

Cusco Regional Development Project

EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE CUSCO REGIONAL DEVELOPMENT PROJECT (P117318): CUSCO LANDFILL AND ASSOCIATED FACILITIES

August 7, 2013

1. Introduction

The Cusco Regional Development Project under consideration for financing by the World Bank consists of four components:

- *Component 1: Development and Consolidation of Tourism Services.* The objective of this component is to improve the quality and coverage of tourism services in the Sacred Valley and surrounding areas. The component will achieve this through consolidating “classic” tourist attractions by expanding and improving infrastructure, providing improved access to sites, internal walkways and signage, and by providing technical assistance and knowledge to position small and microenterprises in the market.
- *Component 2: Integrated Solid Waste Management.* The objective of this component is to improve local capacity for cleaning of public spaces and to efficiently collect, transport and dispose of solid waste in the provinces of Cusco, Calca and Urubamba. The component includes investments in provincial municipal solid waste services to improve solid waste disposal and composting; investments in District-level solid waste services to improve collection, recycling, and cleaning of streets and public spaces; technical assistance and capacity building for improved solid waste services; and communication on the implementation of project works and promoting adequate waste management practices in communities.
- *Component 3: Disaster Risk Management and Disaster Preparedness.* The objective of this component is to increase the resilience of the local population, tourists, and infrastructure in touristic areas with high vulnerability to natural disasters. The component will achieve this through designing and implementing early warning systems for selected locations; designing and implementing an integrated approach to the reduction of geological and climactic risks, and integrated approach to mitigate external geodynamic risks in selected micro-basins; and development of an updated Disaster Risk Management Plan for the Sacred Valley.
- *Component 4: Institutional Strengthening, Management and Monitoring and Evaluation.* This component will support the capacity building of the Project Coordination Unit within COPESCO and other principal institutions involved in the operation of tourism activities in the Sacred Valley. Activities will include commercialization and positioning of tourism products and services in the domestic and international markets; collection of baseline data for later evaluations and follow up analyses; and enhanced capacity for project management, project audits, and monitoring and evaluation of project results.

The Project is located in the Cusco Region in Peru, specifically in the provinces of Calca, Urubamba, and Cusco. The population within the sphere of the proposed project is approximately 563,202 people, distributed throughout the provinces of Cusco (population 427,580), Calca (population 72,583) and Urubamba (population 63,039). Due to its historic and cultural heritage, the Cusco Region is one of the most visited tourist destinations in South America and is the principal tourist destination in Peru, accommodating 88% of the country’s international visitors.

The Project will be implemented by the Regional Government of Cusco. The Government has transferred the implementation responsibility to PER Plan COPESCO. COPESCO is an agency with deep understanding and experience on project implementation, has previous experience working with World Bank financing, and has been leading the preparation of the Project, with the associated environmental and social safeguards documents, consultations and processes. COPESCO has gathered sufficient institutional capacity to cope with safeguard issues, and has established an experienced project coordination unit with both environmental and social experts knowledgeable of Peru's and Bank's requirements; COPESCO has also agreed to strengthen its environmental and social team to ensure adequate capacity during project implementation.

The potential positive long-term outcomes associated with the Cusco Regional Development Project include: improving the quality and coverage of tourism services and thus increasing the positive economic and social impacts in the Sacred Valley and surrounding areas; improving local capacity to efficiently collect, transport and dispose of solid waste, thus reducing negative environmental and health impacts and promoting sustainable development; the appropriate closing and clean-up of existing informal dumpsites, thus removing potential focus of infections and environmental degradation; and reducing the vulnerability of the local population, tourists, and infrastructure in touristic areas to natural disasters.

The Cusco Regional Development Project is classified as Category A according to World Bank Environmental Assessment OP/BP 4.01 based upon one sub-project, the moderate sized landfill in Cusco ("Expansion and Enhancement of the Integrated Waste Management System in the Cusco Province - Cusco Region") to be developed under Component 2, even though this landfill is expected to improve the environmental sustainability of solid waste management in the region. The works associated with components 1 and 3 involve relatively small infrastructure works with potential environmental or social impacts that are short-term, not significant, and readily prevented or mitigated with standard measures. There are no anticipated significant negative indirect or long-term impacts related to the project.

A summary of expected impacts per component, and the plans developed for their proper management, are described below.

Components 1 and 3. The objective of Component 1 is to improve the quality and coverage of tourism services in the Sacred Valley and surrounding areas. The component will include various sub-projects targeted towards consolidating "classic", already existing and operating tourist attractions by expanding and improving infrastructure, providing access to sites, internal walkways and signs; and developing small and micro-enterprises through a pilot *Fondo Concurable*, facilitating access and use of new technologies and knowledge to position themselves in the market. The main potential environment impacts are likely due to construction works associated with rehabilitation of existing roads to existing tourism sites, which, however, are not anticipated to cause significant environmental impacts. Other potential impacts relate to works that will be carried out within or near existing archaeological sites. However, there are strong Peruvian regulatory procedures and oversight related to any such works, such as the presence of an archaeologist/architect during works and continuous monitoring and reporting to the authority (the Ministry of Culture). Anticipated impacts related to activities of Component 3 are similar. Component 3 aims at reducing risk of natural disasters (floods, landslides, etc.) in the valley, both from a management perspective (e.g., with early warning systems, capacity building

and others) and by performing some infrastructure works (e.g., stream bank stabilization, stabilization of lagoons located upstream of populated sites and others). The main potential environment impacts are likely due to construction works that may occur in stream/river banks, which are relatively minor in size and nature, and are not anticipated to cause significant environmental impacts.

For the management of impacts related to Components 1 and 3, an Environmental and Social Management Framework (ESMF) has been developed. The ESMF explains, amongst other things, the types of impacts expected, and the mitigation and management measures required. As part of the ESMF, a Social Assessment, an Indigenous Peoples Planning Framework, and a Resettlement Policy Framework have also been prepared according to the requirements of World Bank policies on Indigenous Peoples and Involuntary Resettlement.

