growth rate equal to 4%	No growth from 2007
1994	61.97	61.97
1995	77.49	77.49
1996	91.79	91.79
1997	91.35	91.35
1998	77.79	77.79
1999	87.28	87.28
2000	81.50	81.50
2001	81.22	81.22
2002	85.17	85.17
2003	82.20	82.20
2004	79.23	79.23
2005	82.56	82.56
2006	104.54	104.54
2007	156.00	156.00
2008		
2009	162.24	156.00
2010	168.73	156.00
2011	175.48	156.00
2012	182.50	156.00
2013	189.80	156.00
2014	197.39	156.00
2015	205.28	156.00
2016	213.49	156.00
2017	222.03	156.00
2018	230.92	156.00
Annual growth rate	4.00%	0.00%
Projected exports 2009-2013	878.74	780.00

Source: Data to 2007 from PROMPERU, extrapolated to 2018 using stated growth rates.

Appendix 2: Cost benefit calculations: fish

Table A2.1: Expected export benefits (current values in US\$)

	Growth rate equal to 5%	No growth from 2004
1994	8.8	8.8
1995	7.3	7.3
1996	25.8	25.8
1997	26.0	26.0
1998	59.5	59.5
1999	79.6	79.6
2000	78.1	78.1
2001	78.0	78.0
2002	94.8	94.8
2003	140.3	140.3
2004	194.65	194.65
2005		
2006	204.39	194.65
2007	214.61	194.65
2008	225.34	194.65
2009	236.60	194.65
2010	248.43	194.65
2011	260.86	194.65
2012	273.90	194.65
2013	287.59	194.65
2014	301.97	194.65
2015	317.07	194.65
Annual growth rate	5.0%	0.0%
Projected exports 2007-2011	1,185.84	973.27

Source: Data to 2004 from PROMPERU, extrapolated to 2015 using stated growth rates

Table A2.2: Expected costs for upgrading SPS capacities (current values in US\$)

	Fixed costs for 5 years	Annual variable costs	Total variable cost for 5 years	Total cost for 5 years	Annual total cost
Personnel	30,000	525,300	2,626,500	2,656,500	531,300
Infrastructure	7,313,000	54,700	273,500	7,586,500	1,517,300
Organizational/ institutional/ legislation (Soft Infrastructure)	0	492,300	2,461,500	2,461,500	492,300
Others (R&D, MIP implementation, market access)	14,470	0	0	14,470	2,894
Total estimated costs	7,357,470	1,072,300	5,361,500	12,718,970	2,543,794
Sensitivity Analysis					
-50%				6,359,485.0	1,271,897.0
-30%				8,903,279.0	1,780,655.8
-10%				11,447,073.0	2,289,414.6
10%				13,990,867.0	2,798,173.4
30%				16,534,661.0	3,306,932.2
50%				19,078,455.0	3,815,691.0

Source: Estimated during fieldwork interviews with various stakeholders in Peru

Table A2. 3: Cost estimations for the fish sector from fieldwork

Project: Basic Plans for the Development of Capabilities in MSF of the Countries									
Costs for the Fishery sector Date: October- 2006									
Cost Types	Description	Institutions	Comments	Total fixed costs	Variable costs per annum	Total variable costs (over 5 years)	Total cost (fixed plus variable) for 5 years	Total cost per year for 5 years	
I. Personnel 1.1 Personnel Diagnosis	Studies to set up training of organizations different from the Sanitary Authority	Diagnosis of different organizations involved with sanitary aspects.	INDECOPI, municipalities, private laboratories, universities	Consulting services to determine training requirements. Considered at 3 months with an approximate cost of US\$ 2500 per month for each one of the institutions involved. It also includes the identification of 10 universities with fish departments and the private sector that should be included. The outcome of the consultancy must be an Annual Training	30,000	0	0	30,000	6,000