Component 2. This component will provide the Cusco Region with an improved solid waste management system, through the improvement in collection routes, urban containers, collection trucks, and ultimately the construction of 3 landfills (Cusco, Calca, and Urubamba). This is expected to have important environmental benefits in the greater Sacred Valley, through a reduction in public health risks and environmental damage caused by inappropriate handling of solid waste, reduction/elimination of damages caused by existing informal dumpsites, and improvement in waste collection, transportation and proper final disposal. An Environmental and Social Impact Assessment (ESIA) has been developed for each landfill. Each ESIA addresses environmental and social impacts, risks, and benefits, and includes an Environmental and Social Management Plan (ESMP). In addition to the ESIA's for the three provinces, a number of instruments have also been prepared in order to better manage environmental and social benefits and impacts, and to ensure compliance with World Bank safeguard policies, summarized below.

For the Cusco landfill (which is the only investment large enough to warrant Category A for the project), an Abbreviated Resettlement Plan (included as Annex 8 of the ESIA and titled "*Plan de Compensación*") has been developed to ensure compensation at full replacement cost for losses of assets. This plan includes investments and activities aimed at improving the quality of life of the communities that surround the new location. A Social Inclusion Plan has also been prepared to support the transition of waste-pickers and informal recyclers to a new regime that will enable them to collect recyclable materials at the source, improve their working conditions, and increase their income. The Social Inclusion Plan will also assist waste-pickers who want to diversify their sources of income by developing other types of businesses.

For the Calca landfill, in addition to the ESIA and its corresponding ESMP, an Abbreviated Resettlement Plan (included as Annex 8 of the ESIA and titled "*Plan de Compensación*") has been prepared, with a scope and content that is similar to the one for Cusco. In addition, an Indigenous Peoples Plan has been prepared to deliver benefits to the neighboring communities.

For the Urubamba landfill, in addition to the ESIA and ESMP, and similarly to Calca, an Indigenous Peoples Plan has been prepared. No resettlement plan is necessary, since the land where the landfill will be located belongs to the Municipality and is free of occupants.

All the documents and instruments aforementioned have been – or are currently in the process of – being disclosed to the public and consulted, and also disclosed through the World Bank's InfoShop web site.

Most of the activities and investments of the Project are relatively small in nature and do not cause any anticipated significant impact, the only exception being the Cusco landfill. It is for this investment alone that the Project has been categorized as A. This level of categorization was given in relation to the irreversible nature of land use at the landfill site, as well as potential risks for water and soil contamination if technology, operational or infrastructure were to fail. The construction technique, by itself, will allow for the minimization of these risks, and for the re-utilization into non-habitational uses of the land once the facility is properly closed.

The following sections of this executive summary will focus exclusively on the Environmental and Social Impact Assessment (ESIA) conducted for the Cusco landfill, and will describe the different analyses and studies that have been prepared to ensure an appropriate environmental performance of the facility during planning, construction, operation and closure. The ESIA has been developed for the Expansion and Enhancement of the Integrated Waste Management System in the Cusco Province - Cusco Region (Cusco landfill project) based upon Peruvian environmental regulatory requirements and World Bank safeguard policies. The ESIA addresses project alternatives, environmental and social baseline conditions and potential impacts, presents an Environmental and Social Management Plan (ESMP), and summarizes public consultation activities. The following is an Executive Summary of the ESIA.

2. Analysis of Alternatives

In order to define the type of final waste disposal in Cusco, and its location, two main alternative analyses were performed: one was related to the best available technology to be applied for waste disposal (e.g., several local landfills, a regional landfill, and other combinations including transfer stations); and another was a site selection analysis, which was also performed based upon the selection of landfill technology. It included various technical, environmental and social factors and took into account stakeholder input.

The no-project alternative, given Cusco's situation, is not an option. Most of Cusco's solid waste is currently being brought to the Haquira dumpsite. This location is reaching its maximum acceptance volume of waste, and its life expectancy is currently estimated in two years or less. A solution for this situation is urgently needed, because once the maximum capacity is reached, there will be no place to securely dispose Cusco's waste. Needless to mention, this situation would involve huge negative impacts.

Waste Management Technology

Existing information was studied and analyzed to identify and assess potential alternatives to meet the needs of a valley-wide "integral" solution to the waste management problem. These alternatives were analyzed in depth through a dedicated study and included regional solutions, solutions by basin, and solutions by demographic distribution. The landfill option was identified

as the most suitable solution. The alternatives also considered the possibility of including transfer stations to collect solid waste from the most remote populations. The regional study indicated that the most suitable final disposal alternative is the implementation of one landfill for each of the provinces of Cusco, Calca, and Urubamba. Landfill design method alternatives, such as the trench landfilling method, the area method, and the cell operation method, were considered for the landfill's infrastructure design. When issues of landfill management, political context, amount of waste generated by province and distances were taken into account, the option of one landfill per province resulted as the best one. The mechanized, sanitary landfill technology was proven to be the most cost-effective for the region, the most widely applied, and the one whose operation and management would suit best within the regional context.

Landfill Site Selection Analysis

Article 67 of Peru's Supreme Decree 057-2004, Regulations of the General Law on Solid Waste, establishes the minimum criteria for the selection of areas for solid waste disposal infrastructure. These criteria were used for the landfill site selection study for this project. The criteria include:

- Harmonization with land use and urban expansion plans.
- Harmonization with the provincial plan of integrated solid waste management.
- Minimization and prevention of negative environmental and social impacts that may result from construction, operation and closure.
- Consideration of climatic, topographical, geological, geomorphological, and hydrogeological factors.
- Prevention of health and environmental risks.
- Preservation of the archaeological, cultural and monumental heritage of the area.
- Preservation of natural areas protected by the State and conservation of renewable natural resources.
- The area's vulnerability to natural disasters.

The assessment also considered other factors, such as availability of land, whether by private owners, associations, or *campesino* communities, and included social considerations such as distance from the site to the nearest inhabited center. Based on a multi-criterion assessment, potential areas/sites were selected. After evaluating each potential site, the one with the greatest potential for implementation of the landfill complex was identified. As a result of the assessment, the area known Huancabamba, located in the district of Cusco, was selected.

3. Project Description

The Expansion and Enhancement of the Integrated Waste Management System in the Cusco Province - Cusco Region Project (Cusco landfill project or "Project") consists of segregation, collection and transportation, a pilot treatment plant and landfill infrastructure components.

Landfill

The landfill is designed for a capacity of approximately 350 tons of solid waste per day. The landfill will have a useful life of 10 years. It will receive only municipal solid waste; no hazardous waste will be accepted in the landfill. The site area is approximately 40 hectares. The maximum height of waste in the landfill will be approximately 45 meters.

The landfill will have the following facilities: a landfill entrance (control point), recycling/composting operations, pilot treatment plant, landfill cells, leachate collection, gas collection, storm water runoff control, water supply, sanitation, electricity, and an office and maintenance area.

The landfill cells will comply with the requirements of existing law and will have waterproofed bases, leachate drains and gas drains. Perimeter drains for rainfall and a perimeter fence are planned. The leachate drainage will consist of a horizontal network of stone trenches at the bottom of the cell. To capture and channel leachate within the landfill, there will be hydraulic perforated PVC pipes (drains) through triangular section trenches. These drains will be dug into the ground and made waterproof using a geomembrane and filled with gravel and a layer of sand. The cells and leachate pool will be waterproofed using a high density polyethylene geomembrane. An additional leachate pool, covered to avoid increasing volume due to rainfall and with an adequate slope, will be built.

Leachates will be collected and re-distributed to the landfill cells. Leachates will be channeled to and stored in a waterproofed basin with a geomembrane and high density polyethylene to ensure no infiltration. The basin will be covered to prevent rainfall from entering. The location will be defined according to the slopes, and the ease of implementing the conduction and storage system for the leachates. A second leachate basin is planned for contingency purposes.

The project provides for the installation of a rainfall drainage system to prevent storm water runoff from external areas from entering into the waste landfill cells. For the biogas generated, a system of collection and chimneys is recommended to allow for its burning.

The construction of an internal access road to transport waste from the entrance of the landfill to the waste disposal area is planned. The landfill will be completely fenced (height of 2.2 meters). The perimeter will also be re-vegetated.

The machinery planned for transport operations and compaction both of waste and coating material is comprised of trash compactors, a crawler loader, a backhoe and a wheel loader. The project provides for the acquisition of tools and equipment as necessary.

Pilot Treatment Plant

The plant will have an unloading area and an inorganic waste treatment platform, and will process collected waste, which will come directly in compactor collectors. The pilot plant is expected to be large enough to treat organic waste from each district's market, as well as

inorganic waste from previously selected population centers (schools, restaurants, universities) in which selective collection at the source is established.

A system for composting organic material by manual turning of 1.25 meter stacks located on modules 34 meters long and 7.8 meters wide is planned. The expected duration of the process is 90 days. The facility has 3 zones equipped with a deck, storage area for organic material, modular composting area and a compost storage area. The establishment of a single line of treatment for inorganic waste triage and for the elimination of contaminating impurities of organic waste, which has advantages related to lower investment costs, is also planned.

4. Regulatory Framework

Peru

Peru's Political Constitution establishes the right of every person to enjoy a balanced environment suitable for their development. Likewise, it gives the State the role of determining the national environmental policy, and promotes the sustainable use of natural resources.

The General Environmental Law (Law No. 28611) provides, inter alia, that environmental impact studies are management tools that contain a description of the proposed activity and the direct or indirect effects expected of such activity on the physical and social environment in the short and long term, as well as the technical evaluation of those effects. These studies should indicate the measures necessary to avoid or reduce damage to tolerable levels.

Moreover, specifically with respect to environmental studies, the guidelines are established in the National System of Environmental Impact Assessment (SEIA). The guidelines for this system are found in the System of Environmental Impact Assessment Act (Law No. 27446). The SEIA is a single, coordinated system of identification, prevention, monitoring, control and anticipated correction of negative environmental impacts of public and private investment projects that contain activities, construction or works.

The project, as per DIGESA's requirements (the Directorate General of Health), has developed a Category II environmental impact assessment.

Moreover, the Rules for the Environmental Impact Assessment System (Supreme Decree No. 019-2009-MINAM) detail the classification procedures and review of environmental studies, the public participation component to be developed, as well as the dynamic nature of Environmental Impact Assessment throughout the investment project. The preparation of this study is aligned with the guidelines of this Act.

World Bank Safeguard Policies

The ESIA was developed taking into account the requirements of the World Bank Safeguard Policies (OP 4.01 Environmental Assessment, OP 4.04 Natural Habitats, OP 4.10 Indigenous

Peoples, OP 4.11 Physical Cultural Resources, OP.09 Pest Management, and OP 4.12 Involuntary Resettlement).

5. Environmental and Social Conditions

Project Location

The area proposed for the infrastructure of the landfill is privately owned. The site has a total area of 40 hectares, which are part of a property of 75.88 hectares. The owner is a member of the Association of Agroecological Producers of Pucará. The land is located in the district of Cusco, Cusco Province, Department of Cusco, at about 3900 meters above sea level.

Access to the project site is divided into three parts. The first is a paved road that starts in Cusco and ends before the site. The second part is an unpaved road of approximately 6.5 kilometers that ends in the Ccorca area, and finally a 0.5 mile dirt road to the point of entry to the site.

Environmental Area of Influence

The area of environmental influence - direct and indirect - has been determined according to the location of the components of the project and the extent of predicted impacts in each of them. Since there are no areas that can contribute with materials (quarries, etc.) or other sources of natural resource use outside the boundaries of the premises, the Area of Direct Influence (ADI) is confined to the area of location of the project components.