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				Plan. ITP elaborate its Annual Training Plan based on the training requirements of the sanitary authority of EU (regulation EC N° 882/2004)					
	Improvement of the coordination and dissemination of sanitary procedures in respect of SANIPES.		Ministry of Production, ITP	Organization of seminars to inform the sector about topics such as the role of SANIPES and sanitary procedures.	0	15,600	78,000	78,000	15,600
1.2	Training Continuous training of the personnel of SANIPES at all levels.	Training of 55 inspectors and directives for SANIPES (also in Lima and Zonal Stations) The training will be done according with the EU training program, through the participation in courses of EU member countries and through the hiring of European specialists.	ITP, PRODUCE, municipalities, accredited laboratories, companies, universities	The following training annual costs are considered: <u>For inspectors on bivalve molluscs:</u> In Piura: remuneration of specialist (1 week, 250 US\$/day), travel allowance of the specialist (250 US\$/day), air ticket (1,700 US\$), domestic flight (US\$ 200), material for training (US\$2,500).	0	28,700	143,500	143,500	28,700

				<p>In Lima: remuneration of specialist (1 week, 250 US\$/day), travel allowance of the specialist (250 US\$/day), material for training (US\$2,000)</p> <p>For directors, inspectors, specialists on standardization, regulations, quality:</p> <p>1 Course in Lima of 3 days of duration: remuneration of the European specialist (250 US\$/day), travel allowance of the specialist (250 US\$/day), air ticket (1,700 US\$), material for training (US\$1,000).</p> <p>1 Course in Piura of 3 days of duration: remuneration of the European specialist (250 US\$/day), travel allowance of the specialist (250 US\$/day),</p>					
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	Continuous training of the personnel of Artisan Fishery Communities	Strengthening of the hygiene and sanitary capacities of the artisan fishing activities, looking for to support the sustainable development of the fishing communities in relation to the sanitary aspects (good practices of manipulation and conservation).	private sector, fishery associations	domestic flight (US\$200), material for training (US\$2,500). International courses for ITP: 2 international courses of 1 week for 1 person (air ticket 1,700 US\$), travel allowance (250 US\$/day) Training in 18 fishery zones. It is considered the following costs in each zone: - operative expenses: 2,500 US\$/month - trainers: 500 US\$/month - equipment and material for training: 4,000 US\$/month	0	225,000	1,125,000	1,125,000	225,000
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1.3	<p>Institutional Capacity</p> <p>Improve the coordination between public research centres and the necessities of the fishery sector (industrialised products).</p>	<p>To aim toward better relations with the industry, to improve the coordination through actions of technological transference like company meetings to show the main results and feedback of the sector with respect to research and development, as well as the accomplishment of workshops, seminars, publication of technical documents, guided visits, among other mechanisms that contribute to disclose and transfer the research made by ITP.</p>	<p>ITP, PRODUCE, IMARPE, private sector</p>	<p>It is considered the coordination costs for spreading events to facilitate technology and spread research results. Approx. 6,000 \$/year.</p>	0	6,000	30,000	30,000	6,000
	<p>Strengthening the system of food-borne illness surveillance</p>	<p>Costs of consultancy for the elaboration of a surveillance system for food-borne illness:</p>	<p>Ministry of Health, DIGESA, SENASA, ITP</p>	<p>It is considered an approx. cost 250,000 \$/year</p>	0	250,000	1,250,000	1,250,000	250,000

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		<ul style="list-style-type: none">- Year 1: compilation of information of the sanitary authorities to know the information on which it is counted and the determination of necessities (to identify products and their risks).- Following Years: risk analysis of more used products in the market, rise of information (taking samples) of these products, pathogens analysis transmitted by foods that will be translated in data of prevalence of the disease and annual revisions.							
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1.4	Implementation of food safety and quality management systems in industry								
	Implementation of food safety and quality management systems in fishery companies	It corresponds to the private sector, the public organizations make the surveillance and control.	Private sector	Implementation of good handling and conservation practices, HACCP, ISO 22001, social responsibility and environment protection			0	0	0
II.	Infrastructure								
2.1	Facilities, equipment, inputs, materials								
	Reinforce the new facilities of ITP and upgrade the existing ones in main fishing zones.	Identify necessities for the evaluation of conformity for fishing products. Central laboratories of reference (2 for the evaluation of residues and the other for the microbiological analysis) in main zonal stations.	ITP	It is considered: - Cost for equipment US\$100 000, - application of technology such as satellite navigation systems - GPSUS\$50,000 - cost of reactivates = US\$1,000/month - equipment maintenance = US\$1,500 a year	150,000	13,500	67,500	217,500	43,500
	Improve the sanitary conditions of fishing terminals	Improve of DPAs (Artisan Fishing Wharves) of Paita, Delicias, Yasila, San Juan de Marcona, Lomas and Matarani.	ITP	At the moment, with the support of Japanese cooperation, it is being developed a Project for the extension and modernisation of the DPA of Talara at a cost of 53 million Dollars.	7,155,000	0	0	7,155,000	1,431,000