The ADI of the project is an area of 1,000 meters surrounding the project site and includes the population centers of Ccocha Ccochayoc, Huchuy Llanacancha, Huamacancha, the *campesino* communities of Huancabamba and Hayllacancha, and the Smallholders Association of Haquira Grande. The Area of Indirect Influence (AII) of the project is a range of 1500 meters surrounding the project, to the east, west, south and southeast, and an area of 4.8 kilometers to the north and northeast along the boundary of Querahuayllo Quebrada, belonging to the Cachimayo micro-basin.

Environmental Baseline

Studies and descriptions of the environmental baseline have been developed in the project's ADI.

The wind direction is predominantly from the SSW, with a frequency of 23%, and 0% calm recorded throughout the measurement. Regarding speed, in general, average speed was 8.02 Kilometers/hour. Average speed from the SSW was 5.56 Kilometers/hour and the highest and lowest speeds from the SSW were 11.3 Kilometers/hour and 1.60 Kilometers/hour, respectively. According to this, the location of the landfill in relation to the existing and projected population centers is favorable because, according to the prevailing wind direction, some houses of the Huancabamba community are located upwind from the premises. No population centers, rather a

natural barrier, are located downwind from the premises, minimizing the chance that the generation of particulate matter (construction) and odors (operation) will affect populations.

The average temperature recorded in the project site area was 6.7 ° C, the maximum temperature was 17.00 ° C (at 15:00 hours) and the minimum temperature was 0.20 ° C (06: 00 hours). The precipitation occurs as rain, with no records of snow or hail in the area, however the residents have reported the occurrence of occasional hail.

The average humidity recorded in the project site area was 71.15%, the minimum humidity was 99.00% (at 08:00 hours) and the maximum humidity was 15.00% (at 13:00 hours).

The project area has altitudes ranging from 3,960 to 4,060 meters above sea level with a 13% average slope. It is located in the west of the Valley of Cusco, belonging to the Sub basin Sipaspujyo (Cusco). The valley axis is a temporary river bed with temporary tributaries that lead to the ravine of Sipaspujyo. The study area consists of a succession of small sub-parallel type ravines, the most important of which is Cañaroyoc.

The Cañarayoc deformation structures, which show very active past internal geodynamics, were noted, due to the structures showing signs of fracturing, like in sandstone and shale outcrop.

The following land uses were identified in the area: urban land distributed throughout access roads, land cultivated with vegetation, land with natural vegetation, forest land, and unused and / or unproductive land.

The air quality was analyzed for the following parameters: particulate matter, gases, and noise levels. For these parameters, the monitoring results show that they are within the values of the regulations on environmental quality standards.

Regarding the characteristics of the surface water, samples were taken at three points, one inside the ADI, one in the AII, and one outside the ADI. According to the laboratory results, the concentrations of total metals analyzed all the three sampling points are within the standards set for water for category IV (Water Environment Conservation), with the exception of total Zinc, which slightly exceeds these limits in one of the measuring points. This result does not imply toxicity of the water. Moreover, the copper, zinc and manganese micronutrients are essential for growth of aquatic organisms, as opposed to lead and cadmium, which are toxic.

The results indicate that the amount of fecal coliforms does not exceed the limits established in the ECA for categories IV (2000 units/100ml) in all sampled points in both the dry and wet season. As for total coliforms, a point beyond randomly controlled trials (300 units/100ml) yielding 220,000 units/100mL, is observed during the wet season. This indicates the presence of animal feces. It is likely that this is due to storm water runoff from upstream grazing areas.

Biological baseline

In regard to flora, there is natural vegetation typical to the high areas of the Andes, where mixed “pajonal” formations dominate the view. In the lower areas there are scattered “puna” grass

formations. Likewise, eucalyptus forests (species planted by the owner for local use) were observed in the project area. Bushes are predominately *Baccharis ororata* "Tayanca" and are largely located in the zone close to the Cusco-Ccorca road.

The study area is located between the Subtropical Mountain Forest (bh-MS) and Very Humid Subtropical Subalpine Paramo (pmp-SaS), ranging from 3,950-4,060 meters above sea level. The area has temporary cultivation areas characterized by presenting annual herbaceous formations, and vegetation formations typical of highlands are found, for example, "pajonal" and "puna" grass, Scrub, Roquedal, and Eucalyptus Forest.

The bird fauna assessment registered *Colaptes rupico* / a "Carpintero Andino", *Zonotrichia capensis* "Gorrión de Collar Rufo" and *Turdus chiguanco* "Zorzal Chiguaco". The mammal fauna assessment registered *Concepatus chinga* "zorrino" and *Akodon* Sp. "ratón campestre". No amphibians or reptiles were registered.

Among the species of fauna listed by sighting, bibliographic recollection, and interviews with residents, none was observed to be protected by Peruvian conservation legislation (DSW034-2004-AG).

The area has widely distributed habitats as part of the high Andean ecosystems. These ecosystems are subject to human activity, which includes footpaths and longstanding agricultural and livestock activity.

The natural habitats present in the proposed landfill site do not have any conspicuous or particular characteristics that demand protection or use restriction, since they have been affected by human intervention. These spaces are home to typical flora and fauna, not belonging to any conservation category (except *Opuntia cactacea floccosa* Ia belonging to Appendix II of CITES and *Megalopterus phalacroboenus* belonging to the same Appendix).

The landscape is characterized by a dense vegetation cover dominated by "pajonal". There is human intervention in the form of pedestrian access, grazing, and the extensive agriculture performed by the owner during the rainy season.

The area of influence is not within the limits of any Protected Natural Area. The Protected Natural Areas closest to the evaluated zone are the Historical Machu Picchu Sanctuary and the Mantamay Private Conservation Area located at approximately 70 kilometers and 37.42 kilometers, respectively, from Huancabamba.

There are no identified areas of significant natural habitats or critical natural habitats in the direct area of influence.

Social and Cultural Baseline

The Association of Agro-ecological Producers of Pucará, where the property to be sold to the project is located and which belongs to the district of Cusco, is within the social area of influence. The Campesino Community of Huancabamba (*Comunidad Campesina de*

Huancabamba), from which the Association separated, also in the district of Cusco , has also been considered. There are 26 families registered in this community, which owns a total area of 550 hectares. It borders the districts of Poroy and Ccorca. Likewise, the Haquira Grande Smallholders Association, belonging to the district of Santiago, is in the area of direct influence. This Association has more than 100 members. Currently, some members of the Association are trying to divide it by lots.

The three districts bordering the Association of Agro-ecological Producers of Pucará, i.e., the districts of Ccorca (Campesino Communities of Tamborpugio, Huayllay Quishuarcancha and Cusibamba), Poroy and Santiago, are considered within the area of indirect social influence. The criteria used is based on the perception of some communities, interest groups, and associations belonging to these districts, who might consider themselves affected by the construction of the landfill.

The Peruvian district of Cusco is one of eight that form the province of Cusco, located in the Department of Cusco, under the administration of the regional government of Cusco, Peru. To the north, it borders the provinces of Urubamba, Galea and Anta. To the east, it borders the district of San Sebastián. To the south, it borders the districts of Wanchaq and Santiago, and to the west, the districts of Poroy and Ccorca. The district of Cusco has an area of 116 square kilometers, and is at an altitude of 3,414 meters above sea level. According to the Population Census of 2007, there are 108,798 inhabitants and population density is 936.1 people/kilometer. Two point ninety-five percent of the population of Cusco province is urban, while only 5% is rural. Forty-nine percent of the population is male, and 51% female. While city of Cusco is a magnet for migration flows from rural areas of southern Peru, foreign population shifts at various times due to various factors. The results of a national household survey on living standards and poverty in the fourth quarter of 2002 reveal that 17% of the population is poor and 34.8% live in extreme poverty. This percentage is high, bearing in mind that in Peru, 54% of the population is below the poverty line, and 24% live in extreme poverty. An important explanation to understand the poverty situation can be found in the income distribution levels. Excessive inequality and income concentration limit the positive effects on poverty reduction that could be expected of sustained economic growth, although there are other factors, such as access to education and health services, which can also explain a country's poverty and social exclusion.

The Huancabanca Rural Community, located in the district, province, and department of Cusco, has a total area of 595 hectares. It borders the districts of Poroy, Ccorca (Huayllay Quishuarcancha and Cusibamba communities), Santiago (Haquira Grande Smallholders Association) and the Association of Agro-ecological Producers of Pucará, which also belongs to the District of Cusco. The Community of Huancabamba is located at an average altitude of 3,800 meters above sea level.

The Huancabamba Campesino Community is considering becoming an association to allow each family to have individual property titles to be able to sell or otherwise use their land. The Community of Huancabamba has frequent interactions with Cusco because of its proximity. An incident in which a group of villagers left the community to constitute themselves in an association is evidence that part of the community has different goals in terms of their beliefs regarding communitarian organization. This, in turn, restructures the sense of community. Nevertheless, some traditional cultural and organizational practices remain valid. There is no

predominance of Quechua relative to other languages. In some aspects of production, there is still dependence on the natural resources of the land. There are no traditional authorities, and customary law is not applied. Agricultural activities are carried out, albeit with few ancestral practices oriented towards the conservation of biodiversity. The 'pago a la tierra', the 'ayni' and the 'minka' are widely practiced in the region as well as in the Huancabamba community. The Huancabamba Community has common use areas (belonging to all community members) for grazing or crop rotation. Also, plots are adjudicated to the villagers (each person has an independent plot) or assigned for their use. Based on communal agreements, these plots transfer through inheritance, making each registered person the owner of their land.

The Association of Agro-ecological Producers of Pucará, is composed of 30 members, who withdrew territorially from the Huancabamba Campesino Community in 2009. It holds 660 hectares. The statutes of the organization are still to be reformulated. Mr. Eustaqui Ttupa, owner of the Huancabamba premises, has given power of attorney to his son, Mr. Gaspat Ttupa, to perform various processes, including selling the property.

The Haquira Grande Smallholders Association belongs to the district of Santiago. In a section of its territory lies the "Haquira" dump, which is the current final disposal site of solid waste in the Cusco province. It brings together more than 100 members, but the groups that are part of it are arranging its division by lots. Specifically, "Haquira Grande", the lot located the closest to the dump, has only 45 registered members. Despite this distribution, the different organizational groups still maintain some level of coordination and common interests. While the Haquira Grande Smallholders Association was never a rural community, the first reference appearing in secondary sources treats it as such and other references call it a peasants' group. Even some residents of nearby communities mistake its organizational nature. The representatives of this association have sent an official letter to the Municipality of Santiago to clarify the fact that they are not a Rural Community because when coordinating and establishing agreements with various institutions, its status as a social organization should be clear. This is useful in evaluating, in a precise manner, the possible impacts at the cultural level and designing community relation strategies, for example, in the framework of this project for the comprehensive management of solid waste.

As for the physical cultural heritage in Huancabamba and its surroundings, there is no record of archeological remains or other evidence of material historical evidence. Neither the Cusco Master Plans that consider the Historical Town and the Historic Sanctuary of Machu Picchu, nor the Atlas of Infrastructure and Cultural Heritage of the Americas: Peru (IDB-Ministry of Culture 2011), contain any record of archaeological remains located in places near the community, let alone the specific area of the landfill. Nevertheless, considering that the construction and operation of the landfill involves excavation and earthmoving, a Certificate of Inexistence of Archeological Remains (CIRA) is necessary, in compliance with national legislation. The process for obtaining this document has been carried out.

6. Evaluation of Environmental and Social Impacts

The ESIA made a detailed and systematic analysis of all potential impacts that could arise as a result of planning, construction, operation, closure, and post-closure of the Cusco landfill project.