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				For next the 5 years the following costs are considered: <ul style="list-style-type: none"> - - quantification of the infrastructure necessities of disembarkation at domestic level. considered amount 355,000 US\$ - - improvement of the DPA of Ñuro, San Andrés (Pisco) and Bahía Blanca (Ventanilla), valorized in 2,7; 1,8 and 2.3 million US\$ 					
2.2	Platform systems Establish an information platform with information of MRLs for veterinary medicaments	Information of MRLs by countries and products	ITP, PROMPERU and private sector	It is considered: <ul style="list-style-type: none"> - construction of an on-line platform: layout, design (1000 US\$) - responsible for the updated of the system (1000 US\$/month) 	1,000	12,000	60,000	61,000	12,200
	Implementation of a National System of Sanitary and Phytosanitary Alerts	Veterinary MRLs, contaminants of microbiological origin, heavy metals, etc.	Private and public sector	A public or private organization will be in charge of the establishment of a platform of communication with the	0	20,500	102,500	102,500	20,500

	Establishment of an information system of SPS	The authorities have to inform through an accessible means of communication, about standards and regulations.	Private and public sector	public institutions, associations in order to attend sanitary and phytosanitary alerts. Expenses of logistic of communication (2,500 US\$/year)) and remuneration (1500 US\$/month) of a person in charge to maintain updated the information are considered. Incorporate within publications of the public and private sector, information on new regulations, standards, etc. Approx 200 US\$/month.	0	2,400	12,000	12,000	2,400
2.3	Accreditation of laboratories of reference Accreditation of additional methods for the ITP laboratory	The laboratory of the ITP was accredited by INDECOPI as chemical and microbiological laboratory (Resolution 0059-2005/CRT/ INDECOPI). However,	ITP	The accreditation of 10 methods is considered: - Audit of accreditation, cost 90% UIT (1 UIT = S/. 3400). The accreditation lasts	5,000	0	0	5,000	1,000

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		the methods accredited according to the requirements of the private sector can be increased to fulfil the exigencies of the markets and to facilitate the international trade.		3 years. The second and third year (previous to the renovation), a pursuit has to be made (70% of the UIT) and the renovation at the third year that has a cost of 90% of the UIT. Also the costs of the evaluator that will make the audit, with an average cost of 800 US\$/day.					
2.4	International recognition of the accreditation body	Recognition from the International Accreditation Forum (IAF), in order that the certification bodies, accredited by INDECOPI, can bring an international recognized service to the exporters.	INDECOPI	The following costs are considered: - payment for the request to belong to IAF US\$2,000. - annual payment for the membership US\$6,300	2,000	6,300	31,500	33,500	6,700

III.	Organizational/Institutional/legislation (soft infrastructure)							
3.1	<p>Coordination and articulation between public, private and academic sector</p> <p>Legally formalize the operation of the Consultative Committee of Quality, Health, Food Safety and research of food</p> <p>The functions and the management to formalize the Committee has to be established and must:</p> <ul style="list-style-type: none"> - Promote the elaboration of required sanitary and quality standards. - Its work must be tie with SPS problems - Must give monitoring, corrective measures and verify the correct fulfilment for the attention of sanitary alerts. <p>The Secretary of the National Codex Committee must participate in this Committee</p>	Public and private sector, associations, universities	<p>The following costs are included:</p> <ul style="list-style-type: none"> - expenses of the participants to participate in the meetings of the Committee (travel costs). Average cost 150 US\$/month 	0	1,800	9,000	9,000	1,800