Based on the detailed description about the characteristics of the proposed infrastructure, and a thorough characterization of social and environmental baselines, the type and magnitude of impacts to the atmosphere, soil, water, landscape, fauna, flora, population, cultural patrimony, territory, local economy and local safety was estimated. This has been done using a series of matrixes that relate the different project components during the different stages of implementation to the different environmental and social compartments, and then the types of impacts are rated on a scale that goes from very high, to high, moderate, negligible, and beneficial. The full description of impacts and their qualitative and quantitative analysis is captured in the ESIA report.

In summary, the construction environmental impacts are considered to be relatively minimal, and easily mitigated with standard mitigation measures. Potential adverse impacts during operation include odors to neighboring communities, visual impacts, truck traffic and increased noise due to waste transportation, contamination of waters caused by leachate, slope erosion due to cuts in the terrain, and security risks such as gas accumulation in the new landfills. The project does not contemplate any significant negative impact, including on natural habitats or on physical cultural resources. The ESIA did not identify any potential likelihood of encountering physical cultural resources. The Project does not involve the purchase or use of significant quantities of pesticides. However the project may involve the relatively minor use of pesticides during the operation of the landfills to control vectors (rodents, insects).

The project will be built on a 40-hectare lot, which will be acquired from a member of a farmers' association. The lot is free of dwellings and other structures and, therefore, land acquisition for the project will not cause physical displacement (relocation). However, an Abbreviated Resettlement Plan (Annex 8 of the ESIA) has been prepared to guide the land acquisition process and ensure that any potential adverse impact from this transaction is appropriately addressed.

Design phase

There are few positive or negative impacts identified during the preparation and design phase. Some positive impacts have arisen as a consequence of the consultation process.

Construction phase

In the construction phase, air quality could be negatively affected due to generation of noise and particulate matter. These impacts are categorized as moderate, mainly due to their extension and their specific character, as they will be generated during land clearance for the cells, roads, and complementary infrastructure. Secondary impacts, related to the building process itself, would be considered negligible, as their negative consequences would be minimal due to their extension and intensity.

The impacts of land clearance and movement, through the generation of particulate material and increased noise at specific stages, and are categorized as moderate. Land clearance activities will have the most impact due to the generation of particular matter and the increase of noise levels during specific stages. For this reason, the impacts have been categorized as moderate.

The main impact on the soil will be related to the brush-clearing and earth-moving work. The organic productive soil will be stored, maintained, and even improved to be used later as final

coverage material for the recovery of the terrain once the waste disposal cells are closed. Significant impacts in water could be generated during the land leveling process, as some leveling and redistribution of soils will be required.

Three activities in the stage of construction are recorded with the highest positive impacts:

- Construction of the hedgerow with exclusively positive impacts, namely job creation, economic activities, and all factors corresponding to landscape, fauna and flora;
- Soil waterproofing treatment with positive impacts corresponding to soil improvement and strengthening resulting from its care and conservation;
- Construction of a monitoring and control booth, administrative infrastructure, and warehouses, with positive impacts corresponding to job generation and economic activities.

Likewise, the negative impacts with the highest values at this stage correspond to the following activities: Cleaning and brush-clearing due to their impact on the soil quality relating to the landscape, fauna and flora and trench excavation because of its predominant effect on the landscape, fauna and flora. There are no identified significant impacts to natural habitats or critical natural habitats.

Operation and Maintenance

The main potential impacts for air quality will be the noise level, generation of particulate matter and gas emissions. As these are specific and of short duration, and therefore easy to mitigate, they are categorized as moderate impacts.

The negative impacts in this stage are the following:

- Traffic flow, due to gas emissions and the generation of suspended particles
- Waste transportation, because it generates high negative impacts in the air due to gas emissions, foul odors, and suspended particles, as well as effects on the landscape by disturbing and modifying its natural composition on a daily basis.
- Potential contamination of ground or surface water.

There could also be negative impacts related to the occupational health of the staff if proper safety and health measures are not implemented.

The positive impacts with the highest values at this stage correspond to the following activities:

- Waste transportation, due to job generation, public health benefits and community involvement.
- Maintenance activities, due to job generation corresponding to vegetation coverage.

Closing Stage

In the closing stage, the highest positive impact values are related to soil recovery, landscape improvements, and recovery of natural air, soil, fauna and flora conditions. Revegetation due to soil recovery, and the generation of a morphology tending to be as natural as possible, would

improve landscape conditions. Revegetation will return reuse capacity to the soil, positively impacting the air, soil, landscape, public health, occupational health, and the local economy. Negative impacts could be related to cell sealing and the installation of gas burners, which negatively affect air quality in a very specific and short timeframe.

Social Impacts

Due to the background of the current operating conditions in the existing Haquira dump, there will be a negative perception of the new landfill, potentially causing a decrease in land value. However, as the operation and maintenance of the landfill reflects the technological and protection processes, and the surrounding plots improve their conditions of use, the perception of the conditions and characteristics of the terrain will shift. This may allow the land values to increase, reaching their highest levels after the landfill closes and its land becomes fit for parks and recreational use.

One potential social impact that the construction, implementation and operation of the sanitary landfill could generate is a barrier impeding the free passage of the neighboring populations due to the perimeter fence that will be built for security, sanitary and environmental protection reasons. In this context, the current custom of having animals graze in the lowlands will be affected. However this is restricted to the very limited landfill area and the small number of people/animals.

The area required for the Project (40 hectares) will be purchased from a member of the Association of Agro-ecological Producers of Pucará, who will retain 36 hectares (the total area of the property affected is 76 hectares). The area to be acquired is free of dwellings and other structures. COPESCO and the affected landowner signed a “pre-purchase” agreement in May, 2013.

7. Environmental and Social Management Plan

The objective of the Environmental and Social Management Plan (ESMP) is to prevent, correct or mitigate the possible environmental and social impacts generated within the project's influence area and owing to its implementation. The ESMP was developed based upon the assessment of the anticipated environmental and social impacts in the ESIA.