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Support the execution of bilateral meetings of negotiation between sanitary authorities in order to open markets. Also the multilaterals	To discuss and negotiate with the EU the heterogeneity of the inspection for bivalve molluscs in order to eliminate the restrictions for the commerce of this product in the EU	ITP, PRODUCE, MINCETUR, RREE	Participate in meetings with a delegation conformed by representatives of ITP (2), PRODUCE (2), MINCETUR (1) and RREE (1). The expenses of air ticket and travel allowance of 6 representatives are considered. 6 trips per year, average cost of US\$2,500 by person.	0	90,000	450,000	450,000	90,000
Strengthen the national participation, public and private, on international expert meetings, discussion forums, technical panels, etc.	Participation in Codex Alimentarius meetings and SPS meetings. Allocation of resources for participation of the private and public sector.	Public and private sector	Participation of delegation of minimum 5 representatives of institutions of the public and private sector in the following international events: - Meetings of the Codex Alimentarius: Committee of Hygiene, Committee of Labelling, Committee of Fishery, CoCommittee of Pesticides, Committee of Inspection and Certification and Codex Commission	0	112,500	562,500	562,500	112,500

3.2	<p>Legislation and Standardization</p> <p>Approach between the organizations responsible for the sanitary and phytosanitary measures</p> <p>Necessity to eliminate the problem of the "double standard" system and to address the issue of standards and quality control in the same way in the local market.</p>	<p>In order to eliminate the aspects that can be confused of the present SPS regulatory frame</p> <p>It is considered the elaboration of 2 campaigns of diffusion per year on good practices</p>	<p>Public and private sector</p> <p>ITP, PRODUCE, Ministry of Foreign Affairs, Ministry of Education.</p>	<p>meeting.</p> <ul style="list-style-type: none"> - Meetings of the Committee of Sanitary and Phytosanitary Measures (3 meetings per year). <p>For all cases, expenses for flight ticket and travel allowance are considered</p> <p>It is considered the accomplishment of two campaigns for the diffusion of good practices per year, through:</p> <ul style="list-style-type: none"> - Elaboration of radio campaign: design, tests, creation of jingles, etc. 20,000 US\$ - 3 months per year for the diffusion in 2 radios of 10 repetitions per day at rotating 	0	0	0	0	0
					0	274,000	1,370,000	1,370,000	274,000

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				<p>schedules (3 US\$/second). Also, it is possible to disseminate information through radio programs that treat subjects related with food</p> <ul style="list-style-type: none"> - Consultancy for the study of impact evaluation includes the gather of evaluation surveys. Duration of one month. Cost 4,000 US\$. - Creation of posters to be displayed in all the places where fish is sold. 10,000 US\$/year. 					
	Continue with the elaboration and spreading of Peruvian Standards for products of the fishing sector	Standards of requirements, of methods, of good practices, harmonized with Codex Alimentarius standards	INDECOPI, private and public sector	<p>It is considered the following costs:</p> <ul style="list-style-type: none"> - participation of members in Peruvian Standards meetings (hours/person, transport) - printing for Peruvian standards 	0	14,000	70,000	70,000	14,000

IV.	Others			- organization of events at domestic level for the spreading of the standards					
4.1	Research and Development	Studies of sanitary conditions where bivalve molluscs are extracted in compliance with D.S.N°07-2004-PRODUCE with the purpose of carry out the sanitary classification and re-evaluation and/or adaptation of fishing extraction approved and sanitary classified	ITP	The areas where bivalve molluscs and other aquaculture products are extracted (included in the D.S. 07-2004-PRODUCE) (bivalve molluscs, equinoderms and tunicates) will be researched. The project would last 4 years and 9 months, the cost assigned for the project implementation is \$144,700	14,470	0	0	14,470	2,894
TOTAL					7,357,470	1,072,300	5,361,500	12,718,970	2,543,794