The commitment set out in the ESIA, as well as the technical and political commitments of the participating institutions, will allow for the proper operation and maintenance of the landfill in order to ensure non-pollution and to establish the trust of the community.

Various potential negative environmental impacts and risks will be prevented or mitigated by the use of strong technical landfill design and operation standards and procedures, including landfill cell design, leachate collection, biogas collection, and storm water runoff control.

The ESMP is based upon a strategy for the avoidance, mitigation or minimization of negative impacts, and the promotion of the positive ones. The strategy has been divided into two plans, one for environmental and another for social management.

Environmental Management Plan (EMP)

The EMP specific objectives include:

- To propose prevention, correction and mitigation measures for the effects on the natural and social environment that could result from project execution.
- To establish guidelines to respond in a timely fashion to any eventuality that may occur during the development of the project activities
- To design measures to monitor and control the negative environmental impacts in the area of influence.
- To link potential negative environmental impacts, environmental actions, and those responsible for their implementation

The scope of the EMP covers each of the stages of the project, covering both the project premises and its direct and indirect areas of influence.

There are six dedicated EMP programs. Each program contains a number of measures and recommendations, targeted towards avoiding or minimizing impacts. It identifies, for each relevant impact, the location where it happens, and the environmental compartment.



The program for the prevention and mitigation of environmental impacts is focused on reducing and mitigating potential impacts during construction. It provides measures for the contractor to follow in the inspection of machinery, workers protection and health, security and order at the construction site, together with other initiatives to protect soil, water, air and population.

The solid waste management program addresses all waste-related issues, targeting reduction, reuse and recycling whenever possible. It indicates how to manage domestic waste, waste water, and industrial (both non dangerous and dangerous) waste. Provisions on which kind of containers should be placed where and with which signage, procedures for accumulation, transport and final disposal are discussed. Several other sources of waste generation during the operation phase (domestic wastewater, leachate treatment, rainwater control, eventual control of rodents, flying objects and others) and their appropriate control are also addressed.

The program for occupational health and safety provides guidelines for the appropriate protection of worker's health and safety. It includes health monitoring campaigns, industrial security plans, protective equipment requirements, and employment conditions.

The program on health, security and environment training is targeted towards raising awareness among workers, ensuring compliance with requirements, and making them more familiar with industrial security, health prevention, environmental protection, and emergency procedures, among others.

The monitoring and control program provides a set of indicators that should be periodically measured to evaluate the environmental performance of the works, identify non-compliances at an early stage, and take the appropriate measures.

The program for the protection of physical cultural patrimony is prepared on a precautionary basis, since no archeological sites or physical cultural rests are expected in the area. However, procedures for appropriate management and handling of chance findings are provided.

The contingency program is aimed at ensuring sufficient level of preparedness against emergencies such as extreme natural events, technical or social emergencies, accidents etc.

A program for closing of facilities has been prepared. It provides best practice on how to seal every cell of the landfill, how to manage gas and leachate production, reduction on landscape impact and others.

The EMP will include procedures and requirements related to chance find management.

Social Management Plan (SMP)

The SMP has been divided into a number of initiatives and strategies, and includes a citizen participation plan, a community relationship plan, and participatory monitoring plans during design, construction and operation.

The citizen participation plan is prepared to ensure adequate involvement of citizens during the definition of the issues, and the design and discussion of solutions. During the implementation of this plan as part of the ESIA preparation, a number of workshops have been implemented, a participatory inspection visit was carried out to the area and its surroundings, and specific consultation sessions with different groups (such as vulnerable waste-picker groups, Association of Agro-ecological Producers of Pucará, and a number of interviews with the community of

Huancabamba and with a number of related civil servants from different municipalities). The plan includes mechanisms to ensure participation during the final stages of consultations, to promote participation and redress mechanisms during project execution (construction and operation), to ensure institutional coordination, efficient communication and outreach, and presentation of documents, among others.

The community relationship plan is designed to promote participatory approaches and to ensure appropriate interaction and feedback with the main stakeholders present around the new landfill site. Its design includes the ongoing implementation of meetings and interviews, directly at the household level and with managerial positions within the communities' organizations; workshops and focal group meetings; mechanisms to promote the participation of youth; organizational strengthening activities; and coordination mechanisms. The plan includes a strategy for temporarily hiring local workers, a worker capacity building program, and a communications program.

A complaint redress mechanism has also been designed to efficiently solve questions, complaints and suggestions.

The participatory monitoring plans, both during construction and during implementation, have been designed to ensure engagement and participation of the main stakeholders for the monitoring and follow up of environmental and social monitoring measures. The plan proposes the creation of a participatory monitoring committee, which would accompany activities throughout the project.

In parallel COPESCO has undertaken constant dialogue and consultation with affected communities and stakeholders. As a result, the EIAS and the Abbreviated Resettlement Plan include investments and other measures that respond to specific requests made by local communities.

Finally, a Social Inclusion Plan has also been prepared to support income-generating programs for waste-pickers and informal recyclers. The Plan has a number of components, one of which is aimed at expanding waste collection at the source by organizations of recyclers and establishing a formal recycling center, another for the promotion of other income-generating activities, and a third targeted to partially fund business proposals prepared by participants.

Responsibilities

The Provincial Municipality of Cusco has ultimate responsibility for the project. COPESCO has been designated to manage project implementation and a Project Coordination Unit has been created, responsible for overall project administration, including social and environmental management.

The implementation of the EMP during the construction stages of the landfill will be the responsibility of the contractor that will do the construction. The construction phase SMPs will be implemented by the Provincial Municipality of Cusco, COPESCO and the construction contractor. The construction contract will require compliance with the ESMP. COPESCO plans

on contracting an independent supervision of the construction, including environmental and social supervision.

The implementation during the operational phase ESMP will be the responsibility of the Provincial Municipality of Cusco, which must designate the necessary personnel to fulfill the different functions required for administration and maintenance.

8. Public Consultations

There has been a steady process during project preparation to keep stakeholders informed and to receive input related to the Cusco Regional Development Project. Since 2011, the Cusco Regional Government, through COPESCO, has been leading a number of activities aimed at explaining the project's scope, objective, main anticipated impacts and mitigation measures.

The public consultation process for the Cusco landfill project has been carried out from the initial stages of project planning. Stakeholder input was received during the waste management selection process. The Terms of Reference for the ESIA were consulted with the population. There have also been consultations on the design and processes raised in the initial profile, as well as the benefits in quality of life related to better services. Likewise, preliminary consultations have been carried out on environmental and social impacts (the impact of changes in source segregation, solid waste infrastructure, transport, transference, environmental education) and the operational implications of waste management processes in the cultural and social sphere. These consultations have all been invaluable inputs for the development of the various environmental and social management plans.

At the institutional level, an Environmental Coordination Technical Group (GTC) was created as a coordinating agency to support the solid waste project implementation process at its various stages. This group is composed of the formally accredited representatives of the institutions involved (provincial and district municipalities, Cusco Public Cleaning Service, Regional Government, Regional Health Directorate, Ministry of Environment, Institute of Water Management and Environment, SERNANP, Regional Directorate of Culture, Association of Biologists, among others).

The consultation mechanisms used during the preparation phase of the ESIA and other studies include: briefings, participative diagnostic workshops, surveys, presentation and consultation meetings, meetings with focal groups, direct consultation through correspondence, and consultation through participation in public spaces.

Consultations have been carried out with stakeholders in the areas of direct and indirect social influence: local, provincial and district governments, Rural Communities in Cusco, local institutions (professional associations, Regional Culture Directorate, National Service of Natural Protected Areas, Regional Health Directorate, Office of Environmental Assessment and Control, Institute of Civil Defense, etc.). Consultations have also been carried out with beneficiaries (Cusco Province), those who perceive themselves as being affected (–the JASS of the Poroy district in Cusco, district of Ccorca), and populations that have environmental concerns, even though they are not opposed to the project (Association of Agro-ecological Producers of Pucará, Huancabamba Campesino Community). Social consultation activities were conducted during the

stages of formulation of the initial profile and elaboration of the preliminary environmental assessment.

The summary of meetings is as follows:

- Rural Community of San Isidro de Carhuis. Anexo Tamborpujio (Cusco). Community Hall (03/24/2011)
- Haqira Grande Smallholders Association (08/10/2011)
- Rural Community of Pícol Orconpujio (Cusco). District Municipality of San Jeronimo, Community Hall. (2011, 08/07/2012, 08/17/2012)
- Huancabamba Rural Community (Cusco, 08/15/2012)
- Meeting with the Ccorca District Municipality (Cusco), which integrates 8 Rural Communities. Municipal Hall (08/24/2012).
- Consultations with vulnerable groups (Waste pickers/recyclers) Cusco (06/17/2012)
- Consultations with the Association of Agro-ecological Producers of Pucará (10/21/2012)

The draft ESIA for the Cusco landfill was disclosed to the public in December 2012, and an updated version was disclosed on July 1, 2013.

While the communities perceive the initial process as damaging due to the potential impacts, including pollution, of the landfill operation, these perceptions could be easily changed as mitigation and compensation measures are implemented, especially in regard to employment opportunities, the improvement of drinking troughs in nearby areas, and the facilitation of daily activities. Likewise, the adequate operation of the landfill will indirectly allow the subsequent closing of the current dump and recovery of the areas it has affected. This will be done by the Regional Government, and the project will provide technical assistance to make sure best practices are known and applied. Furthermore, the potential supply of compost for the improvement of the edaphological characteristics of the soil is an indirect benefit that will change the perception of the communities.

Some rural communities currently perceive the new landfill as the expansion of an infrastructure of the same characteristics as the Haqira dump, translating into a direct contamination impact in the quality of their water sources. It is important to note that, through waterproofing and ecological barrier systems, the engineering design of the infrastructure prioritizes non-filtration and guarantees that water sources will not be affected.

Spaces for conversation, analysis and information exchange with the members of the Sanitation Services Administration Board (JASS) of Poroy will be established to provide ongoing consultation and conflict resolution. The environmental and social management strategies will allow an adequate and continuous process of communication that will ensure that the opinion of the members is taken into account.

Based on the consultation activities undertaken, the project is in the process of consolidating the communication and socialization aspects, in order to restore confidence in those actors who show concern about the risks of the project (pollution), based on current solid waste management practices at the Haqira dump. Most of the communities in Cusco also support the project; however some members of a community in the District of Poroy have expressed concerns related to potential leachates that could pollute their waters.

Annex 1 – List of documents on social and environmental safeguards

<i>Document</i>		<i>Application</i>	<i>Policy</i>
1	Social Evaluation	Project	4.10
2	Consultations with the affected indigenous communities.	Project	4.10
3.	Cusco landfill – Environmental Impact Assessment (EIA), with the Resettlement Plan for land loss attached.	Solid Waste Management	4.01
3a	Cusco landfill – Resettlement Plan	Solid Waste Management	4.12
4	Cusco landfill – Social Assessment	Solid Waste Management	4.01, 4.12
5	Calca landfill – Environmental Impact Assessment (EIA)	Solid Waste Management	4.01
5a	Calca landfill – Resettlement Plan	Solid Waste Management	4.12
5b	Calca landfill – Social Assessment and Indigenous Peoples Planning Framework	Solid Waste Management	4.10
6	Urubamba landfill – Environmental Impact Assessment	Solid Waste Management	4.01
6a	Urubamba landfill – Social Assessment and Indigenous Peoples Planning Framework	Solid Waste Management	4.10
7	Env & Social Management Plan for Tourism and Disaster Risk Management	Tourism and Disaster Risk Management	4.01
7a	Resettlement Policy Framework	Tourism and Disaster Risk Management	4.12
7b	Indigenous Peoples Planning Framework	Tourism and Disaster Risk Management	4.10